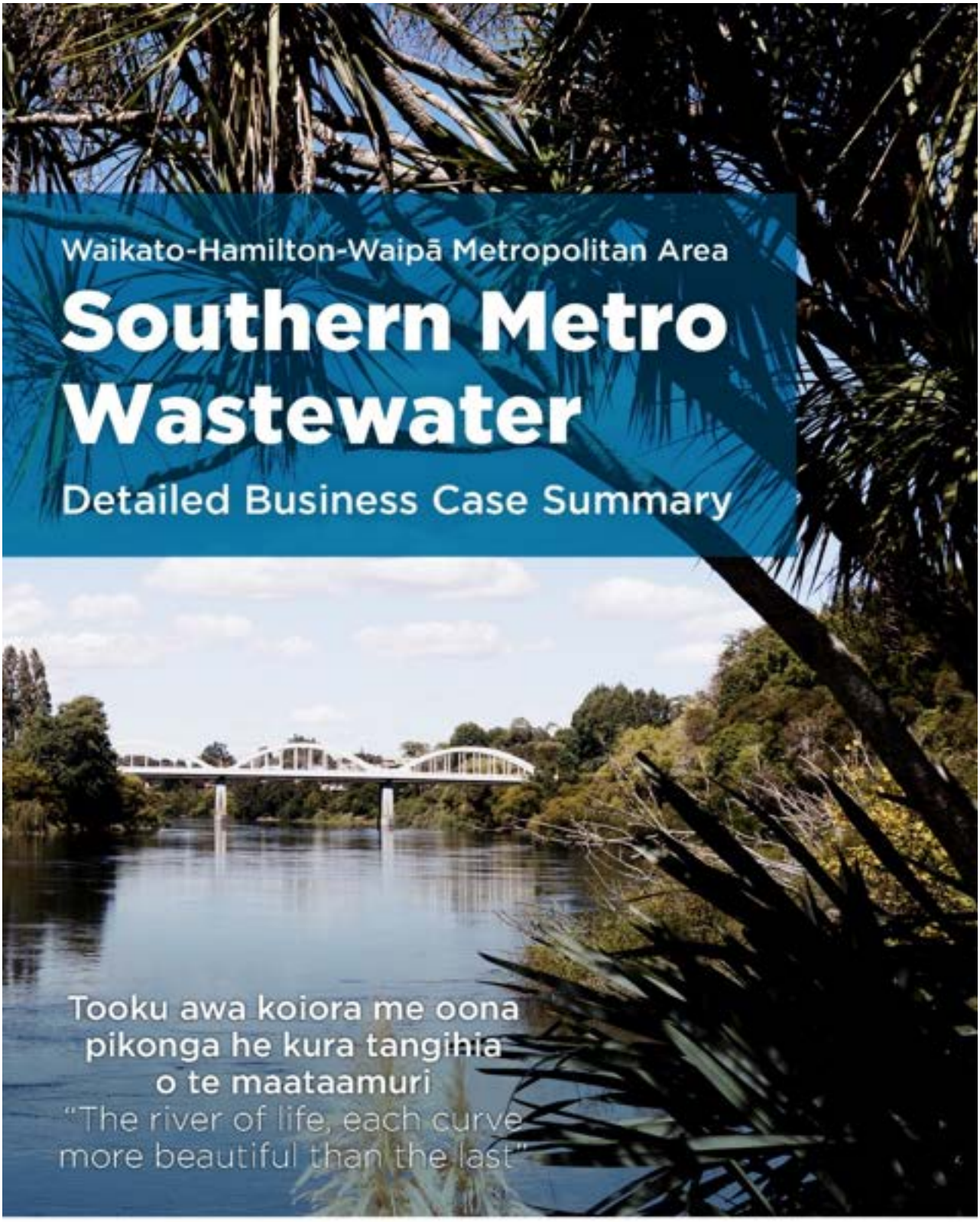
Attachment 1 – Southern Metro Wastewater Detailed Business Case Summary



WAIKATO METRO WASTEWATER

The Waikato-Hamilton-Waipā Metro Wastewater Detailed Business Case project is a collaboration between three councils (Hamilton City, Waipā District and Waikato District) and taangata whenua to identify the best future option for managing wastewater for urban communities in the Metro area.

This document is a summary of the Southern Metro Wastewater Detailed Business Case. The Northern Metro Wastewater Detailed Business Case is under development.

This document summarises five sections of a Detailed Business Case: the Strategic Case, the Economic Case, the Financial Case, the Commercial Case and the Management Case. The full Detailed Business Case (DBC) is available at (add link here).

The DBC investigates and presents a rationale for a new way of delivering long-term wastewater services across territorial boundaries. The work builds on the Waikato Sub-Regional Three Waters Strategic Case (Future Proof, 2019), Waipa District Council – Cambridge Wastewater Indicative Business Case (Waipa District Council, 2019) and the High-Level Waikato Metro Wastewater Assessment (Future Proof, 2020).

A team of specialist consultants were engaged to support delivery of the project including technical investigations and analysis needed to inform the DBC and writing the DBC cases. An independent peer review of the DBC has also been completed to support the overall findings of the DBC.

At the time of writing, the impact of the Government's Three Waters Reform process was unknown. This document has been prepared on the basis of 'business as usual' service delivery structures, noting any proposed structures could transition into new management arrangements if required.

Abbreviations

DBC	=	Detailed Business Case
HCC	=	Hamilton City Council
HUEs	=	Household Unit Equivalents
KPIs	=	Key performance indicators
LGFA	=	Local Government Funding Agency
MCA	=	multi-criteria assessment
NPV	=	Net Present Value
PE	=	Population Equivalent demand
PPG	=	Project Partnership Group
WDC	=	Waikato District Council
Waipā	=	Waipā District Council
WRAL	=	Waikato Regional Airport Limited
WW	=	Wastewater
WWTP	=	Wastewater Treatment Plant

Contents

Introduction

Context

The Waikato - Hamilton – Waipā Southern and Northern Metro Wastewater Detailed Business Cases are being jointly delivered through strong collaboration between the Iwi, mana whenua and Waikato, Hamilton and Waipā Councils.

The Waikato region has seen tremendous growth and development in commercial, industrial, and residential areas, placing pressure on existing wastewater services and creating further demand for wastewater treatment and management services.

The collaborative relationships established to deliver this project represents the era of co-management in respect of the Waikato River and activities within its catchment and joint recognition of the benefits of "boundaryless" planning to restore and protect the health and wellbeing of the Waikato River and meet the current and future needs of the Metro Area.

Te Ture Whaimana o Te Awa o Waikato – the Vision and Strategy for the Waikato River (Te Ture Whaimana) is the primary direction setting document for the Waikato River and for activities within its catchment and forms the foundation for this project.

The recommendations in the DBC seek to actively contribute to achieving the vision and objectives set out in Te Ture Whaimana by delivering "best for river" wastewater management solutions, recognising and providing for the unique relationship that taangata whenua have with the awa as well as contribute to the social and cultural wellbeing of the community.

Through the DBC, the parties have identified preferred servicing solutions for wastewater infrastructure and have worked through how these might be planned for, constructed, and funded.

Project Delivery through Partnership

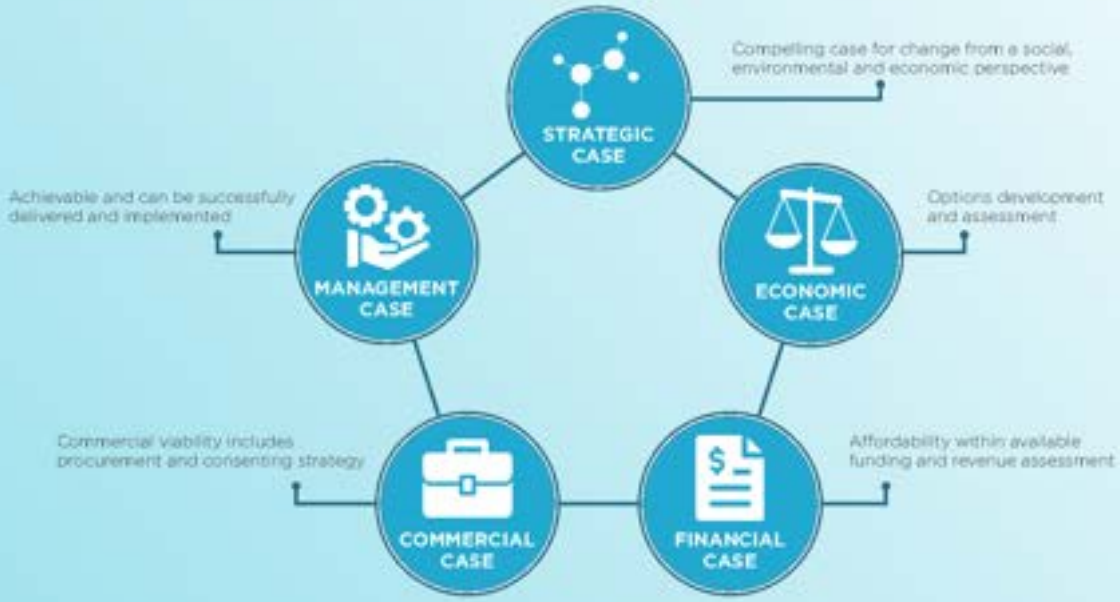
A fundamental principle adopted for this project is giving effect to treaty-based partnerships through strong collaboration, co-design and decision making by council and taangata whenua representatives. This occurred throughout the project at all levels from detailed technical analysis through to overall project governance.

The project governance group made up of elected representatives from each partner group have overseen the project and endorsed or approved the key recommendations and decisions that inform this DBC over the course of the project including:

- Project Vision & Objectives
- Growth Assumptions
- Investment Objectives, KPIs and MCA Criteria
- Treatment Performance Standards
- Preferred Wastewater Servicing Option
- Commercial delivery, contracting and packaging approach
- Funding and financing options
- Project management, governance and risk management arrangements

Treasury Better Business Case Model

The detailed business case has been developed to meet the requirements of the NZ Treasury Better Business Case Model. The Better Business Case Model involves five cases:



- **Strategic Case:** sets out the compelling case for change by identifying current problems, the benefits of addressing the problems and the overarching objectives that are being sought.
- **Economic case:** sets out the preferred WW servicing solution including the long-listing to preferred option assessments and concept details for the preferred option. The MCA used to assess the WW servicing options consider a range of factors including benefits, cost effectiveness, cultural, environmental and social factors.
- **Commercial case:** sets out the delivery structure and plans for the procurement arrangements needed to implement the preferred WW treatment solution. This includes procurement strategy and plan, risk sharing, payment mechanisms and contracting considerations.
- **Financial case:** sets out the preferred funding model and financing strategy. This includes affordability considerations.
- **Management case:** details the arrangements needed to both ensure successful delivery of the preferred solutions and to manage project risks, while maintaining a focus on delivery of benefits.

Purpose of the detailed business case

The DBC recommends long-term wastewater treatment solutions for the Southern Metro Area that give effect to the project vision and objectives.

Project Vision & Objectives

The vision adopted for the DBC is as stated in Te Ture Whaimana

Tooku awa koiora me oona pikonga he kura tangihia o te maataamuri

"The river of life, each curve more beautiful than the last"

...a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come.

The DBC has been developed to meet the requirements of the NZ Treasury Better Business Case Model and deliver "Best for River" outcomes.

The "Best of River" definition methodology developed through the Sub-Regional Three Waters Project has been used to develop the project investment objectives and key performance indicators for the DBC.

Investment Objectives

The investment objectives are:

1. Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect kai from the Waikato River and connected waterways, thereby contributing to the restoration and protection of the health and wellbeing of the river.
2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and around water bodies is enhanced through the reduction of wastewater treatment and discharge impacts before 2050.
3. Wastewater treatment solutions contribute to restoring and enhancing cultural connectivity/relationships with the river so that, before 2050, marae, hapū and iwi access to the river and other sites of significance for cultural and customary practice within the Metro Are no longer impeded by wastewater treatment solutions.
4. Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from wastewater treatment systems before 2050.
5. The wastewater solution provides sufficient capacity to ensure sustainable growth in the Metro Area in accordance with growth projection assumptions for the next 100 years.

Proposals in Summary

The DBC covers proposals for:

- A new Southern Sub-Regional WWTP to service the Hamilton Airport industrial precinct and surrounding areas, Mātangi/Tamahere and southern Hamilton.
- Construction of a new WWTP at Cambridge.
- Upgrades to the existing Te Awamutu WWTP
- Improvements to the existing WWTPs at Mātangi and Tauwhare Pā

Historical context

Taangata whenua within the Metro Area are descended from the Tainui waka. There are six significant iwi/hapuu groupings: Ngaati Hauaa, Ngaati Korokii- Kahukura, Ngaati Maahanga, Ngaati Mahuta, Ngaati Tamainupo, and Waikato-Tainui. Cambridge and Te Awamutu include additional mana whenua Ngaati Maniapoto, Raukawa, Ngaati Apakura, Ngaati Hikairo, and Paretekawa.

Taangata whenua view the Waikato River as an ancestor who is a source of sustenance, identity and mana. They belong to, and are part of the River and have an obligation to protect it.

Prior to European settlement, the Waikato River and all its tributaries would have had very high water-quality and would have been mostly free of contaminants. The River would have teemed with life and would have sustained people physically, mentally and spiritually.

In 1858 the Kiingitanga movement began under the first Maaori King Pootatau Te Wherowhero to unite iwi and halt the alienation of Maaori land. In July 1863, British troops crossed the Mangataawhiri Stream, invading Waikato. In 1865, the Crown unjustly confiscated approximately 500,000ha of Waikato-Tainui land. New settlers occupied the confiscated lands, wetlands were drained, and farms and towns developed. The development contributed to economic growth but degraded the health of the Waikato River.

From the time of the Raupatu (the land confiscation), Waikato-Tainui were excluded from decision-making regarding the Waikato River.

Treaty Settlements

From the 1860s onwards, Waikato-Tainui sought justice for their Raupatu claim and protection for the Waikato River. Waikato-Tainui negotiated directly with the Crown and reached settlement of the Raupatu land claim in 1995 and the river claim in 2008.

The Waikato-Tainui Deed of Settlement for the Waikato River received royal assent in 2010. Its aim is to restore and protect the health and wellbeing of the Waikato River for future generations. Under this Settlement the Waikato River includes the river's main stem, from Huka Falls to the Waikato River mouth, and all its tributaries.

Among other redress, the Waikato-Tainui Raupatu Claims (Waikato River) Act 2010 established the Vision and Strategy for Waikato River, Te Ture Whaimana o Te Awa o Waikato as the primary direction-setting document for the Waikato River and its catchment.

Te Ture Whaimana o Te Awa o Waikato sets out the vision, objectives and strategies to restore and protect the health and wellbeing of the River. It is the primary direction-setting document for the Waikato River and its catchments, which includes the Waipā River.

Te Ture Whaimana is deemed part of the Waikato Regional Policy Statement, and regional and district plans are legally required to give effect to it. The vision, reflected in this DBC is for:

> **"A future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come."**

The ongoing development along the length of the river over the last century has seen an increase in target nutrients and the contamination from industries, communities and farmland and a decline in the health and wellbeing of the awa. The discharge of waste, particularly human waste, to the Waikato River or its tributaries, whether direct or diffuse, is particularly abhorrent to taangata whenua.

The Strategic Case

– evaluates the strategic need for the Project and the case for change.

The Metro Area is the urban sub-region of the Waikato stretching from Taupiri in the north to Te Awamutu and Cambridge in the south. The Metro Area sits across three local authority jurisdictions (Waikato District, Hamilton City, Waipā District).

Figure 1 – Waikato Metro Area
(highlighted in orange)

Some municipal wastewater treatment plants (WWTPs) in the Metro Area do not always comply with existing resource consent conditions. The majority of municipal wastewater discharge consents will also expire in the next 10 years. System performance across the Metro Area has been variable and, in most instances, plants do not meet the standards needed to uphold Best for River principles and achieve the environmental, cultural and economic aspirations of the sub-region.

Historically, each of the three local authorities in the Metro Area have planned and funded wastewater infrastructure independently from each other. Overall, there has been a lack of integration and a number of short-term investment decisions made, including deferred investment decisions which do not align with Te Ture Whaimana o te Awa o Waikato.

Taangata whenua have largely been excluded from decision-making.

Four problems

Four broad problems in regard to three waters management including wastewater have been identified. The impact of these problems and specific wastewater examples are described.

Problem One:

A lack of integrated catchment management and urban waters long-term planning, founded on: a common vision and agreed future outcomes unconstrained by territorial boundaries; the application of both Maatauranga Maaori and conventional science methods; and appropriate funding provisions.

Impact of Problem One:

A lack of integrated catchment management and planning has resulted in:

- limited opportunities to consider catchment-level outcomes,
- a lack of funding and pipeline certainty which has failed to create competitive supply chain pressures
- a lack of work-force capacity and capability more usually associated with larger-scale entities; and
- a wide variation in Three Waters funding and financing strategies and approaches across the region.

Each Council has largely continued to focus Three Waters investment on the needs of their own individual communities in isolation from

neighbouring councils. This is evidenced by:

- numerous previous investigations highlighting the servicing challenges in the Southern Metro Area and proposing possible integrated solutions, that have not been implemented.
- the lack of any major cross-boundary wastewater management investment to date, despite it being the most practical approach in some situations. As an example, the township of Horotiu is serviced through the Ngaruawahia WWTP but is located closer to the Pukete WWTP
- Differing approaches between councils to overall asset management (including renewals, replacement, design, funding) across the Metro Area
- Varying levels of pro-active long-term planning
- Differing requirements and expectations of treatment performance/standards, operation, maintenance, iwi/mana whenua and stakeholder engagement, monitoring and reporting
- Different consent standards and requirements
- Varying levels of compliance with resource consents
- Multiple wastewater discharges to the river and environment

These issues are likely to be exacerbated in the future with accelerated and high rates of development and intensification within the Metro Area. Without consistent and aligned land use, wastewater treatment investment will continue to be reactive, addressing short-term, immediate changes to demand within the wastewater network, instead of proactively planning for future demands.

Further, existing wastewater networks and plants are likely to become inundated with unplanned flows. Both outcomes result in the degraded health and wellbeing of the Waikato River and work against the delivery of Te Ture Whaimana.

Problem Two:

Historic land confiscations coupled with inconsistent, short-term regulatory, planning and investment decisions on land use and urban water resource management have contributed to cultural disconnect, degraded water quality, and poor ecosystem health and over-allocated resources.

As a consequence, the relationships and aspirations of communities with the Waikato River, and the ability of Waikato River iwi to exercise mana whakahaere or conduct their tikanga and kawa have been severely compromised.

Impact of Problem Two:

Iwi and mana whenua have not historically been involved in, or empowered to, make decisions in relation to wastewater management. This includes input into the level of investment or involvement with proposed discharge methods. Councils make all decisions through the LTP process.

The lack of proactive decision-making regarding wastewater treatment and land use management has contributed to substandard water quality. Water quality trends at key sites along the Waikato River show a general trend of degradation, as the concentration of contaminants has increased.

Problem Three:

Reactive infrastructure planning practices coupled with light-handed regulation and compliance, and inconsistent management practices, standards and performance expectations has led to variable WWTP performance across the region. This has adversely impacted the health and well-being of the Waikato and Waipā Rivers.

Impact of Problem Three:

Land development

The dispersed nature of roles and responsibilities, spread across different councils, means no single entity is currently

responsible for monitoring or delivering the performance of the whole system.

The Metro Area includes several areas either zoned for development, or with significant development potential located on the periphery of existing urban settlements. Many of these areas currently have limited wastewater services. In some cases, no servicing is planned, despite the lack of wastewater services constraining development. This means the land is zoned for development without sufficient long-term servicing solutions, or it prevents land that could unlock significant economic potential from being zoned and developed.

In many cases, population growth exceeded forecast projections, leading to discrepancies between what was expected and what was required in terms of key wastewater infrastructure.

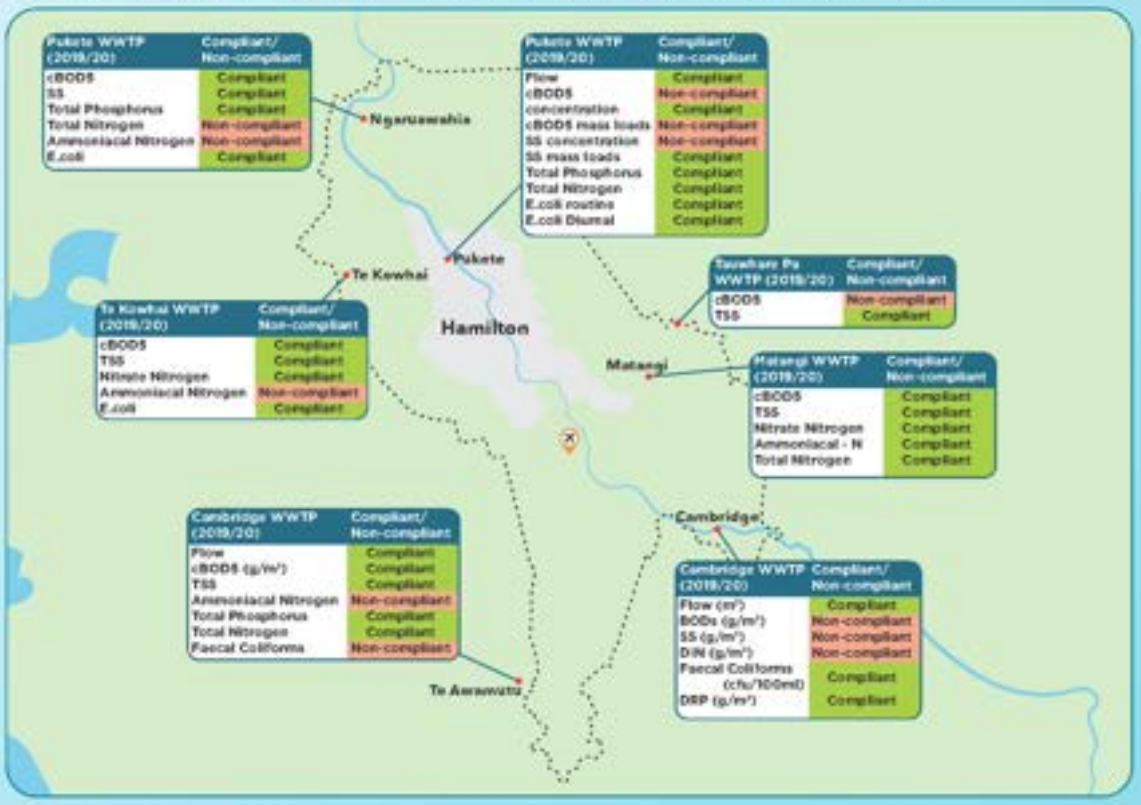
In addition, land use decisions in serviced areas have been made without long-term sustainable servicing solutions compatible with the broader needs of the Metro Area. For example, the Hamilton Airport precinct is undergoing rapid development and is currently serviced through a mixture of small onsite WWTPs and storage and tankered wastewater to the Cambridge WWTP. Other developments in rural zones have been approved based on small, decentralised solutions.

Some recent asset upgrades have been driven by a requirement to meet abatement notice requirements, or by prosecutions, not by what is in the best long-term interests of the River.

Light-hand regulation

Under-performing sites are often neglected until enforcement action is taken. Councils are not always proactive in terms of

Figure 2: Metro Area WWTP Consent Compliance Overview (2019/20)



compliance, and approaches to enforcement are inconsistent. This has resulted in varied discharge standards and levels of compliance. In many instances, there has been non-compliance with environmental standards, sometimes over years.

As at today, some existing WWTPs in the Metro Area cannot meet existing resource consent conditions.

Further, some Plan Changes have been approved and adopted without funded and planned infrastructure, resulting in 'plug and play' solutions that exceed existing network capacity.

There is also misalignment between regulatory documents, for example the NPS - Freshwater Management and Plan Change 1 requirements.

Problem Four:

The legacy of under-investment in urban water systems coupled with infrastructure reaching the end of its life, increasing regulatory requirements, environmental expectations, climate change and greater growth demands have created a significant investment deficit. This has resulted in unaffordable current and future costs for new infrastructure, maintenance and operations as well as staffing challenges with the sector.

Impact of Problem Four

There are increasing and competing priorities for a finite amount of Council funding. Alongside pressure to minimise rates, investment in wastewater infrastructure (and all infrastructure) has been constrained.

Approximately 12 per cent of wastewater pipelines within the Metro Area are assessed as being in 'poor' or 'very poor condition' with an average age of more than 37 years. Operational and capital expenditure costs associated will increase unless action is undertaken.

There is now significant investment required in the Metro Area to upgrade WWTPs discharging into freshwater, to meet objectives set out in the NPS - Freshwater Management as well as Te Ture Whaimana.

Land drainage and flood protection may not be able to cope with more intense and frequent rainfall events, one of the key climate change risks for the region. Consequently, wastewater networks may be overloaded by increased inflow, leading to potential wastewater overflows. Meanwhile, community expectations regarding environmental regulations continue to increase.

Other issues

Wet industry

At present, Metro Area councils do not specifically plan for, or design infrastructure, to include capacity for new wet industry (high water use) activities. This DBC, alongside relevant land-use planning projects, represents an opportunity to implement more integrated and considered infrastructure planning approaches.

Partnering with private industry

Currently several industries in the Metro Area own and operate private WWTPs. This is typically due to the high strength flows they produce and the inability for municipal plants to accommodate these flows. Private facilities include Fonterra Hautapu, Fonterra Te Rapa, Fonterra Te Awamutu, AFFCO and WTTPs at the Hamilton Airport.

Private facilities could benefit by partnering with councils to manage water and wastewater demand holistically for the catchment, including potential resource recovering and re-use opportunities.

In summary

Decisions relating to infrastructure, land use and development have contributed to a current state where:

- the water quality of the Waikato River is significantly degraded
- Three Waters infrastructure in the Metro Area is inefficient and ageing and no longer fit-for-purpose
- there is uncertainty about the abilities of individual councils to fund infrastructure, maintenance and operations for future growth to achieve compliance
- under existing funding arrangements, ratepayers will not be able to afford to fund appropriate infrastructure in the future
- developers in some areas are providing their own, site-specific infrastructure leading to fragmented networks and services that are complex to manage and renew

Future growth pressures, environmental expectations and increased regulatory requirements are likely to exacerbate these issues.

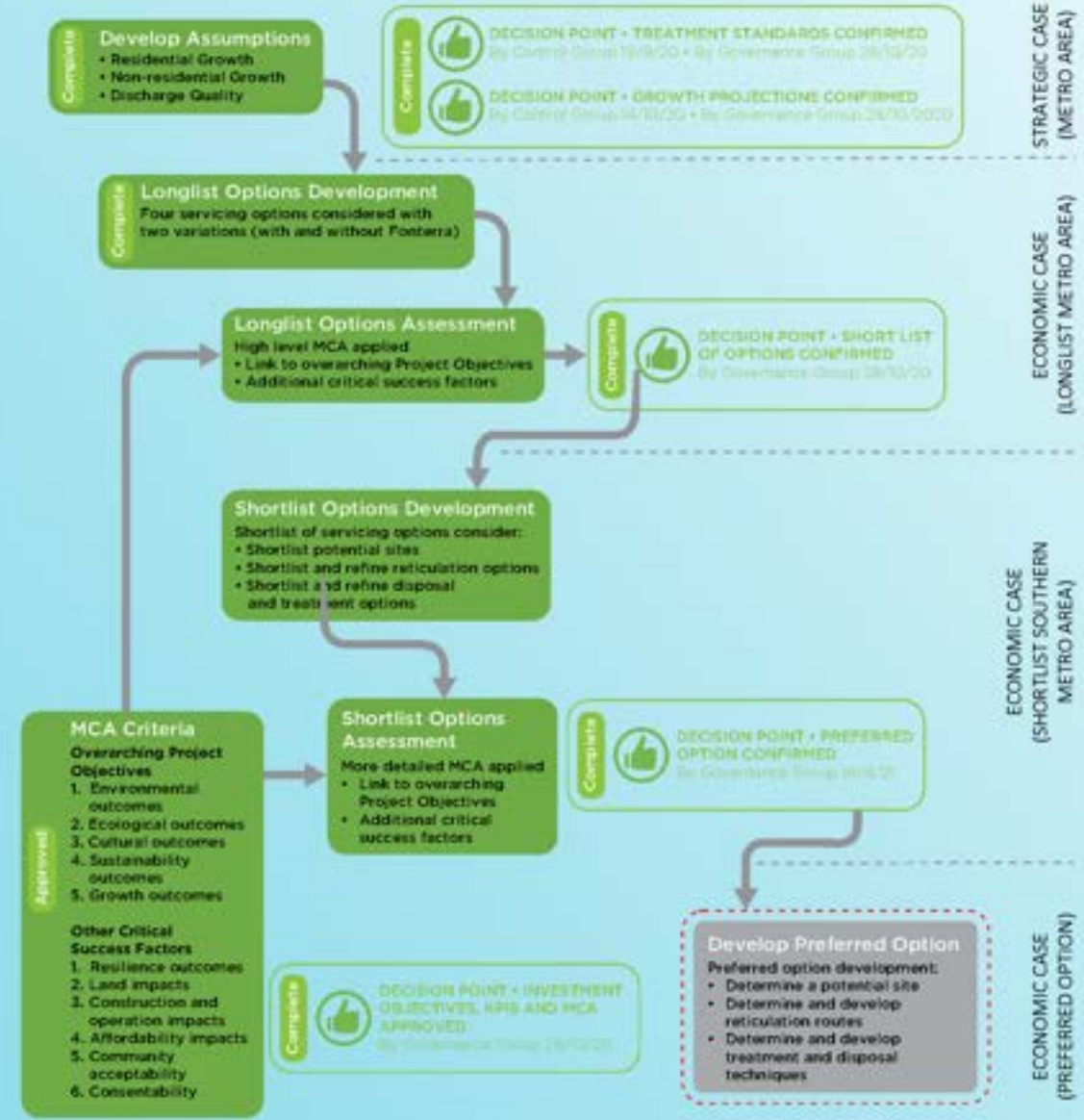
Without a co-ordinated and boundaryless approach, involving all three councils and taangata whenua, the poor state of existing Three Waters infrastructure will limit economic growth and further contribute to environmental degradation of the Waikato River.

The Economic Case

– to identify the proposal that delivers best public value including wider social and environmental effects.

The economic case builds on the Strategic Case and describes the process to develop and evaluate the longlist and shortlist options and details the preferred option. Figure 3 outlines the process used to develop and identify the preferred option and shows the key decisions made throughout the project.

Figure 3 – Key Decisions – Option Development

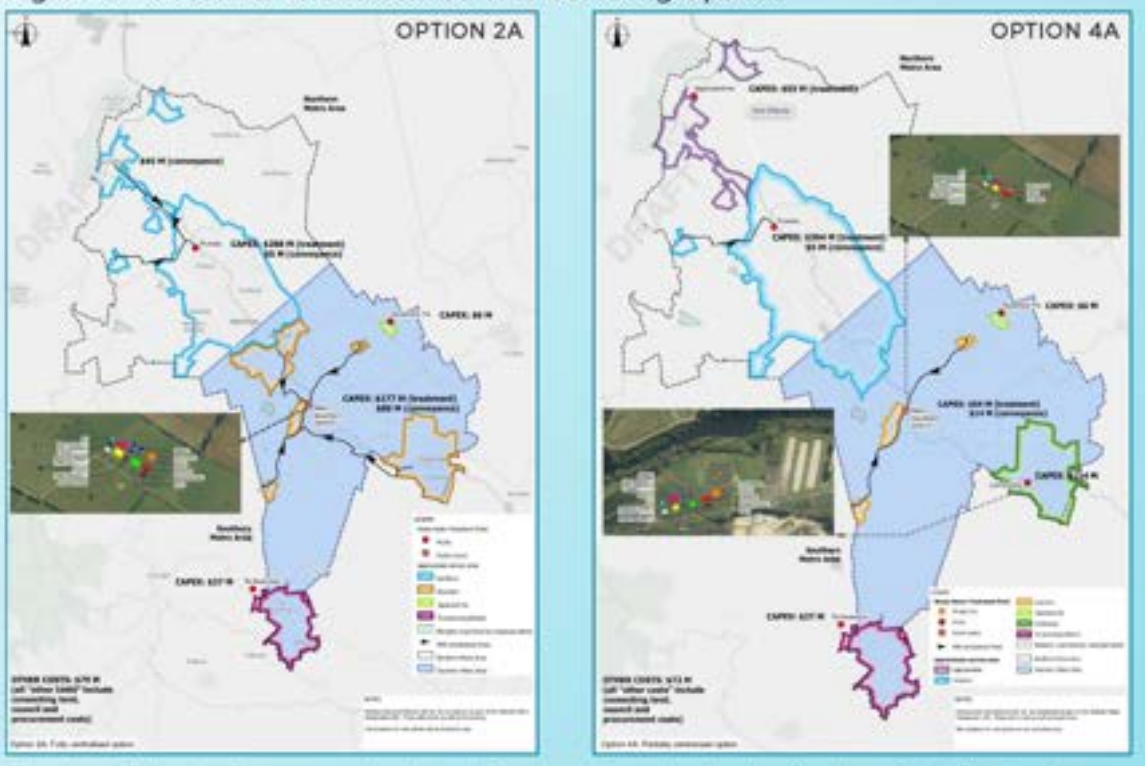


Shortlist development and assessment

Eight longlist options for the full Metro Area were developed for this DBC. The longlist Multi-Criteria Analysis (MCA) and risk assessment identified two options for shortlisting:

- **Option 2A - Three Plant Option** – Involving upgrades and expansion of the Pukete WWTP to service the Northern Metro area (including Taupiri, Ngaruawahia, Te Kowhai, Horotiu and majority of Hamilton); a new southern plant to service the Southern Metro area (including South Hamilton, airport area and environs, Cambridge) and the Te Awamutu WWTP.
- **Option 4A - Five Plant Option** – Involving treatment plant upgrades at Ngaruawahia, Pukete, Cambridge and Te Awamutu and a new southern plant to service the Airport area and environs.

Figure 4 – Overview of Short-listed WW Servicing Options



The short-listed options were developed further (in particular the Southern Sub-Regional WWTP) and assessed in more detail. This work determined that:

- Both options achieved similar outcomes in relation to the investment objectives and Best for River outcomes
- Both were assessed as having a similar ability to be successfully consented and implemented
- Option 4A had a capital cost estimate[1] of $652 million compared with Option 2A ($716 million[2]). These included capital costs for wastewater plant investments for the northern and southern Metro areas to accommodate projected growth out to 2061. Conveyance

1 Capital Cost estimates for WWTP and Conveyance are estimated by Beca and are P50 AACE Class 5 cost estimate; expected accuracy of -30% to +50%. In addition, other costs including procurement, consenting, council resources, land acquisition have also been included and are provided by others.

2 Total dollars out to 2061 and unadjusted for inflation

networks to new treatment plants as well as consenting, procurement, land purchase, make good and council construction overheads were also included.

- A Net Present Value (NPV) assessment on the short-listed options identified that Option 4A had an NPV estimate of -$1,096 million compared with Option 2A (-$1,212 million). Assumptions included capital cost inflation of 3%, operating cost inflation of 2%, costs modelled to 2071 and 5% discount rate.

Option 4A was assessed as more affordable than Option 2A as it gives project partners the potential to defer some capital costs in the first and second decades (2031 and 2041) as well as stage delivery of wastewater servicing for the Hamilton Airport environs and South Hamilton.

Preferred option

The preferred option for the Southern Metro Area is a refinement of Option 4A. This option consists of:

- The adoption of minimum treatment performance standards across all plants, over time
- A new Southern Sub-regional WWTP to service the airport area and environs (including Mātangi/ Tamahere commercial area) and southern Hamilton. Development of the plant will be staged to meet demand. Land discharge is proposed for Stage 1 with a move toward a discharge to water in Stage 2 and beyond as flows increase
- Retaining and upgrading the Tauwhare Pā WWTP and land discharge to service local growth with the potential to be reticulated to the new southern WWTP or HCC network in the future
- A new WWTP at Cambridge to achieve the adopted minimum treatment standards with discharge to the Waikato River
- Retaining and upgrading the Te Awamutu WWTP to achieve improved treatment standards and cater for growth. Continued discharge via rock channel to the Mangapiko Stream is assumed
- Improvements to the existing Mātangi WWTP until the wastewater is conveyed to the new southern WWTP in around 2040
- Tamahere commercial hub to continue to utilise on-site wastewater treatment and discharge systems until 2040 when Mātangi is diverted to the Southern WWTP.
- Ohaupo continuing with private on-site wastewater systems.

The preferred option for the Northern Metro Area is being considered as part of the Northern Metro WW DBC.

Key features of the preferred option (i.e. indicative treatment plant locations, areas served and total capital cost estimates) are shown in Figure 5. Specific details of the areas and population equivalents served by each plant are included in Table 1.

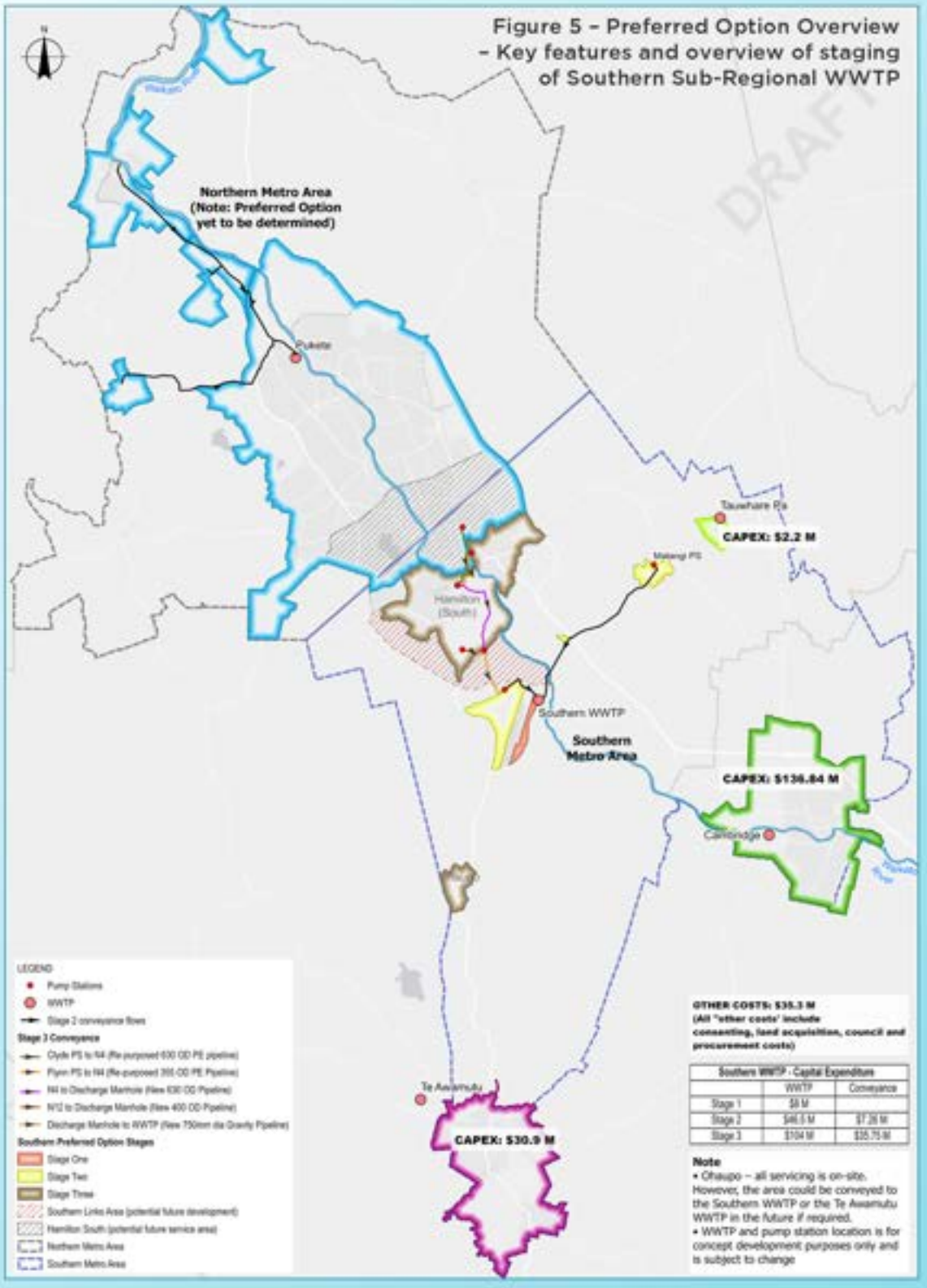


Table 1 – Summary of Preferred Option Service Areas over time

WWTP	Locations served	Population equivalent serviced by capacity available at the following dates					Notes
		2031	2041	2051	2061	Ultimate**	
Mātangi WWTP	Mātangi Village	150	Transfer to Southern WWTP				
Tauwhare Pā WWTP	Tauwhare Pā	619	619	619	619	889	2031 projection includes for additional 500 PE at Tauwhare Pā from current estimates Ultimate includes allowance for Tauwhare Village (270PE)
New Southern Sub-Regional WWTP	Airport area and environs	4,000	6,000	17,852	17,852	17,852	Assumptions are based on ~85ha of developed dry industrial land being serviced at 2031, ~140ha of dry industrial land being serviced at 2041. Assumptions includes flows from wet industrial land use from 2051*
	Mātangi/ Tamahere	Existing standalone facility	464	464	464	1,035	Includes servicing Tamahere commercial area (does not include Tamahere residential area)
	Hamilton South: Hillcrest, Riverlea, Glenview, Peacock	Serviced through Pukete WWTP			59,626	75,366	DBC assumes diversion to new WWTP at 2061. Additional PE in "ultimate" horizon is based on infill in these areas from 2020 Metro Spatial Plan
	Southern Links Area	Not Serviced				35,000	Ultimate forecast includes allowance for Southern Links
	Sub-Total	**4,000**	**6,464**	**18,316**	**77,942**	**129,253**	The Stage 3 WWTP can operate from 40,000 Population equivalent demand level
Cambridge WWTP	Cambridge	32,940	37,801	42,892	45,031	57,649	Assumptions includes for flows from wet industrial land use for small area
Te Awamutu WWTP	Te Awamutu	27,989	30,905	34,982	36,001	42,011	
No WWTP	Ohaupo	Not serviced	All servicing is on-site.				However, the area could be conveyed to Southern WWTP or Te Awamutu in future if required.

**WWTP estimates do not include for servicing "ultimate" populations, however the sites have been sized to ensure that adequate footprint area is available to deliver further capacity in the future

As part of refining the preferred option, further consideration was given to the sizing, staging and cost estimates for the Southern Sub-Regional WWTP as shown in Table 2.

Table 2 – Southern Treatment Concept Staging (note that these are further refined in the Financial Case)

Indicative Year	Date	Stage Description		Assumed Areas Served	Total Stage Built Capacity	Starting Demand
1-3	2022-2024	Stage 1	Pre-Implementation: Land acquisition, designation, consenting, master planning	Land and designation assumed to serve all stages		
3-5	2024-2026	Stage 1	WWTP: SBR with discharge to land including procurement and Council overheads and land discharge extension	Airport precinct (no allowance for wet industry)	1,000 m³/day (5000 PE)	400 m³/day (2,000 PE)
19 - 21	2040-2042	Stage 2	WWTP & Discharge: MBR with discharge to Waikato River. Includes conveyance from Matangi to plant, outfall pipeline and structure to river, operator building, sludge dewatering facility	Airport precinct growth (excluding wet industry) and Mātangi/ Tamahere Commercial areas	1,900 m³/day (9500 PE)	1,200 m³/day (6,000 PE)
29-31	2050-2052	Stage 2	WWTP Upgrade: Additional reactors and membrane equipment	Airport precinct growth, wet industry and Mātangi/ Tamahere Commercial areas	3,600 m³/day (18,000 PE)	3,600 m³/day (18,000 PE)
39-41	2060-2062	Stage 3	WWTP: MBR with Energy Recovery (Primary Sedimentation and Digestion) with discharge to Waikato River. Includes conveyance from Southern Hamilton, major increase in treatment capacity	Airport precinct (with wet industry), Mātangi/ Tamahere Commercial, Southern Hamilton	15,600 m³/day (78,000 PE)	15,600 m³/day

Capital Costs

The capital costs were developed by Beca based on scope prepared by GHD and Beca for each Project. They are P50 cost estimates and include a 20-30% risk allowance on the capital costs[3]. P95 estimates have also been prepared and are included in Appendix B of the Preferred Option Report. An allowance of 10% for procurement and Council overhead costs has been added to the capital cost estimates for inclusion in the economic and financial cases.

Table 3 – Capital (delivery) costs

Programme Capital Costs ($000's, real)						
Project	**2022-31**	**2032-41**	**2042-51**	**2052-61**	**2062-71**	**Total**
Southern WWTP & Conveyance	29,900	40,260	16,500	150,150	-	236,810
Cambridge WWTP	115,720	4,290	6,050	10,780	-	136,840
Te Awamutu Upgrades	20,900	-	11,000	-	-	31,900
Mātangi WWTP Interim Upgrade	550	-	-	-	-	550
Tauwhare Pā WWTP upgrade	2,200	-	-	-	-	2,200
Total Capital Expenditure	**169,270**	**44,550**	**33,550**	**160,930**	**-**	**408,300**

The estimates for Te Awamutu are based on the funding included in the Waipa DC 2021 – 2031 LTP and provisional estimates of the costs of further upgrades. These estimates do not reflect the level of investment likely to be required to achieve the agreed treatment standards. The costs associated with achieving the agreed standards will need to be evaluated as part of future Te Awamutu WWTP consenting and upgrade projects.

Operating and Maintenance Costs

Operating and maintenance costs will be incurred once the new WWTPs are operational, and upgrades have been completed at the existing WWTPs. Over time the total operational costs increase as flows increase. These costs cover power requirements, staff costs, maintenance costs, and finance costs.

Periodic renewal costs reflect the replacement of assets as they reach the end of their useful lives. Periodic renewal costs outside of the estimated 80-year asset lives were not included. Civils and structures are assumed to have an 80 year asset life while electrical and mechanical components are assumed to be refreshed every 20 years which is considered standard for assets of this nature.

An overview of the annual estimate for ongoing costs is provided in Table 4.

Table 4 – Ongoing costs summary

Programme Ongoing Costs (annual, $000's, real)					
Programme cost	**2031**	**2041**	**2051**	**2061**	**2071**
Southern WWTP operating costs	544	672	2,050	2,050	7,400
Cambridge WWTP operating costs	2,040	2,340	2,660	2,790	2,790
Te Awamutu WWTP operating costs	2,600	2,800	3,200	3,300	3,300
Tauwhare Pa WWTP operating costs	40	40	40	40	40
Hamilton South conveyancing operating costs	-	-	-	800	800
Mātangi conveyancing operating costs	-	102	102	102	102
Total operating costs	**5,224**	**5,954**	**8,052**	**9,082**	**14,432**

The estimates for Cambridge are based on achieving the treatment quality standards agreed through this DBC project.

Actual demand and timing of servicing from each area will likely vary from the assumptions used in the DBC. The triggers used to inform staging and implementation of the new plant will need refinement to reflect updates to the Hamilton and Metro Growth Strategies currently under review, and through more detailed assessment of network capacity constraints.

For example, the actual demand from the airport area and environs may be significantly lower than those used for the DBC which have assumed some wet industrial activity post 2051. The timing and extent of Hamilton (and other areas such as Southern Links) diverted to the new plant will likely vary from the assumptions used in the DBC. The diversion may occur much earlier than 2061 and the extent may vary based on growth, and network and Pukete WWTP constraints.

It is recommended that demand assumptions are revisited and confirmed as part of implementing the new Southern Sub-Regional WWTP in the immediate to short term.

The Financial Case

– sets out the allocation of costs, funding requirements, preferred funding and financing solutions and affordability impacts.

There are financial risks and challenges in delivering a complex, long-term programme of works. They include:

- **Long-term programme:** The accuracy of cost estimates is likely to reduce the further out they are being forecast. The timing of elements of capital expenditure could change based on population growth, further reducing levels of certainty.
- **Level of design work to support costings:** Detailed design work has not yet been undertaken and this constrains the accuracy of cost estimates. Costs will be refined as the design work is progressed.
- **Three Waters Reform programme:** The Three Waters Reform programme may change the way wastewater projects and services are delivered and could affect funding and other assumptions.

Cost allocation

Projects will service communities across boundaries and costs will be allocated between councils. Allocation will be undertaken on a beneficiary-pays basis. This means costs will be split between councils depending on the proportion of people served and the time over which they are served. Beneficiaries of the projects are the ones who will ultimately pay for them.

Cost allocation methodologies have been developed for each component. An overview of those methodologies is on the next page.

The cost allocation methodology used for the Southern Sub-Regional WWTP is for illustrative purposes. The actual cost allocation methodology will need to be negotiated and confirmed.

In developing the DBC, the Councils have agreed that WWTP capital costs be allocated between the Councils based on one of the following three formulations:

- Proportion of population equivalents serviced by the WWTP; or
- Each Council's proportion of the population equivalents in the full Metro Area; or
- A connection fee and/or ongoing service charges for connected communities based on population equivalents served.

The options are designed to be proxies for the proportion of beneficiaries served.

The final methodology and cost allocations (including assumptions) will be agreed between the relevant Councils prior to the commencement of construction, including adjustments to reflect the period of access for different beneficiaries (i.e. where a community is not immediately connected to the WWTP), and the value of the assets able to be reused for each upgrade.

Table 5 – Cost Allocation Methodology

Component	Methodology
Local reticulation – capital costs	Costs for upgrades or new local reticulation (where applicable) are proposed to be met by the relevant Council (or developer) on the basis that only beneficiaries within the territory would benefit from the works. The relevant Council is expected to recover these funds as additional properties are connected.
Conveyance - capital costs	Costs for upgrades or new conveyancing are proposed to be met by the Council relying on the conveyancing for connection. This is because the beneficiaries of the conveyancing would be located within that district (e.g. the capital cost of new pipes to connect Mātangi would be expected to be funded by Waikato District Council).
Conveyance - operating costs	As per conveyance capital costs, conveyance operating costs are proposed to be met by the Council that is using the conveyancing.
WWTP - capital costs (upgrades and new plants)	WWTP capital costs are proposed to be allocated between the Councils based on one of the following two formulations: • For a Project with only one stage, the level of Population Equivalent demand from users in the district serviced by the project over its useful life, compared to the level of Population Equivalent demand from users over its useful life; or • For a Project with multiple stages the proportion of capital costs for each stage will be allocated based on the level of Population Equivalent demand from users in its district by that stage of the Project over the useful life of that stage's assets, compared to the level of Population Equivalent demand from users over the useful life of that stage's assets. For a Project with multiple stages there will be a need to account for the reuse of assets from prior stages of the Project. In this case, immediately prior to each future stage being commissioned an assessment of the reusable value from prior stages will be undertaken. The reusable asset valuation will be used in the following ways: i. added to the capital costs of the new stage and allocated using the same methodology set out above; ii. used as the basis for compensation of the Council(s) that has funded the prior stage of the Project. This compensation could be delivered using a rebate to the Council or by netting off the Council's share of the reusable asset value from their funding obligations for the new stage of the Project.
WWTP - operating costs	WWTP operating costs are proposed to be allocated based on the proportion of Population Equivalent demand serviced by the WWTP, as a proxy for the distribution of beneficiaries. The calculation of the respective proportions will need to be updated regularly to reflect changes in the number of Population Equivalent demand in each district. The expectation is that the proportions will be estimated every three years (i.e. to align with Long Term Plan (LTP) cycles), and then confirmed at the start of each financial year as part of the Annual Planning process.
Land and consenting costs (Southern WWTP)	Given the land and consenting costs will benefit all stages of the Project, land acquisition, planning, and consenting costs for the Southern WWTP are proposed to be shared pro-rata according to the estimated final state of wastewater flows in 2061. The base case timing assumes that Hamilton South will have been connected to the Southern WWTP by this point.

Based on the methodologies in the table above, here is a breakdown providing an indication of each Council's share. Note that the allocations for the Southern Sub-Regional WWTP use the growth assumptions agreed for this DBC project and will need to be reviewed as part of project implementation.

Table 6 – Council Cost Allocation

Cost allocation for each Project ($000s, real)							
Project	**Council**	**2022-31**	**2032-41**	**2042-51**	**2052-61**	**2062-71**	**Total**
Southern WWTP*	HCC	15,300	-	-	119,627	-	134,927
	Waipā DC	14,481	29,204	18,296	(5,069)	-	56,911
	Waikato DC	119	3,796	(1,796)	(158)	-	1,962
	Total	**29,900**	**33,000**	**16,500**	**114,400**	**-**	**193,800**
Mātangi conveyancing costs	Waikato DC	-	7,260	-	-	-	7,260
Hamilton South conveyancing costs	HCC	-	-	-	35,750	-	35,750
Southern WWTP (incl. conveyance)	**Total**	**29,900**	**40,260**	**16,500**	**150,150**	**-**	**236,810**
Cambridge WWTP	Waipā DC	115,720	4,290	6,050	10,780	-	136,840
Te Awamutu Upgrades	Waipa DC	20,900	-	11,000	-	-	31,900
Mātangi and Tauwhare Pā Upgrades	Waikato DC	2,750	-	-	-	-	2,750
Total	**169,270**	**169,270**	**44,550**	**33,550**	**160,930**	**-**	**408,300**

* A negative figure represents a rebate to the Council due to the reuse of assets that it has already paid for under the previous stages. Please see Table 5 for further detail on Cost Allocation Methodology

Operating costs	Council	2031	2041	2051	2061	2071
Southern WWTP	HCC	-	-	-	1,670	6,027
	Waipā DC	544	624	1,998	365	1,318
	Waikato DC	-	48	52	15	55
	Total	**544**	**672**	**2,050**	**2,050**	**7,400**
Cambridge WWTP	Waipā DC	2,040	2,340	2,660	2,790	2,790
Te Awamutu	Waipā DC	2,600	2,800	3,200	3,300	3,300
Tauwhare Pa	Waikato DC	40	40	40	40	40
Southern Hamilton Conveyance	HCC	-	-	-	800	800
Matangi Conveyance	Waikato DC	-	102	102	102	102
Total		5,224	5,954	8,052	9,082	14,432

The cost allocation for the Southern Sub-Regional WWTP in 2022-31 reflects:

- the allocation of land and consenting costs allocated between the councils based on the estimated final state of wastewater flows in 2061; and
- The stage 1 build costs which are predominantly allocated to Waipā based on the population equivalents served.

There is potential for Waikato Regional Airport Limited (WRAL) to provide funding for the project. This could influence cost allocation and Waipā's funding requirements for stage one.

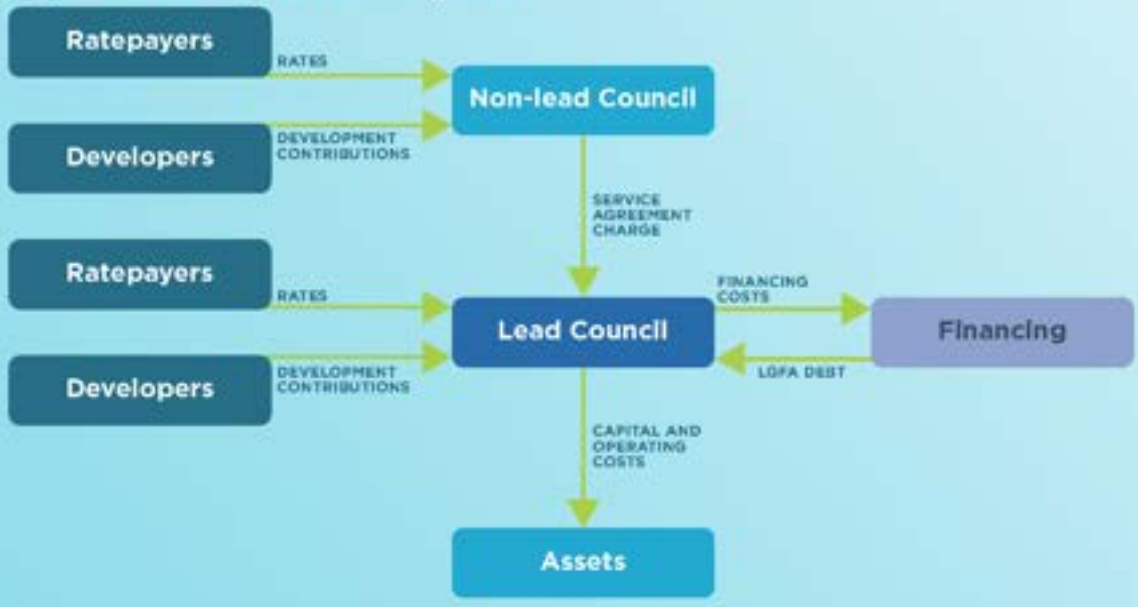
Financing

The individual Programme projects will be delivered by a single council (the "Lead Council"). In the case of the Southern Sub-Regional WWTP, the Lead Council will deliver the project on behalf of the partners. The Lead Council will utilise its existing resources, policies and procedures for project delivery. Under the Lead Council model there is optionality regarding how each Programme is financed:

- Financing for each Council's share of the capital costs is raised by each respective Council and (where relevant) passed through to the Lead Council.
- Financing of the full project cost is proposed to be undertaken by the Lead Council and where costs have been allocated to other councils (the Non-Lead Council), costs (including financing costs) are proposed to be recouped through a service agreement. Of the different Projects, this arrangement is most relevant to the Southern WWTP.
- The Non-Lead Council is expected to meet the service payment through applying its preferred funding tools to the communities that benefit from the Project within its respective territorial boundaries.

An overview of the proposed structure is provided below.

Figure 6 – Funding and financing flows



Funding will be required to smooth and spread the delivery phase costs across the life of the Projects. An evaluation of funding and financing options available to councils was undertaken and assessed. Based on this, the preferred approach is for each Council to leverage its existing funding tools (i.e., general rates, targeted rates, development contributions etc) as per existing policies. These are outlined in Table 7 below.

Table 7 – Long list of funding and financing options

Council	Current funding approach	Current financing approach
HCC	General Rates and Development Contributions	Generally debt funded through the LGFA
Waipā DC	Targeted Rates and Development Contributions	Generally debt funded through the LGFA
Waikato DC	Targeted Rates and Development Contributions	Generally debt funded through the LGFA

Responsibility for collecting rates and development contributions will remain with respective councils who will also determine which funding tools are utilised for each project.

Affordability

A high-level affordability assessment was undertaken based on an assessment of:

- The burden on ratepayers to fund the additional general and/or targeted rates;
- The cost to developers of development contributions; and
- The debt headroom under the current relevant Local Government Funding Agency (LGFA) covenants for each Council.

This assessment indicates the work is affordable for each Council. However, this should continue to be tested against the financials risks and complexities. An estimated rating impact as well as a high-level rates affordability assessment are outlined below.

An overview of the estimated annual impact (i.e. the incremental increase in rates per ratepayer) of the Programme on ratepayers is provided in the following table.

Table 8 – Estimated rating impact

Year	2031	2041	2051	2061	2071
HCC – General Rate	$112	$88	$75	$386	$612
Waipā DC – Southern WWTP Targeted Rate	$403	$874	$468	$282	$304
Waikato DC – Southern WWTP Targeted Rate	-	$2,153	$1,631	$1,257	$1,266
Waipā DC – Cambridge WWTP Targeted Rate	$520	$394	$368	$352	$331
Waipā DC – Te Awamutu WWTP Targeted Rate	$260	$300	$315	$287	$276
Waikato DC – Mātangi & Tauwhare Pa Targeted Rate	$110	$466	$435	$404	$371

An overview of the affordability of these rates increases is provided in the table on the next page. The assessment is based upon the 5% affordability threshold that was identified in the 2007 COVEC report into rates affordability. Ratepayer affordability has been assessed based on adding the average rating impact for a ratepayer to the average household rates bill as provided by the Councils. At the date of this document, Waikato District Council did not participate in this rating survey.

Table 9 – High-level rates affordability assessment

Council	Median Household Income (2021)	Affordability threshold (5%)	Average rates per household	Average additional project rating impact	Total rating burden	Affordability check
HCC – Southern WWTP	$77,485	$3,874	$2,770	$499*	$3,269	✓
Waipā DC – Southern WWTP			$3,092	$466	$3,558	✓
Waikato DC – Southern WWTP			$2,659	$1,577	$4,226	-
Waipā DC – Cambridge WWTP			$3,092	$393	$3,485	✓
Waipā DC – Te Awamutu WWTP			$3,092	$288	$3,380	✓
Waikato DC – Mātangi & Tauwhare Pa upgrade			$2,649	$357	$3,006	✓

* Average additional project rating impact calculation only considers years 2061 and 2071 for HCC i.e. after Hamilton South switches to using the Southern WWTP. The additional rating impact would not be applied to Hamilton North.

Table 9 demonstrates that the rating impacts generally fall within the affordability thresholds set out by COVEC based on the average additional project rating impact for each Council's ratepayers. The exception to this is the Waikato DC – Southern WWTP rating impact which is above this threshold by 9%. This is primarily driven by the costs of conveyancing from Mātangi to the Southern WWTP, with the relative rating impact reducing as further growth comes online in the future. It should be noted that there are likely other costs that would need to be considered in more detail prior to implementing an increase in rates, such as additional water related costs, mortgage servicing costs and other cost of living increases.

Under current council policies, HCC uses a general rate whereas Waikato DC and Waipā DC use a targeted rate. To provide a complete picture of the ratepayer affordability, Pukete upgrade costs would also need to be included in HCC's rating impact assessment. This will be considered as part of the Northern Metro Wastewater DBC.

An affordability analysis for each Council determined if the financial impact would see any Council breaching its LGFA debt-to-revenue financial covenants.

Development contributions

The size of development contributions was estimated using the following approach:

- An assessment was undertaken on the portion of costs the Lead Council would need to recover.
- An estimate was made of the portion of the Project attributable to growth. The increase in Population Equivalent demand over the forecast operational life of the project was used as a proxy for growth.
- Following this, a calculation was made to determine the pro-rata allocation of these costs to the amount attributable to growth. It was assumed this amount can be recovered from development contributions.
- A financing charge was applied based on the respective interest rates for each Council and solved for a level of development contribution that recovers the cost allocated to growth over the life of the project.

This analysis assumes no financial contributions will be received from WRAL (see page 14). The estimated development contribution per Household Unit Equivalent (HUE) of demand for

each of the Councils is provided in the table below. Population data has been divided by 2.5 to convert it into HUE's.

Table 10 – Estimated Development Contributions (per HUE of demand)

Council	2031	2041	2051	2061
HCC – Southern WWTP	-	-	-	-
Waipā DC – Southern WWTP	$9,728	$9,728	$9,728	$9,728
Waikato DC – Southern WWTP (Matangi and Tamahere Commercial)	-	-	-	-
Waipā DC – Cambridge WWTP	$7,327	$7,327	$7,327	$7,327
Waipā DC – Te Awamutu WWTP	$2,162	$2,162	$2,162	$2,162
Waikato DC – Mātangi & Tauwhare Pa	$6,261	$6,261	$6,261	$6,261

No development contributions are shown for HCC or Waikato DC for the Southern WWTP as the plant will only be servicing existing HCC and Waikato DC communities during the time period to 2061. The development contributions compare reasonably to existing levels, falling near the middle of existing wastewater charges for the Councils.

Net Present Value

A Net Present Value (NPV) for the overall programme has been determined to understand the current value of all future cash flows. This measure can be used to test the sensitivity of the Programme to changes in the underlying assumptions (e.g. inflation or changes to costs).

The estimated NPV for the Southern Metro WW Programme and conveyance programme -$344.1 million based upon the capital and ongoing costs (Table 3 and 4) and a 5% real discount rate (as per the New Zealand Treasury guidance). Sensitivity analysis was carried out to understand the potential impact on the NPV as a result of several key risks eventuating. The risks include changes to inflation, operating costs and capital costs.

Results indicate the impact of changes to inflation, capital and operating costs are relatively minor in the context of the overall NPV. This is primarily because most of the capital and ongoing costs are expected to be incurred later in the Programme and are therefore heavily discounted as part of the NPV analysis. Accordingly, there is still expected to be a material impact on affordability if there are significant cost overruns.

Debt to revenue ratios

The estimated impact on the debt to revenue ratio for each of the Councils over the next 10 year LTP period was assessed. Debt forecasts were not available beyond this period.

The councils are forecast to remain within the debt to revenue caps after allowing for the impact of the Programme over the next 10 years, although HCC do get close to breaching their debt limit.

A sensitivity analysis on the debt to revenue ratios was completed by applying changes to inflation and capital costs. The analysis identified that HCC and WDC are not significantly impacted in the next 10 years due to the comparatively small capital expenditure. Waipā's debt does increase, this is relatively minor in scale compared to their current debt portfolio.

Funding and financing

A range of funding and financing options have been considered, detailed below:

Table 11 – Long list of funding and financing options

Funding Options		Financing Options	
Council funding	General rates	**Debt**	LGFA
	Targeted rates		Bank debt
	Development contributions[4]		Bespoke Crown loan
Crown funding	Specific Crown fund		Crown DMO lending
	Crown operational subsidy/ assistance		Bonds/private placements
Direct funding	User pays		Subordinated/convertible instruments
	Long term commercial arrangements	**Equity**	Council equity
Value capture	IFF levy		Crown equity
	Negotiated contribution		Iwi equity
	Private sector partnering		Private equity
	Public sector partnering		

The process taken to identify the preferred funding and financing option is outlined in Figure 7 below:

Figure 7 – Funding and financing option assessment process

4 Inclusive of trade waste and bulk supply arrangements

The preferred funding and financing solution was determined following engagement with each Council. The preferred solution was to leverage the current funding and financing approaches for each Council (i.e., aligned to the relevant revenue and financing policies) with each Council responsible for determining and implementing its preferred funding and financing approach.

Sub-regional approach

The DBC also examined the impacts of a sub-regional approach to wastewater cost allocation. This helps understand the level of charging required to distribute costs equitably across the Metro area.

Under this scenario, costs and beneficiaries from the Northern Metro area are included in the analysis so that rates are harmonised across the Northern and Southern Metro areas. Costs of $393.1 million for the construction of the Pukete and Ngaruawahia WWTPs are included in the analysis. These costs will be updated based on the work from the Northern Metro WW DBC but have been used to provide an initial assessment for the Southern Metro DBC. The costs exclude buffer storage, treated water reuse and outfall replacement costs. It is expected that the Northern Metro area wastewater capital costs will increase from those used in this assessment and therefore will be recalculated as part of the Northern Metro DBC.

The role of Waikato Regional Airport Ltd (WRAL) has been considered. WRAL is open to contributing to a Southern WWTP if it would meet their needs (timing and scale). Their contribution could be through contribution of land, and/or direct financial support. There is likely to be a need for an interim wastewater servicing solution at the airport until the Southern WWTP is operational. The costs of an interim servicing solution have not been included within the preferred option.

The Commercial Case

– considers the approach to packaging and contracting options, the procurement plan, potential for risk-sharing and the planned contractual arrangements.

Procurement

Councils will be encouraged to follow Government Procurement Rules. Procurement for all Projects will be undertaken via competitive tender to ensure market tension and drive value for money.

A detailed procurement plan will be prepared for each package of works. A cross-functional tender evaluation team will evaluate the bids and recommend a preferred supplier. An independent Probity Auditor will shadow the tender process.

Contracting models

A number of contracting models have been considered.

Table 12 – Contracting options long list

Contracting Model	Description
1) Construction only (traditional)	Private contractor is contracted to develop the facility. All design work is completed prior to the tender and a detailed specification is provided to bidders. Financing is managed by the procuring entity.
2) Design and build (D&B)	Private contractor is responsible for design and construction. Procuring entity will prepare the functional and technical performance requirements that are used in the tender process to guide developer design. Financing is managed by the procuring entity.
3) Managing Contractor	Single managing contractor engages with the procuring entity and undertakes the procurement process on its behalf. The managing contractor enters into a contractual arrangement for each of the proposed packages.
4) Alliances	Collaborative model that will bring together the procuring entity and other parties, including contractors and designers, to deliver a 'best for project' outcome. Pain / gain share arrangements where costs below and above target are shared between parties.
5) Design, build, operate and maintain (DBOM)	Private contractor is responsible for design and construction as well as long-term operation and maintenance services. The procuring entity secures the financing independently and retains operating demand risk.
6) Design, build, finance, operate and maintain (DBFOM)	Concession style arrangement where responsibilities for designing, building, financing, operating and maintaining are bundled together and transferred to a private sector consortium. This model is similar to a number of PPPs that have been completed in NZ with a large degree of risk transfer passed to the private sector.
7) Private Provision	Development of the facility is outcomes based with the private sector engaged to provide all aspects of work including design, construction, operation and maintenance. The private sector also takes responsibility for approvals and management. The procuring entity would use the facility under a service agreement.

The methodology for selecting the preferred option used an iterative process, where the long lists were objectively filtered to a short list and preferred option based on Multi Criteria Analysis (MCA).

The preferred contracting, packaging and procurement strategy for each of the Projects is outlined below:

New Southern Sub-Regional WWTP

The procurement strategy is focused on stage one only. The preferred strategy is to tender two separate work packages; a main plant works (and a separate conveyancing package. It is proposed to tender both using a traditional 'construction only' contract. HCC's procurement methodology and Procedure Policy will apply.

New WWTP at Cambridge

The preferred strategy is to tender two separate work packages; an enabling works package and a main plant works package. It is proposed to tender both using a traditional 'construction only' contract. Waipā's Procurement Policy and Manual will apply.

Upgrades to the existing Te Awamutu WWTP

The preferred strategy is to tender a single work package using a 'construction only' contract. Waipā's Procurement Policy and Manual will apply.

Improvements to the existing WWTPs at Mātangi and Tauwhare Pā

The preferred option for the Mātangi and Tauwhare Pā upgrades is to tender a single work package using a 'design and build' contract. WDC's Procurement Policy will apply.

Contracts used will be the New Zealand Standard form contracts. The Lead Council will own the wastewater assets as an asset on their balance sheet. There is not anticipated to be any off-balance sheet treatment under the 'construction only' or 'design and build' contracting structures. Assets underpinning delivery of the services will be held on the balance sheet of the Lead Council.

The Management Case

– covers the management, governance and risk management arrangements.

Project delivery

Given the Projects will be undertaken at different times, locations and by different parties, strong collaboration between the respective councils, iwi and mana whenua will be required to successfully deliver the strategic outcomes agreed in the DBC. A Memorandum of Understanding (MoU) is intended to be entered into shortly after the finalisation of the DBC to capture these requirements.

The MoU outlines the parties' continued commitment to cooperation, collaboration and delivery of the strategic outcomes. It is expected items agreed in the MoU could transition into a three waters entity given the potential for significant structural change to three waters services delivery in New Zealand as a result of the Three Water Reform Programme.

Individual projects will be delivered by a single council (the Lead Council) on behalf of all partners. Lead Councils will retain oversight of core project delivery functions and will be responsible for consenting and planning, procurement, construction management and asset management. While Lead Councils will undertake consenting applications, any cost savings or joint benefits from a global approach must be considered.

Resourcing for each project will also be managed by Lead Councils.

The proposed Lead Councils for each Project are outlined in Table 13 below:

Table 13 – Project Lead Councils

Project	Lead Council
Southern Sub-Regional WWTP	Hamilton City Council
Southern Hamilton Conveyance	Hamilton City Council
Cambridge WWTP	Waipa District Council
Te Awamutu upgrades	Waipa District Council
Mātangi and Tauwhare Pā upgrades	Waikato District Council
Matangi / Tamahere Conveyance	Waikato District Council

Governance

The proposed joint governance structure will ensure strategic directives are being followed by Lead Councils and that opportunities for collaboration and integration are captured. The Project Partnership Group (PPG) will provide direct oversight but cannot make decisions on behalf of their home organisations.

The Programme Director will be independent of all partners, will sit across the whole programme and report to the PPG. The Programme Director will be the key intermediary between the individual projects and the PPG.

Figure 8 – Governance and delivery structure

Risk recording and reporting

The following top risks have been identified. Risks will continue to be updated as work progresses.

Table 14 – Top Risks

Risk Description	Cause	Controls	Likelihood	Consequence	Residual Risk Rating	Risk Treatment	Action Plan
The recommended DBC projects cannot be funded leading to the projects being delayed, not proceeding or lower standards being adopted	- Competing priorities leading to unwillingness to fund the Projects. - Insufficient financial headroom for councils to fund the Projects. - Cost increases or affordability the ability to secure funding or financing - Lack of integration, coordination and planning at a sub-regional level.	- Staging for the Southern WWTP - Traditional approach to financing - Lead council structure agreed in principle and to be confirmed through MOU - Funding to commence implementation of projects recommended in the DBC included in LTPs	Likely (3)	Catastrophic (5)	Very High Risk (15)	Mitigate	- MoU signed by project partners which confirms principles agreed in the DBC including approach to ownership, funding and financing - Establish governance and delivery structure recommended in the DBC for the Programme - Ensure appropriate joint engagement between Councils/Partners occurring throughout project - For Southern Plant, HCC to enter into service agreement with Waipa DC to contribute toward funding the plant
Costs to implement recommended DBC projects are significantly higher than estimates further impacting on affordability and leading to the project being delayed, not proceeding or lower standards being adopted.	Increasing land costs, high contractor demand, limited providers, increasing costs of key materials, supply chain disruption or poor risk allocation in the construction contracts.	- Monitor market conditions - Procure works and services as early as possible to reduce impact and likelihood of escalation - Undertake a procurement methodology that attracts multiple tenderers - Sensitivity assessments completed as part of the DBC to assess the effect of changing inflation rates and operating and capital costs - Recommended immediate initiation of key projects in the DBC	Likely (3)	Catastrophic (5)	Very High Risk (15)	Accept	- Complete site selection, land acquisition, consenting and designation processes early as recommended in the DBC - Early contractor engagement and identification of preferred procurement method - Procure works and services as early as possible to reduce impact and likelihood of escalation - Undertake a procurement methodology that attracts multiple tenderers
The recommended DBC projects do not meet partner expectations which may impact ability to implement the recommendations, consentability and adversely impact relationships	- Lack of meaningful engagement with relevant groups throughout project delivery. - Mana whenua/ iwi views not reflected in Governance discussions and decision making. - Differing priorities/points of view on level of treatment and discharge methods. - Insufficient budget available to deliver "best for river" outcomes in timeframes that are acceptable to partners.	- Project has been co-designed and developed by the partners and this approach will be built on through the project pre-implementation and implementation phases - Metro WW Project vision and objectives embed Te Ture Whaimana and incorporate iwi/mana whenua values and aspirations (e.g. Iwi Env Plans, Economic Aspirations - Recommended governance and project delivery structure provides partner representation at senior level	Likely (3)	Major (4)	Very High Risk (12)	Mitigate	- MoU signed by project partners which confirms principles agreed in the DBC including minimum wastewater treatment standards and project governance structure - Establish governance and delivery structure recommended in the DBC for the Programme - Review & implement communications and engagement plan for each project including specific provision for iwi/mana whenua engagement and partner councils (at multiple levels). Project engagement and delivery approaches to incorporate co-design to solutions and seek mutual agreement.

Risk Description	Cause	Controls	Likelihood	Consequence	Residual Risk Rating	Risk Treatment	Action Plan
Resource consents and designations for recommended wastewater projects cannot be secured or the costs to deliver a consentable solution are prohibitive.	- New activity and discharge to the Waikato River (considered in isolation) is not consistent with the Te Ture Whaimana, NPS FM, and other policy (incl. current NES for Sources of Human Drinking Water and land application requirements). - Other WWTPs consent renewal timeframes do not align. - Legislative change Vision and Strategy and legislative change	- Collaborative approach to delivering the project that involves equal Iwi / TLA representation Project Governance Group. - Having regulator involved in the project to offer advice - Utilise the technical teams involved in Cambridge WW Consenting, PC1 Healthy Rivers Processes and Pukeiohe WW consenting and leveraging off of that work - Consenting Strategy - consistent with the current Vision & Strategy for the river. Identification of alternative consenting pathways to link to other discharges	Likely (3)	Catastrophic (5)	Very High Risk (15)	Mitigate	- Secure the site for new Southern WWTP - Thoroughly explore beneficial re-use opportunities to avoid or reduce the need for water based wastewater discharges - Look for mechanisms to link discharge activities across the broader catchment in order to clearly demonstrate betterment despite a new WW discharge - Ensure appropriate treatment standards are adopted including WRP, TTAVH, Iwi Hgmt. Plans etc - Develop and implement appropriate engagement strategies and plans, including project governance, and technical advisory groups. Ensure consistent messaging across related projects and workshops
Reform of the Three Waters sector impacts the ability or commitment to implement the DBC programme recommendations.	- Potential views that all work should be deferred until clear decisions on sector reform resulting in slowing down of critical infrastructure investment. - If reform occurs, the "actors" involved in project delivery may change and impact on project prioritisation and delivery - Principles and obligations agreed in the MoU are not carried over to a new water entity that is set up as a result of the planned sector reform.	- The preferred options were prepared on the basis of "business as usual" - The recommended programme and project delivery structures aim to maintain optionality and flexibility to transition to a new structure if required - Agreements clearly documented in the MoU and DBC so knowledge transfer can occur to the new water entity	Likely (3)	Major (4)	Very High Risk (12)	Mitigate	- Continue to implement recommendations in the DBC and MoU in line with proposed implementation schedule. - Accelerate implementation of the recommended projects
Inability for councils to move to integrated delivery of programme results in uncoordinated delivery of the overall programme results in misalignment of objectives and 'Best for River' principles.	Misalignment of objectives and commitment of resources from Sub-regional Partners	- MoU to include agreement on minimum performance standards and project governance and delivery structures - Benefit Management reporting and monitoring processes recommended in the DBC - Compliance with consent requirements	Likely (3)	Major (4)	Very High Risk (12)	Mitigate	- Include agreement upfront in the MoU - Ongoing joint visibility through the governance structure and reporting processes recommended in the MoU

Operational changes

New Southern Sub-Regional WWTP

Stage one of the Southern Sub-Regional WWTP is relatively small compared to HCC's existing Pukete plant and operationally, the scale and technology will be comparable or more straight-forward than existing assets. For stage one, new staff will be required to manage the facility and discharge system as well as monitoring and compliance.

New WWTP at Cambridge

The proposed new membrane plant will be more complex than the existing one and staff will need training, alongside the design team.

Upgrades to the existing Te Awamutu WWTP

The scale and technology of the upgrades will not fundamentally change the nature of operations in the first 10 years.

Improvements to the existing WWTPs at Mātangi and Tauwhare Pā

The scale and technology of the upgrades is comparable to existing assets.

Project Plan and Milestones

Southern Sub-Regional WWTP

The Southern Sub-Regional WWTP is expected to be delivered in three key stages with the following staging triggers:

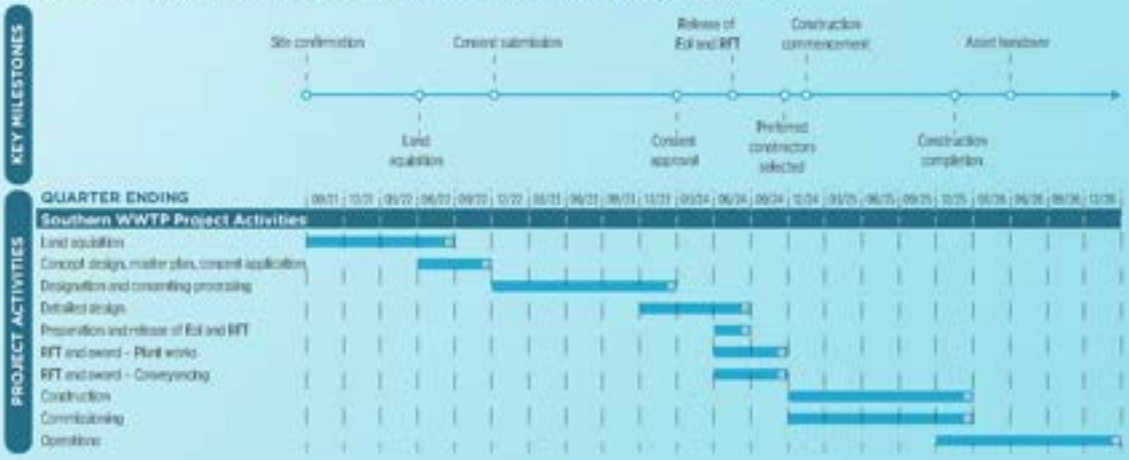
- Stage one: 400 m^3/day - 1,200m^3/day capacity (2021-2025). The trigger to move to stage two will occur when >80% of capacity is utilised or the cost of conveyance upgrades within the Hamilton network exceeds the alternatives.
- Stage two: 1,200m^3/day - 15,000m^3/day capacity (expected 2030-2039 but driven by growth and demand). The trigger to move to stage three will occur when Pukete WWTP capacity is reached (for existing southern Hamilton flows) or the cost of conveyance upgrades exceeds the alternatives.
- Stage three: 15,000m^3/day + capacity (expected 2060+ but driven by growth and demand in particular from Hamilton).

The high-level Project schedule for the Southern Sub-Regional WWTP is provided on the next page.

Table 15 – Key Milestones – Southern Sub-Regional WWTP

Key Milestones (Stage 1 only)	Start Date	End Date
Pre-implementation activities: land acquisition, preliminary design, consenting and designation processes	November 2021	November 2023 (24 months to complete)
Detailed design includes preparation EOI/RFT	November 2023	May 2024 (7 months to complete)
EOI released (Main plant works and conveyancing)	April 2024 (undertaken in parallel with detailed design)	May 2024 (2 months to complete)
RFT and award – Main plant works	June 2024 (8 months after consent issued – assuming consent issued in October 2023)	September 2024 (Preferred contractor selected 4 months after RFT is released)
RFT and award – Conveyancing	June 2024 (8 months after consent issued – assuming consent issued in October 2023)	September 2024 (Preferred contractor selected 4 months after RFT is released)
Construction	November 2024 (2 months after preferred contractor selected)	November 2025 (1-year construction period – excludes 2 months commissioning period)

Figure 9 – Key Milestones – Southern Sub-Regional WWTP



Cambridge WWTP

The Cambridge WWTP will be constructed during 2022-2026 and is expected to be upgraded during 2040-2049 to provide more capacity. Key stages are as follows:

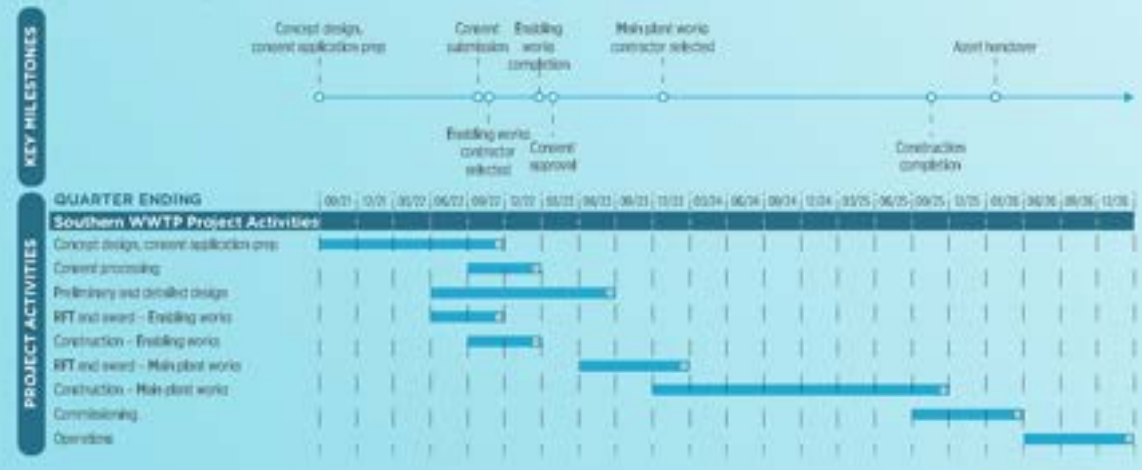
1. Initial construction works: Approximately 7,500 m³/day capacity (2024-2026)
2. Subsequent upgrades: Approximately 9,000 m³/day capacity (expected 2040-2049). Upgrade trigger when >80% of existing capacity is utilised.

The high-level Project schedule for the Cambridge WWTP is provided below:

Table 16 – Key Milestones – Cambridge WWTP

Key Project Milestone	Start Date	End Date
Concept design, consent application preparation	June 2021	July 2022
Consent processing	July 2022	December 2022 (5 months)
Preliminary and detailed design	June 2022 (before consent sign off)	May 2023 (12 months to complete)
RFT and award – Enabling works	June 2022	August 2022 (2 -month procurement period)
Construction - Enabling works	August 2022	December 2022 (4-month construction period)
RFT and award – Main plant works	June 2023	October 2023 (4-month procurement period)
Construction - Main plant works	October 2023	August 2025 (22-month construction period)
Commissioning	August 2025	January 2026 (5-month commissioning period)

Figure 10 – Key Milestones – Cambridge WWTP



Mātangi Upgrades

Minor upgrades to the Mātangi WWTP will be undertaken during 2021-2023 with the plant expected to transfer to the Southern WWTP or the HCC network in 2040-2049. Should denser residential or commercial development occur in Matangi prior to 2040 (e.g. private plan change), the timing of the upgrades could be reviewed.

Tauwhare Pā Upgrades

The existing Tauwhare Pā WWTP will undergo a performance evaluation with concept for expansion developed over 2021-2023. The intention is to implement expansion when development occurs. The trigger for this will be a developer agreement or the need for improved system performance and reliability.

Ōhaupō

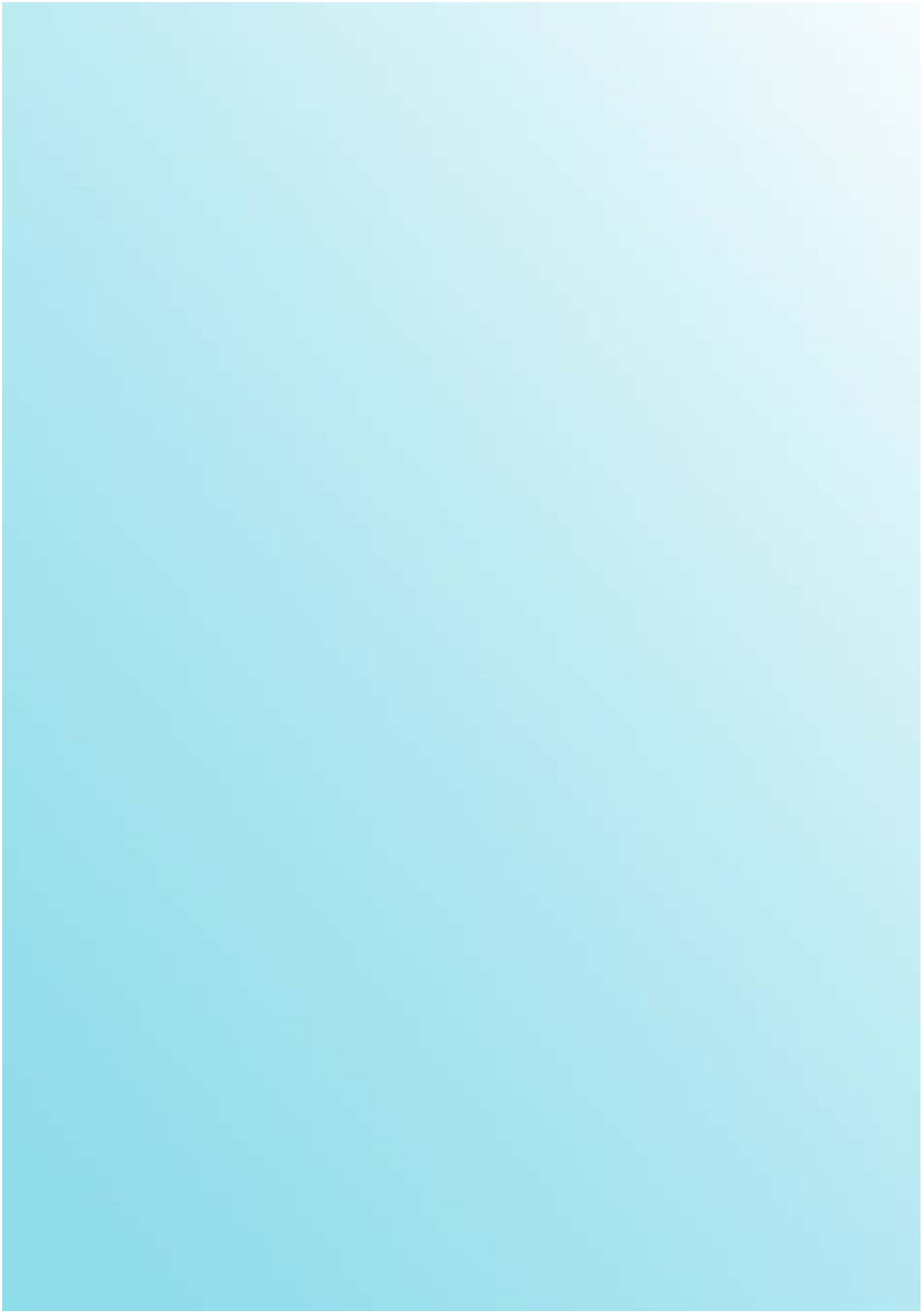
Ōhaupō is expected to continue with household treatment and disposal on site as per the existing arrangements. This will continue until on site environmental performance is no longer acceptable or additional demand dictates the need for centralised treatment.

Next steps

Formal approval from the Partners to progress the implementation of the preferred option recommended in this DBC is required.

The immediate next steps are outlined below:

1. Finalise and enter into the MoU.
2. Establish the proposed governance structure, including the PPG and the Programme Director.
3. Progress with the proposed project plans. The initial activities are outlined below:
   a) Southern Sub-Regional WWTP:
      i. Continue discussions with the Waikato Regional Airport regarding interim arrangements.
      ii. Finalise the preferred site.
      iii. Acquire the land for the WWTP.
      iv. Complete plant and discharge master plan, design, and consent applications.
   b) Cambridge WWTP:
      i. Continue progressing the activities that are already underway:
         1) Consenting.
         2) Technical investigations.
         3) Engineering design and construction.



WAIKATO METRO WASTEWATER

Attachment 2 - Metro WW DBC - Memorandum of Understanding - V2.0b for Approval

VERSION CONTROL REGISTER

Version	Author	Date Issued	Released To	Revisions
V2.0b	Project team	4/5/2022	Partners and PGG	Same version as 2.0a but with tracked changes accepted and comments removed
V2.0a	Project team	4/5/2022	Project file	Tracked changed version on clean V1.3b version showing the agreed amendments from PGG and with comments removed
V1.3b	Project team	24/3/2022	Legal review by Tompkins Wake, Brookfields, Waipa DC for further feedback	Same version as 1.2a but with tracked changes accepted and comments retained
V1.3a	Project team	24/3/2022	Legal review by Tompkins Wake, Brookfields, Waipa DC for further feedback	Tracked changed version with comments and associated responses
V1.2b	Project team	24/3/2022	Partners for further feedback	Same version as 1.2a but with tracked changes accepted and comments retained
V1.2a	Project team	24/3/2022	Partners for further feedback	Tracked changed version with all comments and associated responses
V1.1	Project team	26/10/2021		Revised for clarity,
V1.0	Project team	4/10/2021	Control Group Members	Updated to reflect feedback from Tangata whenua
V0.3	Project team	Sept 2021	Taangata Whenua for initial feedback	Updated to reflect MOU direction, provide further clarity and context
V0.2	Tompkins Wake	August 2021	Core project team	Revisions from core project team
V0.1	Tompkins Wake	August 2021	Core project team	

MEMORANDUM OF UNDERSTANDING

IN RESPECT OF HAMILTON-WAIKATO-WAIPA METRO AREA WASTEWATER PROJECTS

between

HAMILTON CITY COUNCIL

and

WAIKATO DISTRICT COUNCIL

and

WAIPA DISTRICT COUNCIL

and

WAIKATO-TAINUI

and

TAANGATA WHENUA

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MEMORANDUM OF UNDERSTANDING dated 2022

PARTIES

(1) **HAMILTON CITY COUNCIL** ("HCC")

(2) **WAIKATO DISTRICT COUNCIL** ("Waikato DC")

(3) **WAIPA DISTRICT COUNCIL** ("Waipa DC")

(4) **TE WHAKAKITENGA O WAIKATO INC.** ("Waikato-Tainui")

(5) [**TAANGATA WHENUA**, represented by [ ].]

BACKGROUND

PURPOSE AND EFFECT

Purpose

A. The purpose of this MOU is:

(a) to set out the preliminary agreements of each party to deliver the preferred wastewater servicing option for the Hamilton-Waikato-Waipa Metro Area (Metro Area) comprising a series of projects as identified in the Southern Metro and Northern Metro Detailed Business Cases (DBCs); and

(b) to confirm at a high level each party's understandings and obligations relating to project delivery, wastewater treatment performance standards, and the ownership, and capital and maintenance funding of the assets created on completion of the Projects.

Effect

B. The Parties acknowledge and confirm that this MOU is to provide a framework and a structure to allow the planning for the Projects that make up the preferred wastewater servicing option to be continued with more certainty.

C. The provisions of this MOU are at a high level and preliminary and not exhaustive of all matters that will be needed to facilitate and deliver the Projects.

D. However, the parties have invested a considerable amount of time and resources to identify the Projects listed in Schedules Two and Three as key elements of the preferred wastewater servicing option for the Metro Area. As such the parties have agreed to:

(i) strive to make binding commitments to deliver the Preferred Option, to the extent set out in this MOU; and

(ii) on other matters, to agree principles on which binding commitments can be made in the future.

E. The parties will make all reasonable endeavours to reach the agreements needed to advance, validate, and implement the recommendations in the DBCs.

F. Nothing in the MOU circumvents or removes an obligation on the lead Council delivering the Projects to engage with the relevant Taangata Whenua, community, and other stakeholders as appropriate and necessary to deliver the projects.

GENERAL

G. The Hamilton – Waikato Southern and Northern Metro Area Wastewater Detailed Business Cases are being jointly delivered through partnership between the Parties.

H. Treaty of Waitangi/Te Tiriti o Waitangi obligations between the Crown and Iwi, as well as settlement Acts resulting from Treaty breaches, guide the manner in which Taangata Whenua, regional and district councils, and other government agencies exercise their roles and responsibilities. For iwi this covers all aspects of governance, environmental, social, cultural, and economic self-determination.

I. The Waikato region has seen tremendous growth and development in commercial, industrial, and residential areas, placing pressure on existing wastewater services and creating further demand for wastewater treatment and management services.

J. The agreements reflected in this MOU represent an era of co-management in respect of the Waikato River and activities within its catchment and joint recognition of the benefits of "boundaryless" planning to restore and protect the health and wellbeing of the Waikato River and meet the current and future needs of the Metro Area.

K. Te Ture Whaimana o Te Awa o Waikato – the Vision and Strategy for the Waikato River (Te Ture Whaimana) is the primary direction setting document for the Waikato River and for activities within its catchment affecting the Waikato River. Accordingly, the vision as stated in Te Ture Whaimana has been adopted as the vision for the DBCs:

Tooku awa koiora me oona pikonga he kura tangihia o te maataamuri
"The river of life, each curve more beautiful than the last"

...a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come.

L. The recommendations in the DBCs seek to actively contribute to achieving the vision and objectives set out in Te Ture Whaimana by delivering "best for river" wastewater management solutions, recognising and providing for the unique relationship that taangata whenua have with the awa as well as contributing to the social and cultural wellbeing of the community.

M. Through the DBC, the parties have identified preferred servicing solutions for wastewater infrastructure and have worked through how these might be planned for, constructed, and funded.

HISTORICAL CONTEXT

N. The relationship of taangata whenua with the natural environment is intrinsic to their identity, culture, and heritage. Taangata whenua draw and recognise mauri and wairua from natural resources, fisheries, biodiversity, species, habitats and key geographical features of waterways and mountains. While wishing to develop land in a way that sustains their economic capacity and provides opportunities for iwi members, retaining their role as kaitiaki of the environment is a primary aspiration of taangata whenua in the area. Taangata whenua envision a collective approach to sustainable land use which allows the mauri of ancestral land, waters, cultural sites, and taonga to be restored and enhanced.

O. Prior to the Waikato land wars and resulting raupatu (confiscation) of lands, taangata whenua exercised mana whakahaere without challenge. Mana whakahaere involves the exercise of rights and responsibilities to ensure that the balance and mauri (life force) of the rohe is maintained. It is based on recognising that if the environment is cared for, the environment will continue to sustain the people. In customary terms, mana whakahaere is the exercise of control, access to, and management of resources sustainably within a rohe guided by maatauranga in accordance with tikanga and kawa.

P. The year 1863 saw the beginning of the New Zealand Land Wars. In 1858 the Kiingitanga movement originated in the Waikato region to unite iwi and halt land sales. The movement continues to this day with the headquarters of the Kiingitanga movement located at Tuurangawaewae Marae in Ngaaruawaahia, on the eastern banks of the Waikato River. It is the official residence of the current Maaori King, Tuuheitia Pootatau Te Wherowhero VII.

Q. As a result of the New Zealand Settlements Act 1863, huge tracts of Maaori land were confiscated – Waikato- Tainui lost almost all their land and Ngaati Hauaa about one third of theirs. The consequences of this raupatu (confiscation) were devastating to Maaori society and economy across the generations, and negative socio-economic outcomes are still being seen today. The public record, Crown apology and Crown acknowledgements are set out in the relevant Treaty Settlement legislation.

R. Many of the Metro areas iwi/hapuu groupings have signed deeds of settlement with the Crown, with several others engaged in ongoing settlement processes. These settlements have included a variety of land returns, purchase opportunities and rights of first refusal. The outcomes from the Crown's settlement of grievances from its breaches of Te Tiriti, coupled with ongoing capability and capacity building initiatives at individual, whaanau, marae, hapuu, and iwi level, have and will continue to influence the role and participation of taangata whenua in the successful implementation of projects to support the wellbeing of the Metro Area.

THE WAIKATO RIVER SETTLEMENT 2010

S. The Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 gives effect to the deed of settlement in respect of the raupatu claims of Waikato- Tainui over the Waikato River. The overarching purpose of the Act is to restore and protect the health and wellbeing of the Waikato River for future generations. Specifically, the Act established the Waikato River

Authority and Te Ture Whaimana o te Awa o Waikato (the Vision and Strategy for the Waikato River) as the primary direction setting document for activities that impact on the Waikato River. The principles which underpin this legislation, as set out in the Kiingitanga Accord, are:

(i) te mana o te awa (the spiritual authority, protective power, and prestige of the river);
(ii) mana whakahaere (authority and rights of control);
(iii) health and wellbeing;
(iv) co-management;
(v) integration;
(vi) Te Tiriti o Waitangi; and
(vii) honour and integrity.

T. Additionally, the Ngaati Tuuwhareetoa, Raukawa, Te Arawa River Iwi Waikato River Act 2010 and the Ngā Wai o Maniapoto (Waipa River) Act 2012 are important pieces of legislation that give effect to Te Ture Whaimana so that it now covers the whole of the Waikato and Waipā river catchments.

U.

V. Te Ture Whaimana o Te Awa o Waikato sets out the vision, objectives, and strategies to restore and protect the health and wellbeing of the Waikato River. It is the primary direction-setting document for the Waikato River and its catchments, which includes the Waipā River.

CO-MANAGEMENT ARRANGEMENTS

W. Taangata whenua hold mana whakahaere in respect of the Waikato River to ensure that the balance and mauri are restored.

X. Taangata whenua as kaitiaki within their rohe, hold a unique and special responsibility under whakapapa to preserve, protect and manage sustainably the natural and physical resources.

Y. The co-management agreements (including Joint Management Agreements between different Councils, Iwi and Hapuu) in place between taangata whenua and local councils, along with mechanisms such as this memorandum, seek to ensure that these practices are implemented into programme and project design and delivery.

UNDERSTANDING OF PARTIES:

1. **DEFINITIONS AND INTERPRETATION**

1.1 **Definitions**

In this MOU, in addition to the terms defined in the Background:

Assets means, with respect to a Project, the assets that are acquired or constructed as part of that Project;

Councils mean each of Waipa DC, Waikato DC and HCC, and all of them, as the context requires;

DBCs means both the Hamilton-Waikato Metro Southern Area and Northern Area Wastewater Detailed Business Cases;

Household Equivalent Units means the demand for wastewater treatment that would be consumed by one standard household unit [as determined by the parties];

Lead Council means, for each Project, the Council that will deliver the Project;

Metro Area means the Hamilton-Waikato- Waipa Metro Area shown in Schedule One and the communities proposed to be serviced through the solutions identified in the DBCs, namely, the current and planned urban development areas in Taupiri, Hopuhopu, Ngaruawahia, Te Kowhai, Hamilton, Airport Precinct and Environs, Tamahere, Matangi, Tauwhare Pa, Tauwhare, Ohaupo, Te Awamutu, Cambridge;

Minimum Performance Standards means the minimum wastewater treatment performance standards, principles and objectives set out in Schedule Four;

Northern Metro DBC means the Hamilton-Waikato Metro Northern Area Wastewater Detailed Business Case;

Projects means the wastewater projects identified in Schedule Two and Schedule Three, and more particularly defined in the DBC;

PPG means the Programme Partnership Group constituted under clause 4;

Preferred Option means the option identified as such in the relevant DBC, and reflected in this MOU;

Resource Consent means a consent granted under the Resource Management Act 1991 for activities associated with the delivery, operation and discharges from wastewater facilities;

Southern Metro DBC means the Hamilton-Waikato Metro Southern Area Wastewater Detailed Business Case;

Southern WWTP means the Southern Sub-regional wastewater treatment plant to serve the Waikato Regional Airport (the Airport) industrial precinct and environs, Mātangi/ Tamahere Hub, Southern Hamilton, and possibly Ohaupo and Tauwhare Pa in the future as more particularly described in the Southern Metro DBC;

Taangata Whenua[1] means in relation to this MoU, the relevant taangata whenua groups which will depend on The context and location of each Project under consideration; and

Waikato River means the body of water referred to as the Waikato River and its catchments as defined in Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 Section 6 .

1.2 **Interpretation**

In this MOU, unless the context otherwise requires:

(a) a reference to a clause is a reference to a clause of this MOU;

[1] Depending on the location and context of the project, marae, hapuu and iwi groups may prefer the use of the term taangata whenua and/or mana whenua. For the ease of authorship, the term 'taangata whenua' is used throughout this document but this term is inclusive of the term 'mana whenua'.

(b) a reference to a schedule is a reference to a schedule in this MOU;

(c) a reference to a resource consent is a reference to consent granted under the Resource Management Act 1991;

(d) a reference to a notice of requirement or designation is a reference to consent and land use zoning granted under the Resource Management Act 1991;

(e) district, when used in relation any Council, means that Council's district as defined in the Local Government Act 2002;

(f) whenever the words includes or including are used in this MOU, they are deemed to be followed by the words "without limitation";

(g) headings to clauses in this MOU are included for the purpose of reference only and are not to have any effect on construction and interpretation;

(h) a reference to any legislation, policy, standard or specification includes a modification of that legislation, policy, standard or specification and any legislation, policy, standard or specification enacted in place of that legislation; and

(i) all sums referred to in this MOU are exclusive of GST.

2. **COLLABORATION**

2.1 The Parties agree to conduct their relationship on the basis of:

(a) Ngaa matapono o te Kiingitanga (the values of the Kiingitanga):

(i) Whakaiti – Humility;

(ii) Whakapono – Honesty;

(iii) Aroha – Compassion;

(iv) Rangimaarie – Peace;

(v) Manaakitanga – Care;

(vi) Kotahitanga – Unity; and

(vii) Mahitahi – Collaboration;

(b) openness, promptness, consistency and fairness in all dealings and communications between the parties, their agents, and their representatives;

(c) a "best for region" and "best for river" approach to wastewater asset planning;

(d) non-adversarial dealings between the parties and constructive mutual steps to avoid differences and to identify solutions;

(e) open, prompt and fair notification and resolution between the parties of any differences or disputes which may arise or be apprehended;

(f) always acting in good faith and in accordance with the requirements of this MOU;

(g) performing obligations in a reasonable manner, and with all reasonable diligence and speed;

(h) an equitable sharing of costs; and

(i) compliance with all relevant laws, regulatory requirements, approvals and consents.

2.2 Nothing in this MOU is intended to impose fiduciary obligations on the parties.

3. **GENUINE AND EQUAL PARTNERSHIPS WITH TAANGATA WHENUA/MANA WHENUA**

3.1 Consistent with the guiding principles within the Future Proof Strategy the parties agree to work together to:

(a) ensure that the values, principles, aspirations, roles and responsibilities and the place of taangata whenua as a Te Tiriti o Waitangi partner are reflected and incorporated into Project governance and implementation;

(b) recognise and enable the unique relationship that taangata whenua have with the whenua, awa, moana, maunga, taiao katoa: the land, waterways, ocean, mountains, wider environment and other people in the sub- region. This includes, but is not limited to, the practice of kaitiakitanga;

(c) recognise and give effect to mana whakahaere as the basis for engaging with taangata whenua; and

(d) ensure that development does not adversely affect a rohe environmentally, socially or culturally and that the Projects provides for iwi economic development aspirations.

4. PROGRAMME PARTNERSHIP GROUP

4.1 **Establishment.** The Parties will establish, and agree to participate in, a programme partnership group (the **PPG**) which will, subject to this clause, perform an oversight and monitoring function to ensure that the principles and agreements entered into as part of the DBC and MOU are implemented at an individual project level and as an overall programme.

4.2 **Role**: The PPG will provide oversight of Projects that deliver servicing solutions across territorial boundaries to the point that binding obligations can be formed and definitive agreements agreed, including (without limitation):

(a) finalising the Projects to be included in the programme;

(b) assisting the parties to agree the commitments and cost sharing for the;

(c) assisting the relevant parties with service agreements for the use of the Assets;

(d) the strategy for obtaining relevant consents;

(e) the impact and outcome of the government's water reform;

(f) integrated land use planning for the area serviced by the Southern Wastewater Treatment Plant;

(g) identifying and securing funding from third parties to assist in funding for the Projects (excluding development contribution or developer agreements);

(h) sequencing, timing and implementation of the Projects;

(i) risk allocation; and

(j) any other aspect of the Project as agreed to by the PPG and as set out in the PPG's terms of reference (the **Terms of Reference**).

4.3 **Membership.** The PPG will comprise:

(a) up to two (2) representatives appointed by Waipa DC;

(b) up to two (2) representatives appointed by Waikato DC;

(c) up to two (2) representatives appointed by HCC;

(d) up to six (6) representatives of Taangata Whenua, including two (2) representatives appointed by Waikato-Tainui. The remaining four (4) Taangata Whenua Representatives will be appointed by the collective marae, hapuu and Iwi within the Metro Area through processes defined by Taangata Whenua.

4.4 The PPG may engage independent advice to provide expertise and experience as may be required from time to time to perform its oversight and monitoring role.

4.5 **Governance and Conduct.** The PPG will develop the governance and meeting structures necessary and desirable to oversee the completion of the Programme, including the Terms of Reference in accordance with clause 4.6 below. Members of the PPG will ensure that minutes are kept of all proceedings at meetings of the PPG that will be provided to each of the members of the PPG.

4.6 **Decisions.** Until such time as the PPG prepares and agrees its Terms of Reference, a decision of the PPG must be approved by a majority of the members of the PPG. Decisions of the PPG with respect to the Projects will be taken into account by the Councils but will not be legally binding.

4.7 **Terms of Reference.** As soon as reasonably practicable following the signing of this MOU, each of the parties must ensure that the PPG prepares and agrees the Terms of Reference to govern their conduct and role in relation to the Projects.

4.8 **Costs.** The costs of the PPG will be paid for as set out in this MOU. Council appointed representatives of the PPG will not be compensated for acting as a representative unless agreed by a resolution of the PPG.

5. DELIVERING THE PROJECTS

5.1 Each of the Councils will deliver the Projects for which it is Lead Council, as shown on Schedule Two and Schedule Three.

5.2 Where projects are co-funded, the Parties will need to work together to determine at a high level the requirements of the Projects and their delivery, including:

(a) the scope and scale of the Projects, and their estimated cost;

(b) cost allocation and multi-party funding agreements;

(c) key project milestones;

(d) the timing for the commencement and completion of the Projects to ensure:

(i) a cohesive sub-regional approach to delivery; and

(ii) that funds are not allocated and spent too far in advance of expected demand and before other Projects on which a Project is dependent are expected to be completed;

(iii) appropriate triggers are identified for the commencement and completion of Projects and when the projects become operational; and

(e) risk allocation.

5.3 The Southern WWTP is currently expected to be constructed in stages. Potential triggers and staging for the construction of the Southern WWTP are set out in Schedule Five. The actual triggers and staging of the Southern WWTP are subject to the parties agreeing to the relevant funding and funding allocation, and growth and development assumptions.

5.4 Clause 5.1 is allocates responsibility for delivering a Project amongst the parties. In and of itself, clause 5.1 does not commit any Party to incur any expenditure or commence design or construction of the Project until such time as a Project has been formally funded and documented to the satisfaction of the funders, including the Lead Council and other co-funders.

5.5 The Parties to this MOU will use best endeavours to support the Projects delivered as part of the overall programme, including in any application for a Resource Consent for the Projects, if they are planned, designed and delivered in accordance with the principles, objectives and minimum performance standards set out in this MOU and in the DBC.

6. ASSET OWNERSHIP

6.1 Where more than one Council is funding a Project, Asset ownership will need to be agreed, by applying the following assumptions and principles (**Ownership Principles**):

(a) a Council that is Lead Council for a Project has generally been selected as a Lead Council because it has the greatest stake in the outcomes of the Project (e.g., its district will gain the greatest benefit and it is the largest financial contributor to development of the plant out to 2061);

(b) the Lead Council will be managing the risk of the Project as Lead Council;

(c) the Lead Council will fund most of the costs of a Project out to 2061 (recognising that it will not be funding all the costs); and

(d) the Lead Council will finance the costs of a Project recognising that funding agreements will be entered into with other parties (including other Councils) who benefit from the project.

(e) Where the Assets are located is not determinative of ownership (e.g., it is expected that the Southern WWTP will be in Waipa DC's district but owned by HCC).

6.2 If Ownership Principles described in this MOU lead to a determination that the Lead Council is the owner of an Asset, , then the Lead Council should be the sole owner of the Assets relating to that Project.

6.3 If the Ownership Principles described in this MOU are not agreed with respect to a Project, the parties will need to agree on the ownership for those Assets, prior to entering into definitive documentation with respect to that Project.

6.4 Assets (e.g., pipelines, pumpstations) that are not part of the Project will generally be owned by the Council whose district the asset is servicing.

7. FUNDING

7.1 Projects ultimately (i.e., when fully developed) servicing customers located in a single district will be funded solely by the relevant Council.

7.2 Where more than one Council is responsible for funding a Project:

(a) each Council will fund its own reticulation and conveyance capital costs to connect to the Project;

(b) each Council will fund its own reticulation and conveyance operating costs to connect to the Project;

(c) Project costs (including land purchase, planning, consenting, design, procurement, construction, commissioning and operations and maintenance) will be allocated between the Councils based indicatively on one of the following three formulations:

(i) proportion of household unit equivalents (HUE) serviced and/or intended to be serviced by the WWTP; or

(ii) each Council's proportion of the total population in the sub-region; or

(iii) a connection fee and/or ongoing service charges for connected communities,

which are designed to be proxies for the proportion of beneficiaries in each district.

7.3 The final methodology and cost allocations (including assumptions) will be agreed between the relevant Councils prior to land purchase and prior to procurement of physical works contracts. The final methodology and cost allocations will recognise future benefits where a community is not immediately connected to the WWTP.

7.4 This is particularly relevant for the Southern WWTP where HCC and Waikato DC communities are expected to be connected in later stages of the Project. The current estimates for funding of the Southern WWTP are set out in Schedule Five.

7.5 The same funding principles in clauses 7.1 and 7.2 would be applied for the funding of the Pukete wastewater plant upgrade in connection with the Northern business case.

7.6 This MOU is being entered into on the basis that these Projects will be funded, in accordance with the funding principles. However, this clause 7 does not create an obligation to Fund the Projects.

8. MINIMUM PERFORMANCE STANDARDS

8.1 Each of the Minimum Performance Standards outlined in Schedule Four will apply to the Projects when treatment plants obtain Resource Consents, and each party commits to ensuring that all elements of the Projects, including design and construction ensure that the plants achieve, at a minimum, the Minimum Performance Standards.

8.2 If any party applies for a new Resource Consent for any of its wastewater plants that are one of the Projects, it will ensure that the plant is planned, designed, consented and constructed to meet the Minimum Performance Standards outlined in Schedule Four.

8.3 To complete the DBCs, assumptions have been made regarding discharge methods to be employed at each plant. Appropriate discharge methods will need to be considered and evaluated in detail as part of delivering each Project to support resource consenting of any discharge activities.

9. OPERATIONS

9.1 The owner(s) of an Asset is primarily responsible for operating that Asset, and funding the operation of that Asset, but may outsource these obligations as appropriate and subject to complying with law.

9.2 Where a Project is to provide services to ratepayers of a Council, but the Project is not in that Council's district and/or that Council does not own the Asset, that Council will enter into a servicing agreement to cover its proportionate use of wastewater supply, treatment and charges. The form of these servicing agreements is to be developed and agreed.

10. COSTS

10.1 Each party will bear its own costs in relation to the preparation, negotiation, and performance of this MOU.

10.2 HCC, Waipa DC and Waikato DC will equally fund the Programme Director and secretariat roles needed to establish, operate and service the PPG. HCC, Waipa DC and Waikato DC will equally fund and support mana whenua participation in the PPG.

11. CONFIDENTIALITY

11.1 The parties agree that all information and trade secrets associated with this MOU (including without limitation, the terms of this MOU), communicated to one party (a **Recipient Party**) by another party (the **Disclosing Party**) whether before or after the date of this MOU (**Confidential Information**):

(a) will at all times remain the property of the Disclosing Party;

(b) is strictly confidential;

(c) will be kept confidential by a Recipient Party; and

(d) will be used by a Recipient Party only for the purposes of this MOU.

11.2 Confidential Information does not include:

(a) Information in the public domain through no breach of any obligation of confidence by the Recipient Party;

(b) Information already known to the Recipient Party prior to disclosure by the Disclosing Party; or

(c) Information made available to the Recipient Party by a third party through no breach of any obligation of confidence by that third party.

11.3 A Recipient Party will:

(a) use adequate measures to ensure the Disclosing Party's Confidential Information under its control cannot be accessed or used by any unauthorised person, including as a minimum using the same measures as a Recipient Party uses to protect the Recipient Party's own confidential information, but in any event using not less than reasonable security measures; and

(b) immediately inform the Disclosing Party if a Recipient Party knows or believes an unauthorised person has possession of, access to or use of the Disclosing Party's Confidential Information and take all reasonable steps to prevent or stop the unauthorised use and to prevent or stop that person from having possession of or access to the Disclosing Party's Confidential Information.

11.4 Confidential Information will not be disclosed by a Recipient Party to any third party without the prior written consent of the Disclosing Party other than:

(a) as contemplated by this MOU;

(b) as required by law, including under the Local Government Official Information and Meetings Act 1987, in which case a Recipient Party will:

(i) as soon as possible give the Disclosing Party notice, when reasonably practicable, of the requirement to disclose (including the nature of the information required and any time frame a Recipient Party has to provide the information) so that the Disclosing Party may decide whether to seek an order preventing disclosure or any other protective remedy;

(ii) only disclose the part of the Confidential Information that is legally required;

(c) to its officers, employees, and professional advisers (**Representatives**), but only on a strictly need to know basis and only for the purpose for which the Confidential information was disclosed to a Recipient Party; or

(d) if the Confidential Information has become public other than through breach of an obligation by a Recipient Party.

11.5 Confidential Information will be returned (together with any copies) to the Disclosing Party on request, subject to compliance with the Public Records Act 2005.

11.6 A Recipient Party will ensure that all of its Representatives who receive Confidential Information comply with the provisions of this MOU as if they were a Recipient Party.

12. DISPUTE RESOLUTION

12.1 Disputes

This clause 12 applies to any dispute or difference between two or more of the Parties relating to this MOU (a **Dispute**). If a Dispute relates to the interpretation of this MOU, and other party not a direct party to the Dispute may join the Dispute by written notice.

12.2 No proceedings

A Party must not institute or commence any legal proceedings in respect of a Dispute, or submit a Dispute to mediation under clause 12.5 or arbitration under clause 12.6, unless and until:

(a) that Party has first complied with the requirements of clauses 12.3 and 12.4; or

(b) the legal proceedings otherwise comprise an application for any urgent equitable or other urgent remedy.

12.3 Parties to designate representatives

(a) Any Party (referred to in this clause 12, as the **First Party**) claiming that there is a Dispute must give written notice to the other relevant Party or Parties involved in the Dispute (referred to in this clause 12, as the **Second Party** and all parties involved in the dispute the **Dispute Parties**) of such Dispute. Such notice will:

(i) describe the nature of the Dispute and the remedy sought; and

(ii) designate its representative in negotiations relating to the Dispute a person with authority to settle the Dispute.

(b) The Second Party will, within 5 Business Days after receipt of the First Party's notice, give written notice to the First Party designating as its representative in negotiations relating to the dispute a person with similar authority.

12.4 Attempt to resolve dispute

The Dispute Parties involved in the Dispute will use their reasonable endeavours to procure that the persons designated under clause 12.3 will, within 15 Business Days after the last designation required by clause 12.3, make whatever investigations each such person deems appropriate and seek to resolve the Dispute by agreement.

12.5 Mediation

(a) After the expiry of the period specified under clause 12.4, a party which has complied with the provisions of clause 12.4 in relation to the Dispute may, by written notice to the other party(ies) involved in the Dispute, terminate the dispute resolution process

provided for in those provisions and may then require that such Dispute is resolved by way of mediation (**Mediation Notice**).

(b) The mediator will be such person as the Dispute Parties may agree upon in writing within 3 Business Days of receipt by the Dispute Parties of the Mediation Notice or, failing such agreement being reached within that period, will be the person appointed, at the request of any Party, as mediator by the President for the time being of the Auckland branch of the New Zealand Law Society following such consultation with the Dispute Parties as that President considers appropriate.

(c) The place of mediation will be Hamilton, New Zealand.

(d) The Dispute Parties will each bear their own costs in connection with any mediation under this clause 12.5 and will equally share the mediator's cost.

12.6 **Arbitration**

If the Dispute Parties cannot resolve the dispute by mediation under clause 12.5 within 40 Business Days of its referral, then either party may by written notice to the other refer the dispute to arbitration in accordance with the Arbitration Act 1996 on the following terms:

(a) a single arbitrator will be appointed;

(b) if the Dispute Parties fail to agree on an arbitrator, then the President of the Arbitrators and Mediators Institute of New Zealand Inc will appoint the arbitrator;

(c) the place of arbitration will be Hamilton;

(d) no person who has participated in an informal dispute resolution of the dispute will act as arbitrator;

(e) the arbitrator will proceed promptly to deliver an award. The Dispute Parties will co-operate fully in this respect;

(f) the Dispute Parties agree that the arbitrator's decision will be final and binding;

(g) the Dispute Parties will bear their own costs in arbitration and (in the absence of an arbitrator's award to the contrary) will pay the costs of the arbitrator in equal shares; and

(h) either Party will be entitled to appeal to the High Court on any question of law arising out of the award.

13. **THREE WATERS REFORM**

13.1 The parties acknowledge that responsibility for one or more of the Projects may pass to another entity (**Successor Entity**) as part of the government reform of waters infrastructure (**Three Waters Reform**). If this occurs, then any of the Councils may assign or novate its rights and obligations under this MOU to the Successor Entity without the consent of the other parties.

13.2 If, due to the nature or outcomes of the Three Waters Reform, it becomes evident that any of the agreements set out in this MOU:

(a) are inconsistent with Three Waters Reform;

(b) will lead to a party incurring costs that it is not likely to recover; or

(c) will lead to duplication of infrastructure or waste of resources,

then any Party may notify the other parties in writing that it wishes to review this MOU (**Review Notice**).

13.3 Upon receipt of a Review Notice, the parties will discuss whether any changes are necessary to this MOU, or whether the MOU should be terminated.

13.4 If there is no agreement between the parties as to whether any changes are necessary to this MOU, or whether the MOU should be terminated, then any party may terminate this MOU.

14. GENERAL

14.1 Amendments in Writing

The parties may together agree to amend any provision of this MOU. No amendment to this MOU will be effective unless it is in writing and signed by authorised signatories of each of the parties.

14.2 Statutory Powers

This MOU does not override any party's statutory and regulatory rights, powers, duties or functions. The parties acknowledge that Hamilton CC, Waipā CC and Waikato CC ("Councils") are required to carry out their regulatory functions, and the obligations of the Councils under this MoU cannot fetter each Council undertaking such regulatory functions. Any decisions or actions by a Council in undertaking its regulatory functions will not be treated as decisions or actions by that Council as a party to this MoU, and vice versa. To the extent that the lawful exercise of those regulatory functions is inconsistent with this MoU, the exercise of those regulatory functions will take precedence over this MoU.

14.3 Exclusion of Partnership and Agency

Nothing in this MOU shall create, or constitute or be deemed to create a partnership, or agency arrangement, or fiduciary duties between the parties.

14.4 Counterparts

This MOU may be signed in any number of counterparts all of which, when taken together, constitute one and the same instrument. A party may enter into this MOU by executing any counterpart. A counterpart may be an emailed pdf.

14.5 No Third-Party Rights

This MOU does not create any rights or remedies in third persons not party to this MOU.

14.6 **No Assignment**

Subject to clause 13.1, this MOU, and any rights or obligations under this MOU, must not be assigned or novated by any party without the prior written consent of the other parties.

14.7 **No Legal Relations**

Except for clause 11 (Confidentiality) and clause 12 (Disputes) nothing in this MoU is intended to create legally binding commitments between the Parties.

EXECUTION

SIGNED for and on behalf of)
HAMILTON COUNCIL)
by its authorised signatory) .....

SIGNED for and on behalf of)
WAIKATO DISTRICT COUNCIL)
by its authorised signatory) .....

SIGNED for and on behalf of)
WAIPA DISTRICT COUNCIL)
by its authorised signatory)
.....

SIGNED for and on behalf of)
WAIKATO TAINUI)
by its authorised signatory) .....

SIGNED for and on behalf of)
MANA WHENUA)
by its authorised signatory) .....

SCHEDULE ONE

HAMILTON – WAIPA – WAIKATO METRO AREA

SCHEDULE TWO

SOUTHERN METRO AREA PROJECTS

PROJECT	LEAD COUNCIL
New Southern Hamilton Sub-Regional Wastewater Treatment Plant and discharge	Hamilton City Council
New Cambridge Wastewater Treatment Plant and Discharge	Waipa District Council
Te Awamutu Wastewater Treatment Plant and Discharge	Waipa District Council
Matangi Wastewater Treatment Plant and Discharge	Waikato District Council
Tauwhare Pa Wastewater Treatment Plant Upgrade and Discharge	Waikato District Council

SCHEDULE THREE

NORTHERN METRO AREA PROJECTS (TBC)

PROJECT	LEAD COUNCIL
Pukete Wastewater Treatment Plant and discharge	Hamilton City Council
Ngaruawahia Wastewater Treatment Plant and discharge	Waikato District Council

SCHEDULE FOUR

MINIMUM PERFORMANCE STANDARDS

PARAMETER	MINIMUM PERFORMANCE STANDARDS FOR DISCHARGES TO WATER
Total Nitrogen	Less than 4.0 milligrams per litre (as annual means).
Total Phosphorus	Less than 1.0 milligrams per litre (as annual means).
Escherichia coli (E.Coli)	Less than 14 cfu per 100 millilitres (as a 95th percentile).
	Noting that the future consents for any water based discharges will likely include specific daily limits on nutrient mass loadings (in units of kg/d rather than concentration limits in mg/l) for both summer and winter flow conditions.

PARAMETER	MINIMUM PERFORMANCE STANDARDS FOR DISCHARGES TO GROUND
Total Nitrogen	Less than 20 milligrams per litre (as annual means).
Total Phosphorus	No specific limit.
Escherichia coli (E.Coli)	Less than 500 cfu per 100 millilitres (as a median).
	Noting that actual parameters will depend on nitrogen and phosphorus loads able to be sustainably discharged to land irrigation systems, and appropriate microbial parameter limits will be dependant on the method and location of discharge to ground.

The minimum treated wastewater quality standards adopted are very high and based on current best practice and delivering "best for river" outcomes which include having a river that is swimmable and safe to gather food from.

In order to give effect to Te Ture Whaimana, alongside these quantitative minimum performance standards, the mauri of the water and land will be protected from adverse effects resulting from any parts of the Projects.

The treated wastewater quality standards would be introduced by 2031 or when the existing discharge resource consent for each wastewater treatment plant expires. Noting that achieving these targets may need to be staged within resource consents to provide sufficient time to upgrade and transition existing plants (i.e., Pukete WWTP) to meet these minimum standards.

For the purpose of completing the DBCs, assumptions have been made regarding discharge methods to be employed at each plant. Appropriate discharge methods will need to be considered and evaluated in detail as part of each Project to support resource consenting of any discharge activities.

For solids stream:

Solids management complexity, extent of solids destruction and energy potential realisation will increase in steps with population equivalent served.

Atmospheric emissions:

(a) Proposed provisions for atmospheric emissions are reasonably general but all would require best practice to be implemented.

(b) In all process plant development, life cycle emissions will be given due consideration. It is anticipated that the councils will adopt and apply the zero carbon bill aspirations and optimization of life cycle emissions generally. These will be drivers for initiatives, particularly in the larger plants, and for processes that drive the plants towards energy neutrality and emissions minimisation.

SCHEDULE FIVE

SOUTHERN WWTP STAGES

Year	Assumed Date	Stage	Description	Assumed Areas Served	Total Stage Built Capacity	Capital Cost Estimate (2020 indexed)	Starting Demand
1 - 3	2022-2024	Stage 1	Pre-Implementation: Land acquisition, designation, consenting, master planning	Land and designation assumed to serve all stages		$20 million	
3-5	2024-2026	Stage 1	WWTP: SBR with discharge to land including procurement and Council overheads and land discharge extension	Airport precinct (no allowance for wet industry)	1,000 m^3/day (5000 PE)	$9.9 million	400 m^3/day (2,000 PE)
19 - 21	2040-2042	Stage 2	WWTP & Discharge: MBR with discharge to Waikato River. Includes conveyance from Matangi to plant, outfall pipeline and structure to river, operator building, sludge dewatering facility.	Airport precinct growth (excluding wet industry) and Matangi/ Tamahere Commercial areas	1,900 m^3/day (9500 PE)	$39.6 m assumes all Stage 1 plant can be reused	1,200 m^3/day (6,000 PE)
29-31	2050-2052	Stage 2	WWTP Upgrade: Additional reactors and membrane equipment	Airport precinct growth, wet industry and Matangi/ Tamahere Commercial areas	3,600 m^3/day (18,000 PE)	$16.5 million	3,600 m^3/day (18,000 PE)
39-41	2060-2062	Stage 3	WWTP: MBR with Energy Recovery (Primary Sedimentation and Digestion) with discharge to Waikato River. Includes conveyance from Southern Hamilton, major increase in treatment capacity.	Airport precinct (with wet industry), Matangi/ Tamahere Commercial, Southern Hamilton	15,600 m^3/day (78,000 PE)	$150.15 million (assumes 60% Stage 2 plant can be reused)	15,600 m^3/day

*The dates included in this table (and used for the Southern Metro DBC) reflect the agreed growth assumptions used for the project. The actual timing and staging of the Southern WWTP will depend on demand for wastewater servicing in the area. Stage 1 is assumed to be required as soon as possible in order to provide a servicing solution for the Airport Precinct that aligns with the objectives of the DBCs. Timing of future stages and the areas serviced will depend on demand.

Attachment 3 - Project Governance Group - 29 April 2022 - Meeting Presentation

Metro Wastewater Detailed Business Case

Governance Group Meeting

29th April 2022

WAIKATO METRO WASTEWATER

Overview

- Seeking endorsement of Southern DBC and MoU and agreement to take to respective partner organisations

- Northern Business case still in production. Specific Governance Group meeting for Short-list assessment planned for 30 May 2022

AGENDA

Item	Topic	Pages
	Welcome and apologies	
	Declarations of interest	
1	Southern Metro WW DBC & Memorandum of Understanding	4-76
2	Overall project update	76-78
3	Northern DBC – Papers	79-83
	Northern Metro WW DBC – Objectives, KPIs and Measures	84-97
5	Northern Metro WW DBC – Growth and Treatment Assumptions	98-113
6	Action List	114-115
7	Minutes from 16th April 2021 Meeting	116-125

Key Recommendations to PGG

- Endorse the Southern WW DBC & recommend to partner organisations for adoption and implementation through LTPs
- Endorse the draft MoU and recommend to partner organisations for signing
- Endorse recommendations to commence implementation activities outlined in the MoU
- Note the need to integrate findings of the Northern and Southern WW DBC including further consideration of timing, investment triggers and sub-regional consenting strategy

Project Vision

Tooku awa koiora me oona pikonga he kura tangihia o te maataamuri

"The river of life, each curve more beautiful than the last"

...a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come.

Overarching objectives

Tooku Awa Koiora – My River of Life

- Delivering "Best for River" outcomes – catchment view, transcending localism
- Cross jurisdiction strategic infrastructure planning and investment
- Supporting and unlocking residential, commercial and industrial growth opportunity
- Delivering the greatest value for money through efficient and future proofed waters systems
- Maximising resource recovery and re-use as part of full water cycle considerations
- Integrated approaches to water, energy and carbon management
- Alternative funding and financing options
- Partnership & Investment Opportunities

Key project decisions (June 2020 – Oct 2021)

Project Vision & Objectives for Full Metro Area

"Best for River"; Boundaryless; Supporting & unlocking growth; efficient & futureproofed Water systems; integrated approaches

Growth Assumptions

Investment Objectives, KPIS and MCA Criteria

- *Water quality;*
- *Biodiversity;*
- *Cultural;*
- *Sustainability*
- *Adaptability*

Treatment Performance Standards

"Pukekohe" or better water quality standards, solids stream, and atmospheric standards

Short-listed Options for Full Metro Area

Preferred WW Servicing Option for Southern

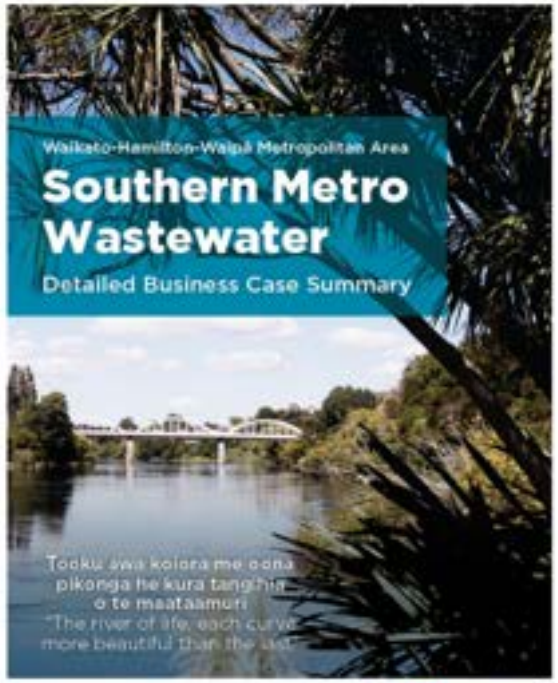
- *New Southern WWTP*
- *Cambridge WWTP*
- *Te Awamutu WWTP*

Delivery mechanisms for preferred option for DBC

Development of MOU to commit to key recommendations in DBC

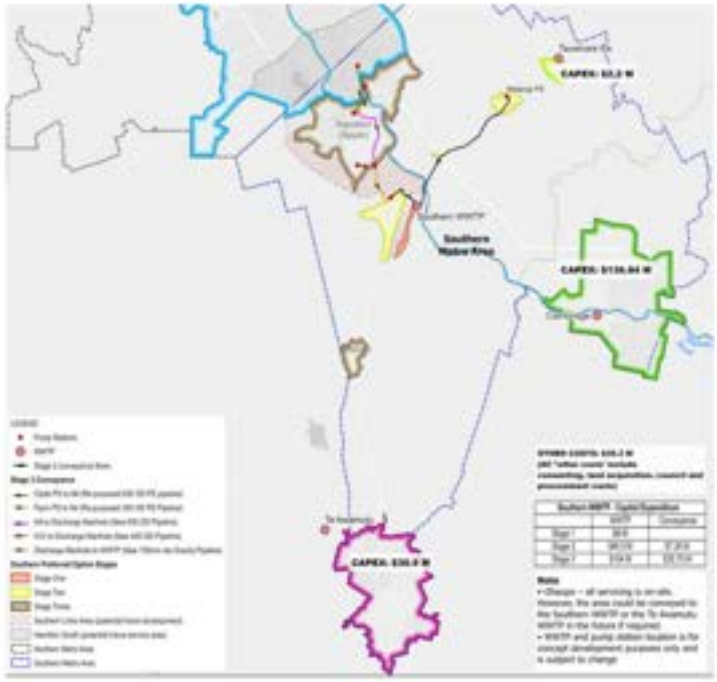
Southern DBC Summary

- Introduction & Purpose of DBC
- Historical context
- Strategic Case
- Economic Case
- Financial Case
- Commercial Case
- Management Case
- Next Steps



Southern DBC Preferred Option

- Minimum performance standards
- New Southern Sub-Regional WWTP
- Upgraded/ New Cambridge WWTP
- Matangi WWTP improvements until diversion to new southern WWTP
- Retain & upgrade Te Awamutu WWTP
- Retain & upgrade Tauwhare WWTP with potential for future



Southern WWTP Staging used for DBC

Indicative Year	Date	Stage Description		Assumed Areas Served	Total Stage Built Capacity	Starting Demand
1-3	2022-2024	Stage 1	Pre-Implementation: Land acquisition, designation, consenting, master planning	Land and designation assumed to serve all stages		
3-5	2024-2026	Stage 1	WWTP: SBR with discharge to land including procurement and Council overheads and land discharge extension	Airport precinct (no allowance for wet industry)	1,000 m³/day (5000 PE)	400 m³/day (2,000 PE)
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*The dates included in this table (and used for the Southern Metro DBC) reflect the agreed growth assumptions used for the project. The actual timing and staging of the Southern WWTP will depend on demand for wastewater servicing in the area. Stage 1 is assumed to be required as soon as possible in order to provide a servicing solution for the Airport Precinct that aligns with the objectives of the DBCs. Timing of future stages and the areas serviced will depend on demand.

Preferred Option P50 estimates

Table 3 – Capital (delivery) costs

Programme Capital Costs ($000's, real)						
Project	**2022-31**	**2032-41**	**2042-51**	**2052-61**	**2062-71**	**Total**
Southern WWTP & Conveyance	29,900	40,260	16,500	150,150	-	236,810
Cambridge WWTP	115,720	4,290	6,050	10,780	-	136,840
Te Awamutu Upgrades	20,900	-	11,000	-	-	31,900
Mātangi WWTP Interim Upgrade	550	-	-	-	-	550
Tauwhare Pā WWTP upgrade	2,200	-	-	-	-	2,200
Total Capital Expenditure	**169,270**	**44,550**	**33,550**	**160,930**	**-**	**408,300**

Estimates in 2021 dollars (excluding inflation). The cost estimates are deemed to be Class 5 estimates as per the AACE Cost Estimate Classification System and have an expected accuracy range of -30% / +50%. Include a 20-30% risk allowance. An allowance of 10% for procurement and Council overhead costs has been added to the capital cost estimates for inclusion in the economic and financial cases. P95 estimates have also been prepared.

Te Awamutu estimates based on the funding included in the Waipa DC 2021 – 2031 LTP. Provisional estimates for Maatangi and Tauwhare further included. Actual costs will need to be revisited in future.

Preferred Option OPEX

Table 4 – Ongoing costs summary

Programme Ongoing Costs (annual, $000's, real)					
Programme cost	**2031**	**2041**	**2051**	**2061**	**2071**
Southern WWTP operating costs	544	672	2,050	2,050	7,400
Cambridge WWTP operating costs	2,040	2,340	2,660	2,790	2,790
Te Awamutu WWTP operating costs	2,600	2,800	3,200	3,300	3,300
Tauwhare Pa WWTP operating costs	40	40	40	40	40
Hamilton South conveyancing operating costs	-	-	-	800	800
Mātangi conveyancing operating costs	-	102	102	102	102
Total operating costs	**5,224**	**5,954**	**8,052**	**9,082**	**14,432**

Operating costs increase as flows and loads increase. OPEX includes power, staff costs, maintenance costs, periodic asset renewals and finance costs. Periodic renewal costs outside of the estimated 80-year asset lives were not included.

Key Financial Risks

- Cost estimates – detailed design work not yet undertaken, supply chain, inflation impacts
- Long-term programme: Accuracy of estimates will decrease over time

Cost allocation methodology used for DBC

Table 5

Component	Methodology
Local reticulation – capital costs	Proposed to be met by the relevant Council (or developer). Relevant council expected to recover these costs from users
Conveyance capital and operating costs	Proposed to be met by the relevant Council because the beneficiaries of the conveyancing would be located within that district
WWTP – capital costs & operating costs	WWTP capital costs allocated between the Councils based on proportion of population equivalents serviced.
Southern WWTP land and consenting costs	Shared pro-rata according to the estimated final state of wastewater flows in 2061.

Affordability

A high-level affordability assessment was undertaken based on an assessment of:

- The burden on ratepayers to fund the additional general and/or targeted rates;
- The cost to developers of development contributions; and
- The debt headroom under the current relevant Local Government Funding Agency (LGFA) covenants for each Council.

Project delivery

Table 13 – Project Lead Councils

Project	Lead Council
Southern Sub-Regional WWTP	Hamilton City Council
Southern Hamilton Conveyance	Hamilton City Council
Cambridge WWTP	Waipa District Council
Te Awamutu upgrades	Waipa District Council
Mātangi and Tauwhare Pā upgrades	Waikato District Council
Matangi / Tamahere Conveyance	Waikato District Council

Governance & delivery

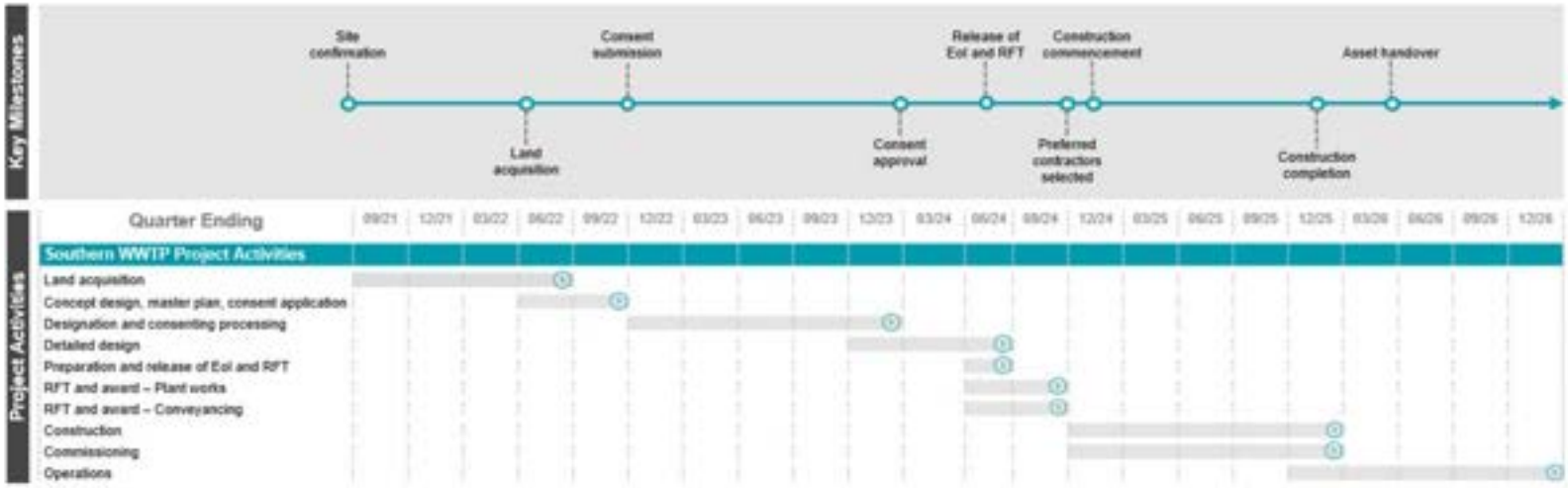
Figure 8 – Governance and delivery structure

Top Risks – Table 14

- Recommended projects cannot be funded
- Costs to implement are significantly higher than estimates
- Recommended projects do not meet partner expectations
- Resource consents and designations for recommended projects can not be secured or costs to deliver consentable solution are prohibitive
- Three Waters reform impacts ability or commitment to implement recommendations
- Inability for councils to move to integrated delivery of programme The burden on ratepayers to fund the additional general and/or targeted rates;

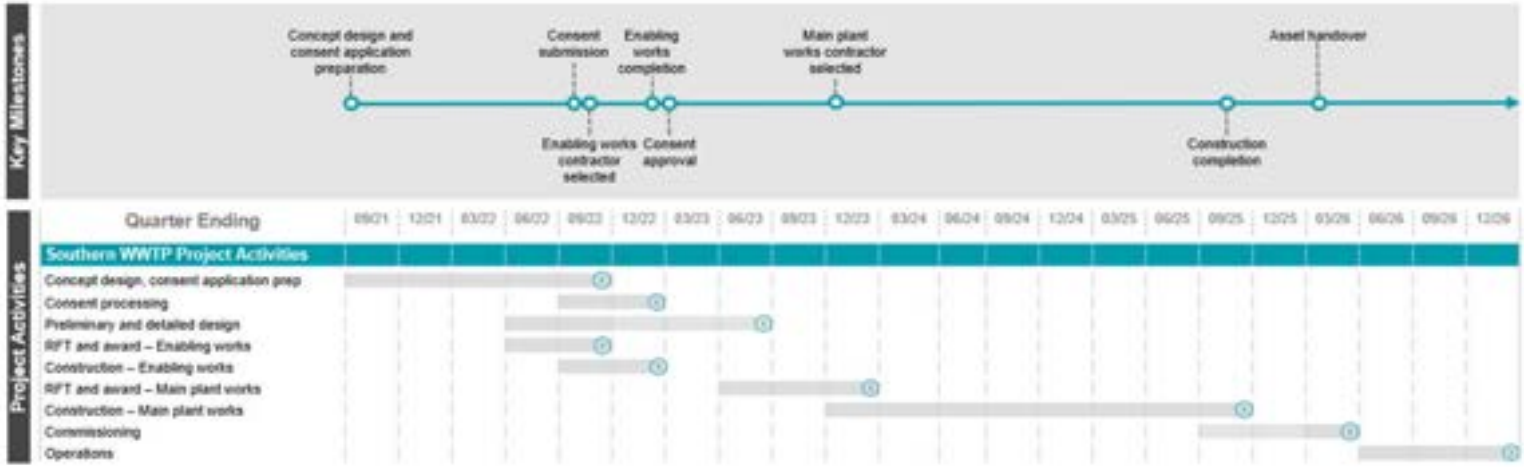
Sensitivity: General

Southern WWTP Stage 1 Implementation in DBC



- Project planning to deliver the project has started
- Looking to stand team up as soon as possible
- Requires funding agreement between

Cambridge WWTP Upgrade Implementation



- Detailed investigations for long term consent application underway
- Target to lodge consent application by Q3 2022
- Have developed Maatauranga Maori Framework which may be useful for other WW projects?

Questions, feedback

Memorandum of Understanding

- Not legally binding but seeks a further level of commitment by partners to support and deliver the preferred option developed through the DBC process
- Varying levels of commitment reflected in the document

MoU Development

- Developed to reflect Governance Group decisions and direction at June 2021 meeting
- June 2021 decisions used to complete the Southern Metro WW DBC document

Proposed Level of commitment in the MoU			
Item	Agree to agree in MoU	Agree principles in MoU	Agreed commitment in MoU
1. Minimum performance / environmental standards			• As per DBC Wastewater Minimum Treatment Standards that were endorsed at Governance Group meeting on 28 October 2020.
2. Governance structure	• Detailed powers of any joint oversight function to be agreed.		• Form of the joint oversight function, parties and scope.
3. Cost allocation, funding and financing		Cost allocation principles for: • Land acquisition for the Southern sub-regional plant • Reticulation / conveyance costs • Plant costs (Masterplanning, consenting and design costs, initial ground works, stages 1-3).	
4. Southern sub-regional plant thresholds	• Investment on the basis of the cost allocation principles outlined in the MoU with specific amounts to be agreed in the future.		• The Southern sub-regional plant thresholds and triggers for investment.
5. Lead Councils			• Allocation of Lead Councils for each project.
6. Cross-boundary servicing arrangements	• Agree to negotiate service agreement details between Councils at appropriate time.		• A service agreement between Councils, based on commercial terms, will be used for servicing of cross-boundary communities.
7. Ownership		• Principle that joint ownership of plant not preferred and that ownership will likely reflect financing / control.	

MoU Development Process

- June 2021 – Decisions and direction from Governance Group
- August 2021 - Engaged Tompkins Wake to develop draft based on agreed structure.
- August 2021 - Project team reviewed (HCC, Waipa DC, Waikato Tainui) & Revision
- Sept 2021 – Initial Taangata Whenua feedback & revision
- Oct 2021 – Control Group Members feedback & revision
- March 2022 – Further feedback from partners with responses & revision
- March 2022 – Legal review comments from partners & revision
- April 2022 – Draft released to PGG

Requested MoU Amendments

- Waikato River Definition add "as defined in the 2008 River Settlement Act s6".
- Clause 3.1 – Remove "endeavour to"
- Clause 3.1 b – Replace "acknowledge" with "recognize and enable".

REPORT RECOMMENDATIONS

That the Waikato Metro Area Wastewater Governance Group:

1. *Receive this report.*
2. *Endorse the Southern WW DBC (subject to any amendments agreed at the meeting)*
3. *Endorse the draft MoU (subject to any amendments agreed at the meeting))*
4. *Endorse recommending the Southern WW DBC (subject to any amendments agreed at the meeting) to the partner organisations for adoption and implementation through their Long Term Planning processes*
5. *Endorse recommending that the partner organisations sign the MoU (subject to resolving the matters outlined in this paper and raise by the Governance Group) and establish the governance framework set out in the MoU.*
6. *Endorse recommending that the relevant Councils commence implementation actions outlined in the Southern WW DBC and the MoU (subject to any amendments agreed at the meeting), including agreeing the framework for funding the SS WWTP.*
7. *Note that a supplementary assessment will be completed to evaluate the impacts of accelerated development of the SS WWTP (i.e., more capacity earlier than assumed for the Southern WW DBC and MoU). The assessment will be completed in parallel with the Northern WW DBC.*
8. *Note that on completion of the Northern DBC the relevant Councils will need to integrate the findings of the Northern and Southern WW DBCs, including further consideration of WW system investment timing and triggers, and development and implementation of th sub-regional WW consenting strategy.*

NORTHERN Metro Wastewater Project

Project Governance Group Meeting

29 April 2022

WAIKATO METRO WASTEWATER

Focus

- To provide an update on work completed to date on the Northern Metro DBC
- To seek approval for updates to the RACIE table
- To seek approval for Investment Objectives, Key Performance Indicators, and MCA criteria
- To seek approval for population and treatment assumptions to be applied to the Northern Metro DBC
- To provide a high-level overview of the short-list options

Northern Metro WW DBC

Part 1: Overview

- Overview and recap
- Process to date
- Description of existing treatment and discharge systems

Part 2: RACIE

- Revised RACIE

Part 3: KPIs and MCA

- Revised KPIs
- Revised MCA criteria

Part 4: Key assumptions

- Population growth assumptions overview
- Treatment assumptions overview

Part 5: Short-list options

- Southern short-list
- Northern short-list options development

Part 6: Next steps

Overview

- The Northern Metro DBC has broadly adopted the assumptions made for the Southern Metro DBC with some recommended changes.
- Approval to commence on this basis approved by Control Group (October 2021)
- Papers seek formal approval from the governance group for:
  - The updated RACIE table for the Northern Metro DBC
  - The Investment Objectives, Key Performance Indicators, and MCA criteria
  - The population and treatment assumptions to be applied to the Northern Metro DBC

Northern metro area

WAIKATO METRO WASTEWATER

Sensitivity: General

Existing system

Ngaaruawaahia: Pond system with Actiflo and UV followed by gravel beds and discharge to the Waikato River via diffuser

Te Kowhai: Recirculating sand filter with discharge to land

Pukete:

WAIKATO METRO WASTEWATER

Short-list options

- Two options from Southern Metro DBC:

Service the Northern Metro Area via the Pukete WWTP

Retain and upgrade both Pukete WWTP and Ngaaruawaahia WWTP

Short-list options

OPTION A

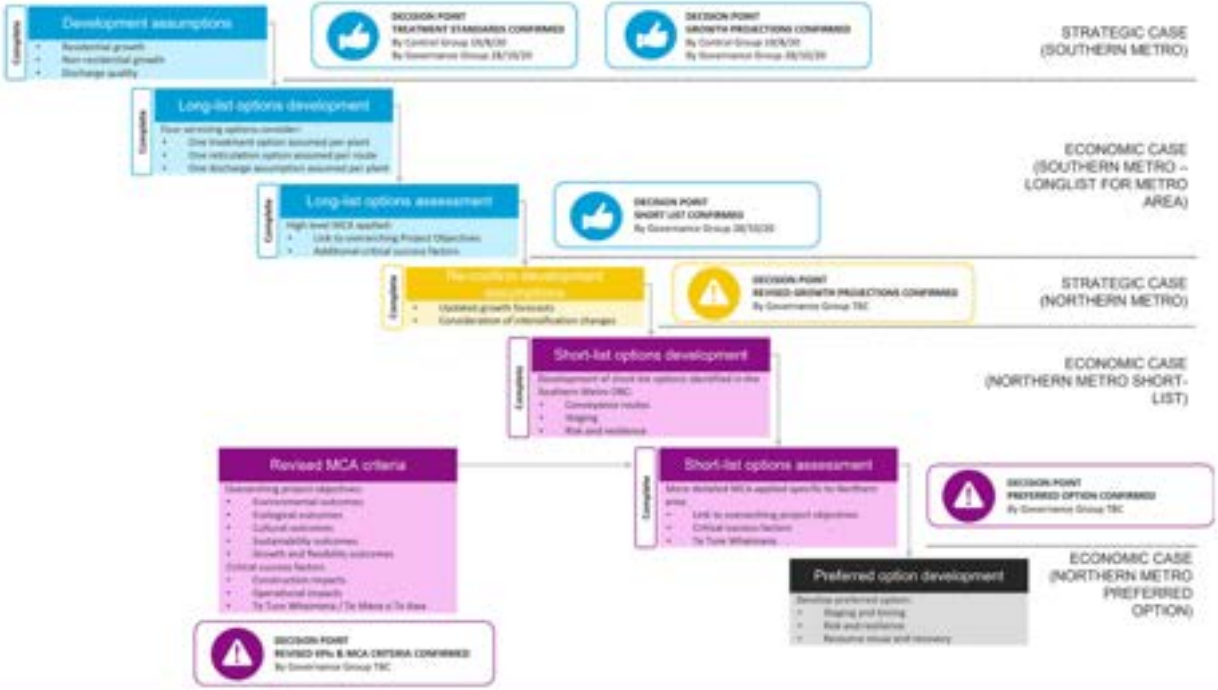
OPTION B1

OPTION B2

OPTION C

Sensitivity: General

Northern metro DBC process

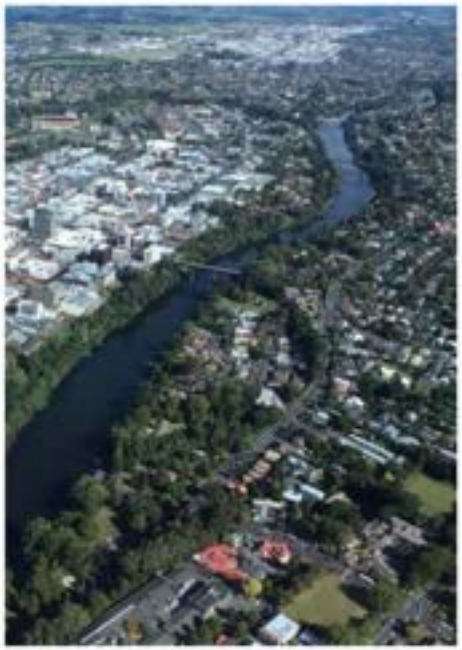


WAIKATO METRO WASTEWATER

RACIE

- Southern DBC RACIE used as a starting point
- Northern DBC RACIE recognises the collaborative process taken to develop and approve the key assumptions (e.g. Objectives, KPIs, Criteria) for the Southern WW DBC
- Minor amendments to reflect change in parties involved and strengthen accountabilities of the governance group as decision makers

Key performance indicators



- Southern DBC KPIs used as a starting point
- Minor amendments to:
  - Focus on contaminant load (rather than concentration) and include pathogens as well as E.coli
  - Include wetland vegetation (as well as riparian)
  - Refocus "number and quality of access points to the river" to the broader ability to physically and culturally connect with the awa and whenua
  - Broaden focus from *carbon footprint* and *biosolids* to greenhouse gas footprint and beneficial reuse of any available resource

Multi-criteria assessment

- Southern DBC criteria used as a starting point
- Minor amendments to:
  - Reflect changes to KPIs
  - Include consideration of the number and location of discharge points to the river and the direct cultural and social impacts of those discharge points
  - Remove Critical Success Factors that are unlikely to provide distinction between the shortlist options
  - Add specific consideration of Te Ture Whaimana as a critical success factor

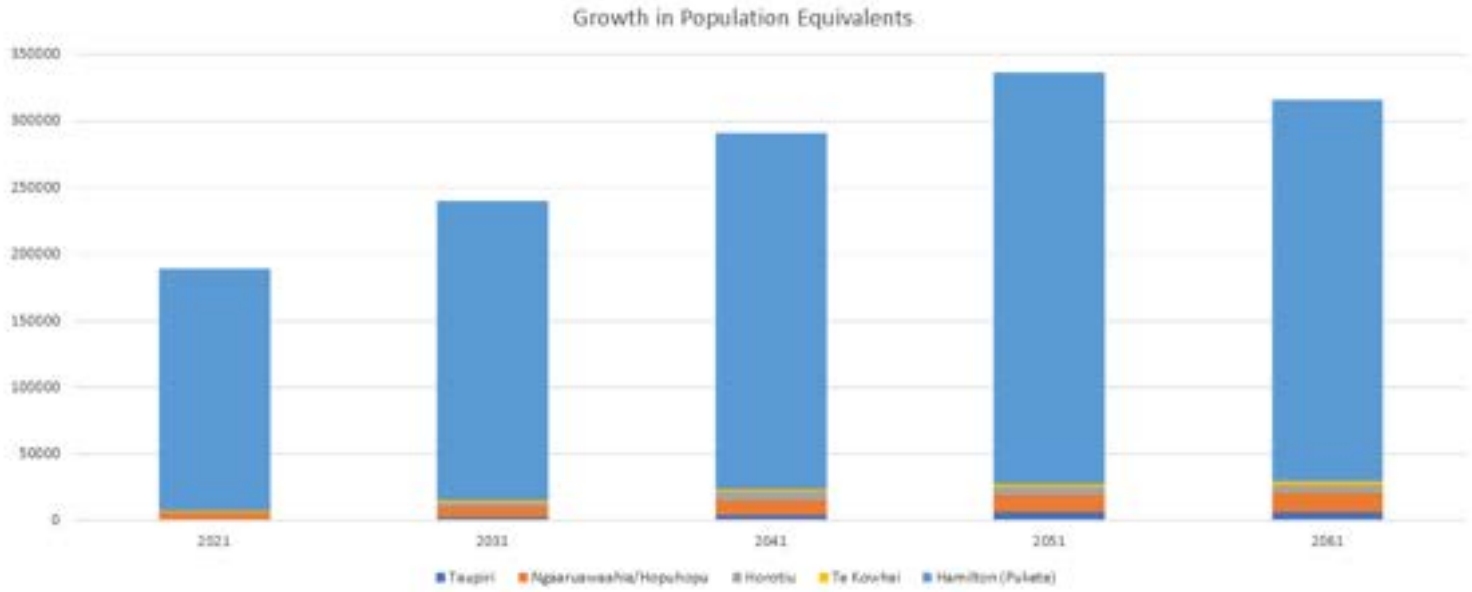
Growth assumptions

- Southern DBC assumptions used as a starting point
- Non-residential growth:
  - Allowance for Ngaaruawaahia Business Hub, Hamilton City assumptions in line with Future Proof Business Demand Capacity Assessment (2021), reduced industrial yield for Waikato District zones (70% vs 80%), Te Kowhai Airport revised to 100 dwellings, Horotiu industrial assumes RITS standard wastewater generation
  - Trade waste: Existing and known discharges included, large industrial facilities with existing private wastewater treatment systems (including Fonterra Te Rapa and AFFCO/Open Country Dairy Horotiu) are excluded
  - Wet industry: For new wet industry areas (Horotiu/Te Rapa) assume 2% of area used for wet industry assuming food processing industry typical wastewater flows, allowance for 50ha additional industrial land at Horotiu as water availability is limited

Growth assumptions

- Residential growth:
  - Waikato District: Updated to reflect the University of Waikato April 2021 'High' projections with additional residential growth for the Taupiri residential growth areas indicated in Waikato 2070. Area outside Te Kowhai township removed (will not be serviced)
  - Hamilton City: Updated to reflect the University of Waikato April 2021 'High' projections combined with industrial population equivalent forecasts. Includes Metro Spatial Plan infill forecasts.
- Sensitivity testing:
  - Faster growth/more growth in Hamilton – including additional intensification per NPSUD
  - More residential growth north of Hamilton (Te Rapa/Horotiu/Te Kowhai/Hopuhopu)
  - Additional wet industry (Horotiu/Te Rapa)

Growth assumptions



Treatment assumptions

- Southern DBC assumptions used as a starting point
- Liquid stream:
  - Nitrogen: <4mg/L TN (annual mean)
  - Phosphorus: <0.5mg/L TP (annual mean)
  - E.coli: <14 cfu/100ml (95th percentile)
  - Pukete: Recycled water supply to Class A/A+ allowing use for industrial purposes and other city uses, but not as a potable water substitute
- Solid stream:
  - Ngaaruawaahia: Dewatering to minimum 19% dry solids
  - Pukete: Anaerobic digestion with energy recovery & advanced mass reduction

Treatment assumptions

- Atmospheric emissions:
  - Noise emissions to comply with District Plans
  - No objectionable odours beyond the site boundary
  - Process units specified and configured to minimise release of fugitive greenhouse gas emissions – targeting nitrous oxide
  - All process development to consider life cycle emissions, maximise energy recovery, and target energy neutrality

Short-list options

- Two options from Southern Metro DBC:

Service the Northern Metro Area via the Pukete WWTP

Retain and upgrade both Pukete WWTP and Ngaaruawaahia WWTP

Short-list options

OPTION A

OPTION B1

OPTION B2

OPTION C

Option A: Pukete only

- All wastewater sent to Pukete - pipes upgraded as required
- Pukete WWTP upgraded to MBR and discharge standard improved:
- Ngaaruawaahia WWTP removed, site remediated
- Considerations:
  - Future use of Ngaaruawaahia site
  - Form of discharge at Pukete

Option B1: Two WWTP

- Te Kowhai, Horotiu and Taupiri pumped to Ngaaruawaahia
- Pipes upgraded as required
- Pukete and Ngaaruawaahia WWTP upgraded to MBR and discharge standard improved
- Considerations:
  - Form of discharge at Pukete
  - Continuation of discharge in proximity to Taupiri Maunga

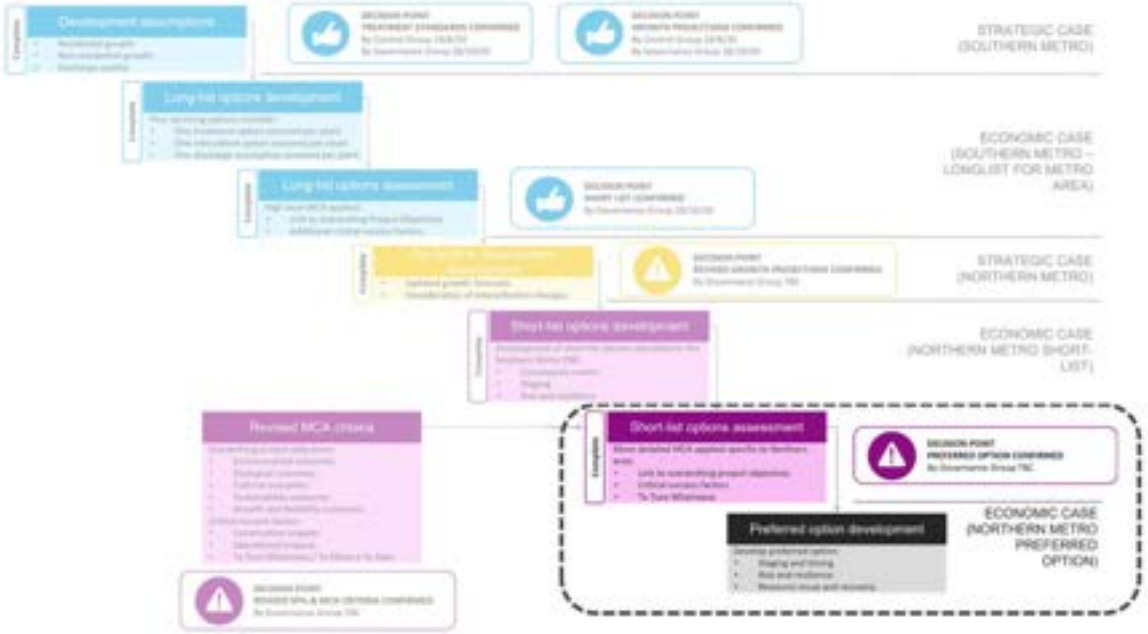
Option B2: Two WWTP

- Taupiri pumped to Ngaaruawaahia
- Te Kowhai and Horotiu pumped to Pukete
- Pipes upgraded as required
- Pukete and Ngaaruawaahia WWTP upgraded to MBR and discharge standard improved
- Considerations:
  - Form of discharge at Pukete?
  - Continuation of discharge in proximity to Taupiri Maunga

Option C: Do minimum

- Improvement over baseline, but less significant than other options – purpose is to provide a comparison to show improvements under Options A, B1 & B2
- Te Kowhai, Horotiu and Taupiri pumped to Ngaaruawaahia (Te Kowhai subject to funding)
- Pipes upgraded as required
- Ngaaruawaahia WWTP upgraded to MBR and discharge standard improved
- Pukete WWTP "business as usual" upgrade

Next steps



Next steps

- 30 May 2022 Governance Group Meeting
  - Present short-listed options assessment
  - Seek endorsement of proposed way forward to complete Northern WW DBC

Attachment 4 - Southern Metro Wastewater Detailed Business Case - Final Unformatted version

Strategic Case Contents

Figures

Tables

Appendices

Document Control

Document Information

	Position
Document ID	
Document Owner	
Issue Date	4/9/20
File Name	Waikato Metro Wastewater Treatment Detailed Business Case

Document History

Version	Issue Date	Changes
0.0	21/8/2020	GHD review – Minor changes made to chapters 1 to 3
1.0	28/8/2020	PwC review – Changes made to wording and figures to be clearer and more concise
1.1	4/9/2020	Partner review –Review to be undertaken (no changes currently made)
1.2	2/03/2020	Updates made to Draft Strategic Case following Partner review and comments received
1.3	13/10/2021	Document restructure, inclusion of recently available information and inserts from partner organisations
1.4	24/02/2022	Updates from client comments and initial peer review
1.5	22/04/2022	Updates from final peer review, readability review and client comments. Issued to PGG

Document Review

Role	Name	Review Status
Project Manager and Business Case Specialist	*Tim Eldridge*	Draft issued for endorsement

Document Sign-off

Role	Name	Sign-off Date
Senior Responsible Owner/ Project Executive	*Jackie Collier*	

Glossary of Terms

Abbreviation	Description
ADWF	Annual Daily Wastewater Flows
AEE	Assessment of Environmental Effects
BBC	Better Business Case
BOD	Biochemical Oxygen Demand
DBC	Detailed Business Case
DIA	Department of Internal Affairs
IBC	Indicative Business Case
KPI	Key Performance Indicators
LTP	Long Term Plan
MCA	Multi-criteria assessment
MCI	Macroinvertebrates Community Index
NPS	National Policy Statement
RMA	Resource Management Act
TLA	Territorial Local Authorities
UV	Ultraviolet
WWTP	Wastewater Treatment Plant

Disclaimer

This report: has been prepared by GHD/BECA for Hamilton City Council as the lead agent for the Waikato - Hamilton Metro Area Wastewater Detailed Business Case Project. The Waikato - Hamilton Metro Area Wastewater Detailed Business Case Project is being delivered and funded by the project partners Hamilton City Council, Waipa District Council, Waikato District Council, Waikato-Tainui (Te Whakakitenga o Waikato) and mana whenua from the Metro area. The report may only be used and relied on by the project partners as set out in section 1.1 of this report.

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The Cost Estimate has been prepared for the purpose of making a relative assessment of options and must not be used for any other purpose.

The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD/Beca does not represent, warrant or guarantee that the project can or will be undertaken at a cost which is the same or less than the Cost Estimate.

Executive summary

Introduction

This report sets out the Strategic Case for the Waikato Southern Mero Area Wastewater Detailed Business Case (Southern Metro DBC).The purpose of the Strategic Case is to evaluate the need for the project and the case for change. The case for change has been informed by examining the problems of the existing wastewater management situation and refining the benefits of addressing the existing problems. Investment objectives are also defined to inform the other cases.

This report also includes:

- An overview of the approach taken to develop the DBC
- Strategic context relevant to the Waikato Metro Area and this DBC including geographic extent, historical context, Te Tiriti o Waitangi Settlements, wastewater assets, previous wastewater servicing investigations, relevant policies and plans, and population and land use assumptions.

Local authorities, iwi, communities and industry face significant challenges in meeting their current and future three waters service needs.

The Waikato Metro Wastewater Detailed Business Case (DBC) seeks to provide a long-term wastewater infrastructure solution for the Hamilton-Waikato-Waipa Metropolitan Areas.

The study area for this DBC includes the following communities and areas of future development, which lie within the Metro Area. These communities have been separated into northern and southern areas:

Northern Communities

- Taupiri
- Hopuhopu
- Ngaaruawaahia
- Horotiu
- Te Kowhai
- Hamilton (North)
- Area east of Hamilton

Southern Communities

- Mātangi
- Tamahere
- Hamilton Airport
- Ohaupo
- Cambridge/Karapiro
- Te Awamutu /Kihikihi
- Tauwhare
- Tauwhare Pa

The Case for Change

The Waikato Sub-regional Three Waters Strategic Case (2019) highlights the water infrastructure issues the Waikato River sub-regional catchment area is currently facing. These issues relate to all three waters (i.e., drinking water, wastewater and storm water) and to the wider management of water resources and infrastructure. The programme level problem statements have been adopted for this Project and refined to reflect the specific wastewater issues within the Metro Area. The table below provides a high-level summary of the programme problems.

Table SC - ES 1: Programme problem statement and relevance to the project

Problem	Programme Problem Statement	Relevance to Wastewater Treatment within the Metro Area
Problem One	Lack of integrated catchment management and urban waters long-term planning, founded on: - a common vision and agreed future outcomes that are unconstrained by territorial boundaries - the application of both Maatauranga Māori and conventional science methods, and - appropriate funding provisions is resulting in inefficient, near-sighted decision-making and degraded health and well-being of the Waikato River.	There is currently no long-term integrated wastewater services planning, funding or operations and maintenance across the Metro Area. This creates the potential for misalignment in wastewater planning and servicing objectives, methods and approaches. Development and land use changes often occur without full appreciation of the impacts on wastewater infrastructure and the investment needed to provide capacity for growth, in the short and long-term. As a result, development and growth can occur without the necessary infrastructure and investment needed to service it. This adds more pressure to existing systems, and at times contributes to further degradation of the health and wellbeing of the Waikato River through increased contaminant loading from wastewater treatment plant discharges and network overflows. This problem has led to reactive and short-sighted wastewater infrastructure decisions in the Metro Area. The impact of these short-sighted and reactive investment decisions are further evidenced in problem two.
Problem Two	Historic land confiscations coupled with inconsistent, short-term and parochial regulatory, planning and investment decisions on land use and urban water resource management have contributed to: - cultural disconnect, - degraded water quality, - poor ecosystem health and over allocated resources. As a consequence, the relationships and aspirations of communities with the Waikato River and the ability of Waikato River iwi to exercise mana whakahaere or conduct their tikanga and kawa have been severely compromised.	Problem two further investigates how short-sighted and reactive investment decisions have affected river water quality, river ecosystems, Te Mana o te Awa and contributed to the cultural disconnect, through an inability by mana whenua to exercise mana whakahaere. There are differences in the way that council engage with iwi and mana whenua on wastewater activities across the Metro Area. Currently individual councils react to wastewater issues as they occur, making it difficult to apply consistency and planned decision making to the wider wastewater treatment network. This means wastewater treatment facilities are consistently falling short of environmental and cultural standards and impacting the health and wellbeing of the river.
Problem Three	Reactive infrastructure planning practices coupled with: - light-handed regulation and compliance - inconsistent management practices, standards and performance expectations has led to variable urban water system performance across the region and has adversely impacted the health and well-being of the Waikato and Waipā Rivers.	Reactive infrastructure planning practices are evidenced in problem statements one and two. This problem focuses on the issues of regulation, compliance and inconsistent and changing practices, standards and performance expectations across the three councils concerning the treatment of wastewater and how this has led to variable performances of WWTPs.

Problem	Programme Problem Statement	Relevance to Wastewater Treatment within the Metro Area
Problem Four	The legacy of under investment in urban water systems coupled with: - infrastructure reaching end of life. - increasing regulatory requirements; - environmental expectations. - climate change impacts. - greater growth demands; has created a significant investment deficit. This has resulted in unaffordable current and future costs for new infrastructure, maintenance and operations and human capacity and capability challenges within the waters sector.	This problem further investigates issues related to affordability, ageing infrastructure and assets, climate change impacts and growth and capacity impacts. These have all led to a wastewater infrastructure deficit across the Metro Area.

Ageing wastewater infrastructure, increasing regulatory requirements and environmental expectations, climate change impacts and greater growth demands have created a significant investment deficit in the Metro Area.

To accommodate partner and stakeholder expectations for future growth, to make the necessary performance improvements to current infrastructure that recognise and provide for Te Mana o te Awa, Mana Whakahaere, and give effect to *Te Ture Whaimana*, requires an approach founded on Te Tiriti o Waitangi and a long-term wastewater servicing strategy unconstrainted by territorial boundaries.

Investment objectives

SMART investment objectives (Specific, Measurable, Attainable, Relevant and Time bound) that apply specifically to wastewater management have been developed to inform options assessments and identification of the preferred servicing solution for the Southern Metro Area.

The investment objectives were developed and agreed by the project partners as part of this DBC. The investment objectives also built on the Best for River Statements and high-level objectives developed in the *Strategic Case – Compelling Case for Change* and with reference to relevant regulatory and planning documents, including *Te Ture Whaimana o Waikato* and *Tai Tumu Tai Pari Tai Ao*. The following objectives have been developed to align with the Te Ture Whaimana and the Best for River definition.

1. Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect kai from the river and connected waterways, thereby contributing to the restoration and protection of the health and wellbeing of the river.
2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and around water bodies is enhanced through the reduction of wastewater treatment and discharge impacts before 2050.
3. Wastewater treatment solutions contribute to restoring and enhancing cultural connectivity with the river so that before 2050 marae, hapuu and Iwi access to the river and other sites of significance for cultural and customary practice within the Metro Area are no longer impeded by wastewater treatment solutions.
4. Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from wastewater treatment systems before 2050.
5. The wastewater solution provides sufficient capacity to ensure sustainable growth in the Metro Area in accordance with growth projections assumptions for the next 100 years.

Benefits

Three benefit statements were developed as part of the Waikato Sub-regional Three Waters Strategic Case. This project, whilst only focusing on wastewater treatment within the Metro Area will contribute towards delivering these benefits. This is outlined further below.

Table SC - ES 2: Programme benefits and relevance to the project

Benefit	Programme Benefit Statement	Relevance to Wastewater Treatment within the Metro Area
Benefit One	River health and quality is enhanced and people's connection with the River is restored. This benefit statement relates to: • the need to work collaboratively towards achieving the goals and objectives of Te Ture Whaimana • the need to improve the water quality of the Waikato River along its entire length, including reducing turbidity, E.coli bacteria and nitrogen and phosphorous contaminants present in the river • improving people's connections, interactions and appreciation of the river, and increasing the length of the river that is suitable for swimming and safe collection of kai. The Waikato River and region's waterways can be used more actively and commonly for customary, recreation and education practices.	The DBC contributes to achieving this benefit through: • The partnership approach and collaboration that is central to delivering this DBC • Adopting Te Ture Whaimana as the project vision and ensuring direct linkages between the project SMART objectives and Te Ture Whaimana to ensure it is at the forefront of all considerations. • Project objectives 1, 2 and 3 align directly with this Benefit Statement.
Benefit 2	Commitment and dedication to a collaborative and integrated approach to land, water, community planning that is holistic, integrated, aligned with community aspirations, and provides opportunities for involvement by the wider community.	The project is intended to deliver an integrated, holistic and collaborative wastewater treatment solution. The scope of the project (i.e. the Metro Area) is broader than the territorial boundaries and considers wastewater treatment as a wider network, rather than in isolation. By assessing solutions in a boundaryless way, the Project is well placed to achieve a collaborative response to the wastewater treatment issues in the Metro Area. Wider land use and development decision-making has also been incorporated into the Project to deliver a fully integrated approach. It is expected that the Metro Spatial Plan (as outlined in Appendix B) will evolve to align with the metro-wide wastewater treatment strategy to be developed as part of this Project.

Benefit	Programme Benefit Statement	Relevance to Wastewater Treatment within the Metro Area
Benefit 3	Deliver Best for River solutions and approaches for managing growth and resource sustainability. This benefit statement relates to: • the need to invest efficiently in existing and new three waters infrastructure to meet growth demands for appropriate land uses and improve the capacity and capability to efficiently manage associated waters infrastructure provisions • the need to prioritise investments in the sub-region as a whole based on the condition and risk of assets, and offset maintenance and renewal costs through a reduction in reactive repair and maintenance costs • the need to achieve national/regional standards and targets, and investment in infrastructure and servicing solutions that are energy efficient to deliver Best for River outcomes. There are strong linkages between this benefit and the targets and outcomes sought in the World Future Council's Regenerative Cities report: • Initiating comprehensive political, financial and technological strategies for an environmentally enhancing, restorative relationship between urban communities and the ecosystems from which they draw resources for their sustenance[6]	Project objectives 4 and 5 align directly with this Benefit Statement.

1. Introduction

The Hamilton-Waikato Metropolitan Area (Metro Area) is the urban sub-region of the Waikato. Hamilton is at the core of the Metro Area which extends from Taupiri in the north to Te Awamutu and Cambridge in the south[1]. The Metro Area sits across three local authority jurisdictions (Waikato District, Hamilton City, Waipā District).

The Metro Area is located on tribal lands unjustly confiscated by the Crown in 1865. The Raupatu (confiscated) lands were the subject of a Treaty of Waitangi claim and the 1995 Waikato Raupatu Land Settlement.

In 2009, Waikato-Tainui entered into a deed of settlement in response to the Raupatu claims over the Waikato River. The Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 (the Waikato-Tainui Act) gave effect to the 2009 deed of settlement. The overarching purpose of the settlement is to restore and protect the health and wellbeing of the river for future generations.

Recommendations in this DBC are based on achieving "*Best for River, Best of Community*" outcomes that seek to contribute to achieving the vision and objectives of *Te Ture Whaimana o te Awa o Waikato (The Vision and Strategy for the Waikato River)*.

Challenges

Local authorities, iwi, communities and industry face significant challenges in meeting current and future three waters service needs in the Metro Area. Ongoing population growth and development in the Metro Area and the broader Waikato River catchment is increasing pressure on lands and waters. These pressures manifest in negative ways, from degraded environmental quality and loss of biodiversity through to constraints on water allocation.

Many of the municipal wastewater treatment plants (WWTPs) in the sub-region have poor resource consent compliance records. The majority of municipal wastewater discharge consents will expire in the next 10 years. System performance has been variable, and not of the standard needed to meet Best for River principles and achieve the environmental, cultural and economic aspirations of the sub-region.

Historically, each of the three local authorities in the Metro Area have planned and funded wastewater infrastructure separately. Tangata whenua have been excluded from strategic infrastructure planning resulting in a lack of system thinking and integration. In some instances, this has resulted in short-term investment decisions, including deferred investment decisions, which do not align with the vision for co-governance established in the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010.

1.1 Purpose

This DBC identifies and recommends long-term wastewater treatment solutions for the Metro Area unconstrained by territorial boundaries. The DBC seeks formal approval to invest in a wastewater treatment solution for the Southern Metro Area (refer to Figure SC - 3:).

The DBC has been delivered through a partnership between taangata whenua and the three local authorities. The project delivery structure has sought to give effect to Te Tiriti o Waitangi partnership in the form of equal representation between local authorities and iwi/hapuu at all levels of the project (i.e., from governance through to technical project teams).

[1] Hamilton – Waikato Metro Spatial Plan, 2020.

In summary, the purpose of this DBC is to:

- Identify the investment option that delivers Best for River outcomes
- Prepare the investment proposal for procurement
- Plan the necessary funding and management arrangements for the successful delivery of the project
- Inform a proposal to decision-makers to seek agreement and finalise the arrangements for implementation and funding assessment of the project.

1.2 Better Business Case Approach

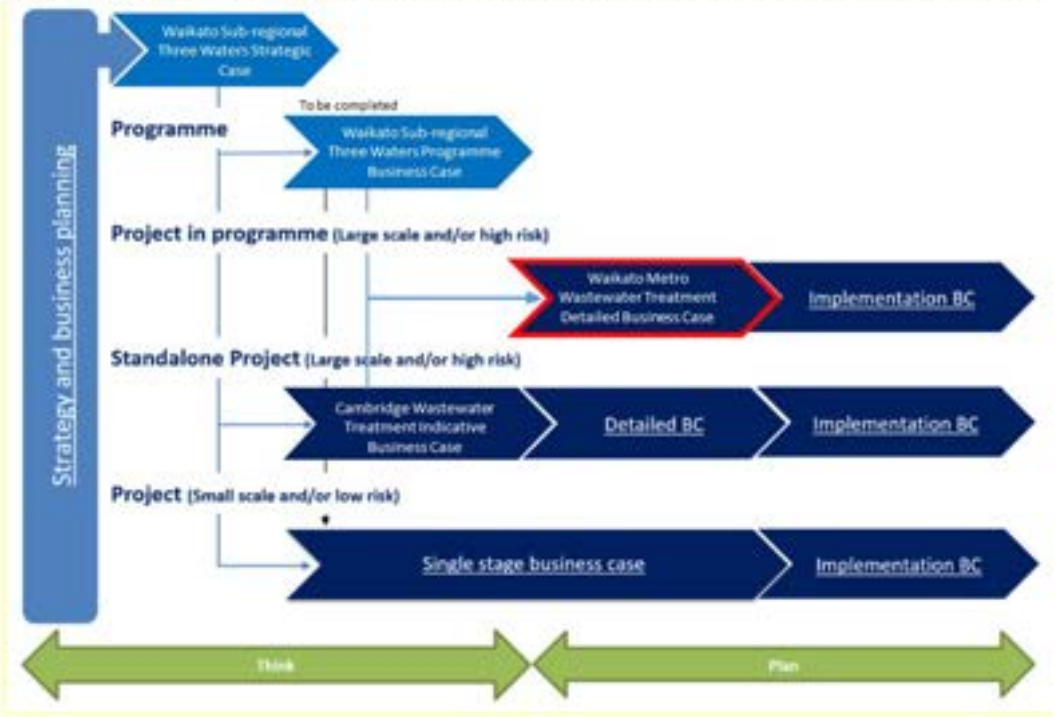
The five case Better Business Cases model (BBC) has guided this DBC. The BBC model provides a disciplined, step-by-step approach to ensure the key aspects of a robust investment proposal are explicitly and systematically addressed (NZ Treasury, 2018).

The Waikato Sub-Regional Three Waters Strategic Case was approved in December 2019, which provided a compelling case for change in the way that water, wastewater, and stormwater (three waters) services are planned, managed and delivered in the Waikato and Waipā river catchments. A Waikato Sub-Regional Three Waters Programme Business Case (PBC) building on the earlier strategic case is being undertaken and is expected to be completed in 2023. The PBC will incorporate the work undertaken to complete this DBC as well as the work currently being undertaken for the Northern DBC in relation to Wastewater. The PBC will incorporate this information with water supply and stormwater to provide a long-term understanding of the Three Waters programme for the sub-region.

The Cambridge Wastewater Treatment Indicative Business Case (IBC) was also approved in late 2019. This indicative case set out the case for change, and high-level options assessment for the Cambridge WWTP. Both projects provide key inputs to the 'thinking' part informing this DBC process, mapping out the strategic intent for the wastewater infrastructure within the Metro Area (see Figure SC - 1).

This DBC moves into the 'planning' phase of the process.

Figure SC - 1: The Better Business Cases Framework – Think and Plan phases (NZ Treasury, 2018)



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To achieve the DBC purpose (in line with the BBC guidelines) the following five cases are investigated: Strategic Case, Economic Case, Financial Case, Commercial Case and Management Case.

The high-level purpose and scope of each case is as follows:

- The Strategic Case evaluates the strategic need for the project and case for change. The case for change has been informed by examining the problems of the existing situation and refining the benefits of addressing the existing problems. Investment objectives are also defined to inform the other cases.
- The Economic Case evaluates whether the project is environmentally, socially, culturally and economically desirable through identifying options and evaluating which option best aligns with the project investment objectives. Through this DBC a longlist of wastewater servicing options for the full Metro Area is evaluated utilising a Multi-Criteria Assessment (MCA) to determine a shortlist of options. The short-listed options are refined, and a more detailed MCA of these options completed to determine a preferred way forward for the Southern Metro Area[2].
- The Commercial Case evaluates whether the preferred way forward is commercially viable. A longlist of potential commercial models and procurement options are assessed to determine preferred options. A detailed procurement strategy has also been developed as part of the Commercial Case.
- The Financial Case evaluates the affordability of the project to determine whether it is financially feasible. A longlist of funding and financing options was identified, refined and evaluated to determine a shortlist and then to determine a preferred way forward. A funding and financing strategy has been developed as part of the Financial Case.
- The Management Case evaluates whether the project can be practically delivered and outlines the governance structures, plans and management aspects required to implement the preferred option.

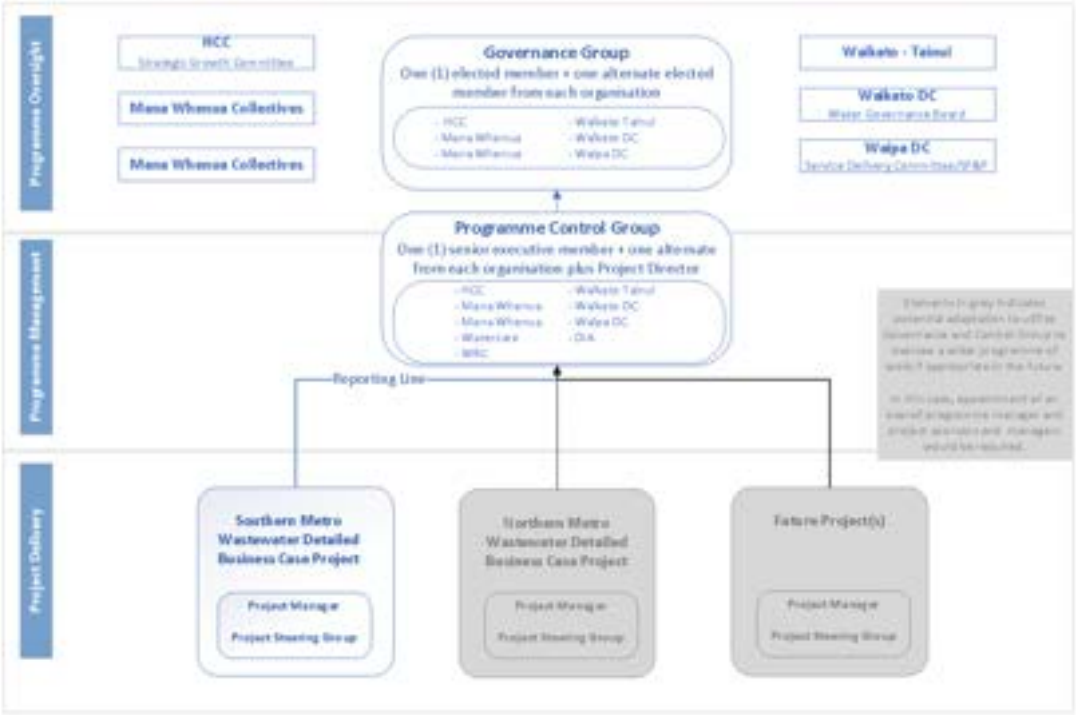
[2] A cost benefit analysis is not to be undertaken due to the challenges in monetizing environmental and cultural benefits.

Stakeholder engagement, risk management and benefits realisation strategies have been developed as part of the Management Case.

1.3 Partnership and Collaboration

Delivering this DBC has been a collaboration between HCC, Waipā DC, Waikato DC, Waikato-Tainui and Mana Whenua representatives (collectively referred to as "the Partners") at all levels of the project structure. The membership of the Governance and Control Groups provide for equal representation for local government and Iwi/Mana whenua.

Figure SC - 2: Metro Wastewater DBC Project Governance Structure[3]



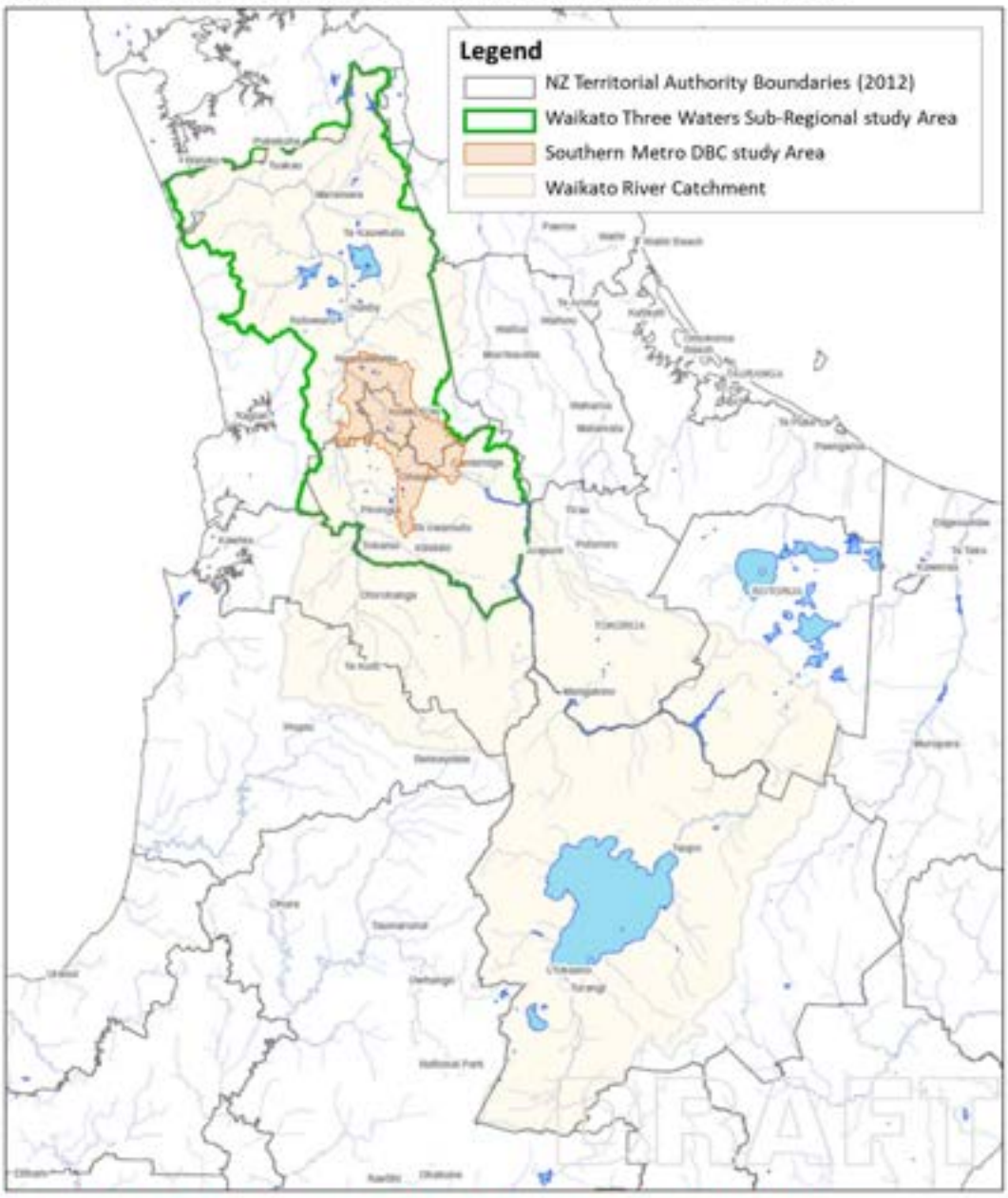
Key milestone decisions informing this DBC were made by the Partners throughout the project. The process adopted for decision-making has been to develop and review the key project elements with subject matter specialists from the partnership; seek endorsement from the Project Control Group; seek approval from the Project Governance Group.

Key decisions have included:

- Scope of the DBC
- Growth assumptions
- Project vision, Investment Objectives and Key Performance Indicators (KPIs)
- Long list and short list of commercial, financial and wastewater servicing options
- Preferred commercial, financial and wastewater servicing solutions
- Minimum treatment performance standards.

[3] Hamilton – Waikato Metro Area Wastewater Detailed Business Case Project – Project Governance Terms of Reference

Figure SC - 3: Waikato Three Waters Sub-Regional study area and project study area



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2. Strategic Context

This DBC seeks to identify the most innovative, responsive and timely wastewater servicing solutions, unconstrained by territorial boundaries, while creating better environmental outcomes, community benefits and overall efficiencies than can currently be achieved by individual councils.

A "boundaryless" approach is considered essential to restoring and protecting the health and wellbeing of the Waikato River. A boundaryless approach can deliver greater alignment and consistency in approach and objectives, economies of scale, support the adoption of new and emerging technologies. It can secure a future state of water and overall environmental gains that individual local authorities will struggle to realise alone.

Benefits of this approach include a more holistic, integrated and planning approach to land use and water, including responding to current and future growth, more efficient resource use (including water, energy, carbon, nutrients), water quality improvement and ecological enhancement.

Currently Hamilton City, Waikato District, and Waipā District Councils are individually responsible for three waters infrastructure and services in their respective communities. Despite best intentions and considerable work and expenditure on three waters infrastructure, decisions relating to this infrastructure and land use and development in the Waikato River catchment have contributed to a current state where:

- The water quality of the Waikato River is significantly degraded.
- Three waters infrastructure is inefficient and ageing, no longer fit-for-purpose.
- There is with a significant legacy of under-investment.
- There is uncertainty around the abilities of individual councils to fund infrastructure, maintenance and operations for future growth and to achieve regulatory targets for freshwater quality.
- There is concern under existing funding arrangements that ratepayers will not be able to afford appropriate three waters infrastructure in the future.
- Developers in some areas are providing their own site-specific infrastructure (e.g., wastewater package plants) leading to fragmented networks and services that are complex to manage and renew, increasing the risk of failure and resulting environmental degradation.

Future growth pressures, environmental expectations and increased regulatory requirements (such as Te Ture Whaimana and the National Policy Statement for Freshwater Management) are likely to exacerbate these issues. Without a coordinated solution to these problems, three waters infrastructure will be a hand brake on development in our Metro Area. Ongoing environmental degradation will occur.

2.1 Geographical context

The Metro Area extends from Taupiri in the north to Te Kowhai in the west, Tauwhare in the east, and Te Awamutu/Kihikihi and Cambridge in the south.

The DBC considers wastewater servicing for the following communities[4] (separated into northern and southern areas):

[4] Gordonton, Pirongia, Whatawhata and Tamahere Country Living Area were excluded from the scope of the study at the direction of Waikato and Waipa District Council.

Northern Communities

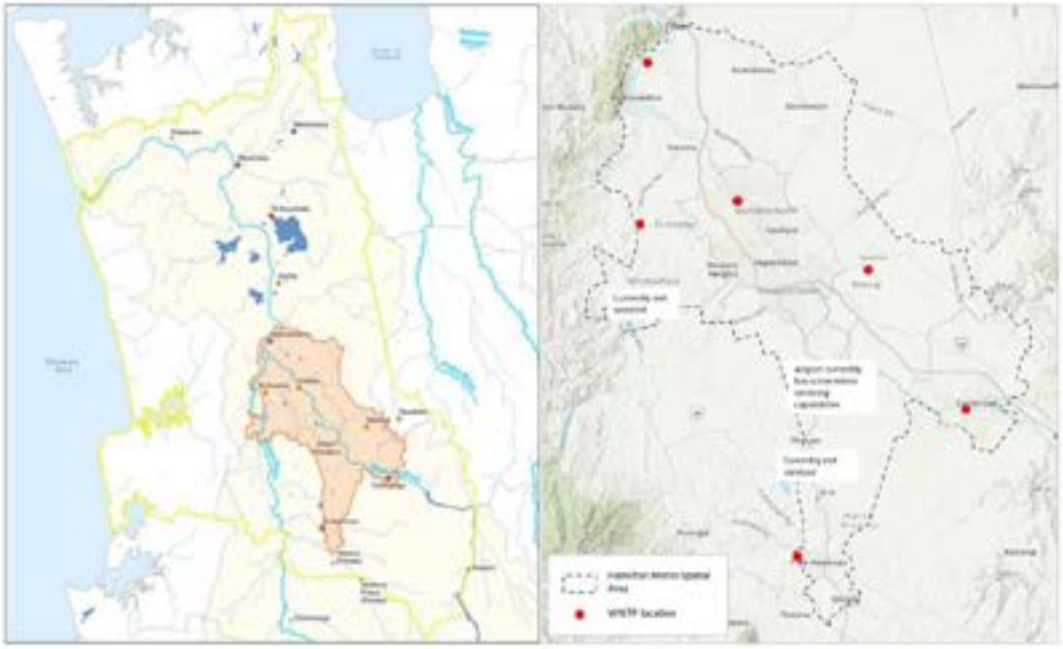
- Taupiri
- Hopuhopu
- Ngaaruawaahia
- Horotiu
- Te Kowhai
- Hamilton (North)
- Area east of Hamilton

Southern Communities

- Mātangi
- Tamahere
- Hamilton Airport
- Ohaupo
- Cambridge/Karapiro
- Te Awamutu /Kihikihi
- Tauwhare
- Tauwhare Pā

Figure SC - 4: shows the location of these areas and existing wastewater treatment plants within the Metro Area.

Figure SC - 4: Metro Wastewater Detailed Business Case Study Area: Southern Metro Area[5]



Graphic designer to redraw map, graphic to show the extent of the communities included in the study, Waikato River, overall boundary, show the location of the plants accurately, show the airport, label the Fonterra Hautapu site.

[5] Note: The Northern Metro Area and Southern Metro Area boundary shown is indicative only and subject to further consideration following existing WWTP capacity assessments.

2.2 Historical Context

Taangata Whenua within the Metro Area are descended from the Tainui waka. There are six significant iwi/hapuu groupings within the Metro Area boundaries: Ngaati Hauaa, Ngaati Korokii- Kahukura, Ngaati Maahanga, Ngaati Mahuta, Ngaati Tamainupo, and Waikato-Tainui.

The southern towns of Cambridge and Te Awamutu includes additional mana whenua Ngaati Maniapoto, Raukawa, Ngaati Apakura, Ngaati Hikairo, and Paretekawa.

The Metro Area contains significant landmarks, including the sacred Taupiri mountain and the Waikato River. It is said that Taupiri lived near her brother Tongariro until her marriage to the mountain chief Pirongia brought her to her new home near Ngaaruawaahia. Upon her arrival she became ill and sent a message asking Tongariro to deliver healing waters. Tongariro sent a faithful dog to cut a pathway between Tongariro and Taupiri – said to be the origin of the Waikato River. Taupiri recovered once she was able to drink the healing waters.

Tangata whenua hold the Waikato River in very high regard, viewing it as an ancestor who is a source of sustenance, identity and mana. They view themselves as belonging to, and being part of, the River, and they have an obligation to protect it.

Prior to European settlement, the Waikato River and all its tributaries in the Metro Area would have had very high water-quality and would have been mostly free of contaminants other than those occurring naturally, such as vegetation litter and sediments from naturally occurring stream erosion and scour. The Waikato River, streams, lakes and extensive wetlands in the Metro area (and indeed throughout the entire catchment) teemed with life. Tuna (eels), whitebait species (inanga, banded kokopu and giant kokopu), smelt, piiharau (lamprey eels), kanae (mullet – yellow-eyed and grey), paatiki (flounder), kaakahi/kaaeo (freshwater mussels) and koura (freshwater crayfish)[6] lived in one or more of these different types of water body. The health, wellbeing and abundance of resources provided food, rongoa (medicines) and materials for making tools, clothing, houses, fortifications, weapons and canoes, and sustained the people physically, mentally and spiritually.

In 1858 the Kiingitanga movement originated in the Waikato region under the first Maaori King Pootatau Te Wherowhero to unite iwi and halt the alienation of Maaori land. The movement continues to this day with the headquarters of the Kiingitanga movement located at Tuurangawaewae Marae in Ngaaruawaahia, on the eastern banks of the Waikato River. It is the official residence of the current Maaori King, Tuheitia Pootatau Te Wherowhero VII. On 12 July 1863, British troops crossed the Mangatawhiri Stream, breaching the aukati (a boundary not to be crossed) declared by the second Maaori King Taawhiao, and invaded Waikato.[7]

In 1864 and 1865, military settlements, including Hamilton and Cambridge, were established.[8] In 1865[9], by Orders in Council under the New Zealand Settlements Act 1863, the Crown unjustly confiscated approximately 1.2 million acres (approximately 500,000ha) of Waikato-Tainui land from the Tainui iwi in order to punish them and gain control of the land placed by them under the protection of the Kiingitanga.[10]

New settlers occupied the confiscated lands, wetlands were drained, and farms and towns developed. The development contributed to the economic growth of New Zealand but resulted in the pollution and

[6] Waikato-Tainui Te Kauhanganui Incorporated, 2013, s.22.1.5, p.186

[7] *Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010*, Preamble, paragraph 5

[8] Ibid, Preamble, paragraphs 6

[9] Ibid, Preamble, paragraph 7

[10] *Waikato Raupatu Claims Settlement Act 1995*, Preamble, paragraph F.

deterioration of the health of the Waikato River and significantly impacted on the fisheries and plant life of the River.[11]

Widespread suffering, distress, and deprivation were caused to the Waikato iwi because of the war waged against them, the loss of life, the destruction of their taonga and property, and the confiscations of their lands. The effects of the Raupatu have lasted for generations.[12]

From the time of the Raupatu (the land confiscation), which occurred in 1865 following the invasion of the Waikato by the Crown's military forces, Waikato-Tainui were excluded from decision-making regarding the Waikato River.[13]

Waikato-Tainui never willingly or knowingly relinquished their rights and interests in, or authority over, the Waikato River[14]. From the 1860s onwards, Waikato-Tainui continually sought justice for their Raupatu claim and protection for the River[15].

2.3 Treaty Settlements

Waikato-Tainui negotiated directly with the Crown and reached settlement of their Raupatu land claim in 1995 and their river claim in 2008.[16]

The Waikato-Tainui Deed of Settlement for the Waikato River received royal assent in 2010. The overarching purpose of the settlement is to restore and protect the health and wellbeing of the Waikato River for future generations. Under this Settlement the Waikato River includes the river's main stem, from Huka Falls to the Waikato River mouth, and all its tributaries.[17]

The purpose of the Waikato-Tainui Raupatu Claims (Waikato River) Act 2010, as set out in Section 4 is to:

a) Give effect to the settlement of raupatu claims under the 2009 deed:

b) Recognise the significance of the Waikato River to Waikato-Tainui:

c) Recognise the vision and strategy for the Waikato River (Te Ture Whaimana o te Awa o Waikato):

d) Establish and grant functions and powers to the Waikato River Authority:

e) Establish the Waikato River Clean-up Trust:

f) Recognise certain customary activities of Waikato-Tainui:

g) Provide co-management arrangements for the Waikato River:

h) Provide redress to Waikato-Tainui relating to certain assets:

i) Recognise redress to Waikato-Tainui of the Kiingitanga Accord and other accords provided for in the schedule of the Kiingitanga Accord.

[11] *Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010*, Preamble, paragraph 9

[12] *Waikato Raupatu Claims Settlement Act 1995*, Preamble, paragraph G

[13] *Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010*, Preamble, paragraph 8

[14] Ibid, Preamble, paragraph 17(d)

[15] Ibid, Preamble, paragraph 16

[16] Ibid, Preamble, paragraphs 12 and 15

[17] Ibid, s.6, interpretation of "Waikato River"

Amongst other redress, the Act recognises the Vision and Strategy for Waikato River[18], Te Ture Whaimana o Te Awa o Waikato[19], (the Vision and Strategy) as the primary direction-setting document for the Waikato River and activities within its catchment affecting the Waikato River.[20]

The Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 gives effect to the deed of settlement in respect of the raupatu claims of Waikato- Tainui over the Waikato River. The overarching purpose of the Act is to restore and protect the health and wellbeing of the Waikato River for future generations[21]. Specifically, the Act established the Waikato River Authority and recognises Te Ture Whaimana o te Awa o Waikato (the Vision and Strategy for the Waikato River). The principles which underpin this legislation, as set out in the Kiingitanga Accord, are:

(i) te mana o te awa (the spiritual authority, protective power, and prestige of the river)

(ii) mana whakahaere (authority and rights of control)

(iii) health and wellbeing

(iv) co-management

(v) integration

(vi) honour and integrity.

Additionally, the Ngaati Tuuwhareetoa, Raukawa, Te Arawa River Iwi Waikato River Act 2010 and the Ngā Wai o Maniapoto (Waipa River) Act 2012 are important pieces of legislation that give effect to Te Ture Whaimana so that it now covers the whole of the Waikato and Waipā river catchments.

Te Ture Whaimana o Te Awa o Waikato sets out the vision, objectives and strategies to restore and protect the health and wellbeing of the Waikato River. It is the primary direction-setting document for the Waikato River and its catchments, which includes the Waipā River. The restoration and protection of the health and wellbeing of the Waikato River.

The Vision and Strategy is deemed part of the Waikato Regional Policy Statement[22], and regional and district plans are required to give effect to it[23]. The vision is for:

"A future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come."

Disposal of human sewage directly to water is offensive to taangata whenua, adversely impacting on spiritual values and the feeling of connection.

(vii) Te Tiriti o Waitangi

2.4 Current wastewater assets

There are seven municipal WWTPs currently servicing the Metro Area urban settlements: Ngaruawahia (servicing Taupiri, Hopuhopu, Ngaruawahia, Horotiu), Pukete (servicing Hamilton City), Te Kowhai, Mātangi,

[18] Ibid, Schedule 2

[19] Ibid, s.9(3)

[20] Ibid, s.5(1)

[21] Ibid, s.3

[22] Ibid, s.11

[23] Ibid, s.13(4)(b)

Tauwhare Pā, Cambridge and Te Awamutu. A network of strategic, trunk and local conveyance infrastructure (Interceptors, trunk mains, local reticulation, pump stations, storage facilities) manage and transfer wastewater from customers to the WWTPs.

In addition to the municipal WWTPs, there are many private systems servicing un-reticulated or un-serviced residential and industrial/commercial properties. The industrial/commercial properties serviced by private systems include the Waikato Regional Airport Precinct and Fonterra Hautapu (see Figure SC - 4:).

This DBC considers the seven municipal plants and the long-term servicing needs of the airport precinct. The long-list options assessment also considered long-term servicing of the Fonterra Hautapu plant. Other private facilities are not included in this study.

Table SC - 1: below describes the municipal plants included in this DBC and their capacity, average peak flows and current performance standards. Further details on these plants and the conveyance systems discharging to the plants is included as Appendix A.

2.4.1 Pukete Wastewater Plant & Hamilton City Conveyance Network.

Hamilton City is serviced through a network of local, trunk and strategic wastewater conveyance draining to the Pukete WWTP.

The Pukete WWTP is the largest plant in the Metro Area and services a residential population of more than 180,000 plus commercial and industrial activity (approximately 246,000 population equivalents[24].)

Figure SC - 5: Pukete Wastewater Treatment Plant

Graphic Designer: include an image of the Pukete wwtp in the laid up document

The Pukete WWTP process is complex and involves primary, secondary and tertiary treatment stages. Treated wastewater (effluent) is discharged to the Waikato River via a diffuser and biosolids from the process are transported to a vermiculture facility in South Waikato.

The Pukete WWTP was commissioned in 1975/76 to replace the inadequate septic tanks used to manage wastewater from the city. Early concepts sited the WWTP on the banks of the Waikato River and identified surrounding land that should be either acquired for the plant or zoned to provide buffer zones around the site[25].

Through foresight and strategic investment, a large site was secured to provide space and buffer margins for a WWTP to serve a city of 300,000 people plus non-domestic flows and loads over time[26].

While the Pukete WWTP has served Hamilton City well and will continue to do so in the future, the site footprint does have an ultimate 'build-out' capacity. The ultimate population size that can be served at the site will depend on the treatment processes, adopted performance standards, and the ongoing build-out and development of the site. The build-out capacity of the plant has been assessed and informs this DBC, in particular the potential timing that flows from Hamilton City may need to be diverted to a second WWTP. Details of this assessment are included in Section 4.1 of the Economic Case.

Recent upgrades at Pukete aim to meet the short-term needs of the city until around 2028. A programme of further upgrades at Pukete WWTP is included in HCC's 2021-31 Long-term Plan (LTP) and 2021-51 infrastructure strategy based on status quo growth assumptions and treatment standards. Further investment

[24] Pukete Buildout Capacity Review, Beca, January 2021.

[25] Sewage Treatment and Disposal for the City of Hamilton, Steven & Fitzmaurice, 1966

[26] Hamilton City Comprehensive Development Plan, 1974

will be required at Pukete to cater for growth and to contribute toward restoring and protecting the health and wellbeing of the Waikato River.

The strategic wastewater interceptors as shown in Figure SC - 6:. These strategic interceptors have finite capacity, and the upper western interceptor is already constraining development in the western and southern extents of the city.

Figure SC - 6: Strategic interceptor network (HCC Long Term Infrastructure Strategy 2015-2045)

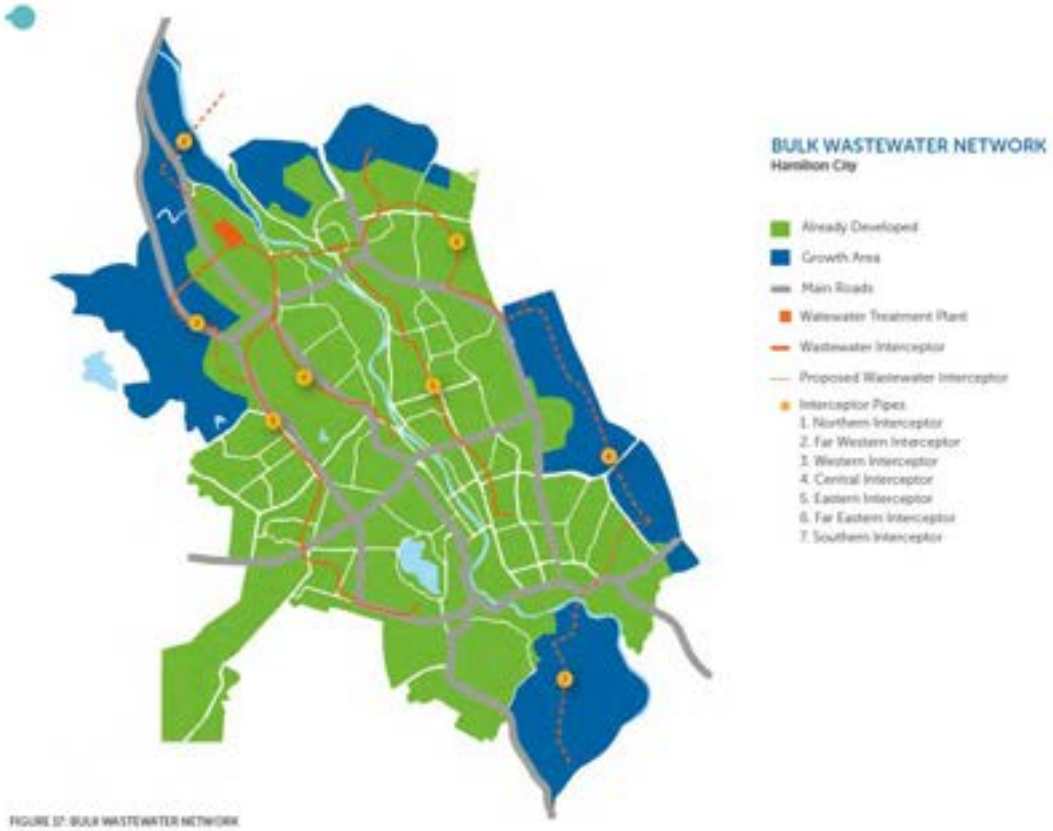


FIGURE 37: BULK WASTEWATER NETWORK

Dry weather flows into the network will increase as 'brownfield' intensification, infill and greenfield development occurs. Wet weather peak flows and their frequency will also increase as a result of more extreme rainfall events arising from climate change. These flow increases will place increasing pressure on the networks. Without appropriate investment in the conveyance networks there will be more frequent and larger scale network overflows to the environment.

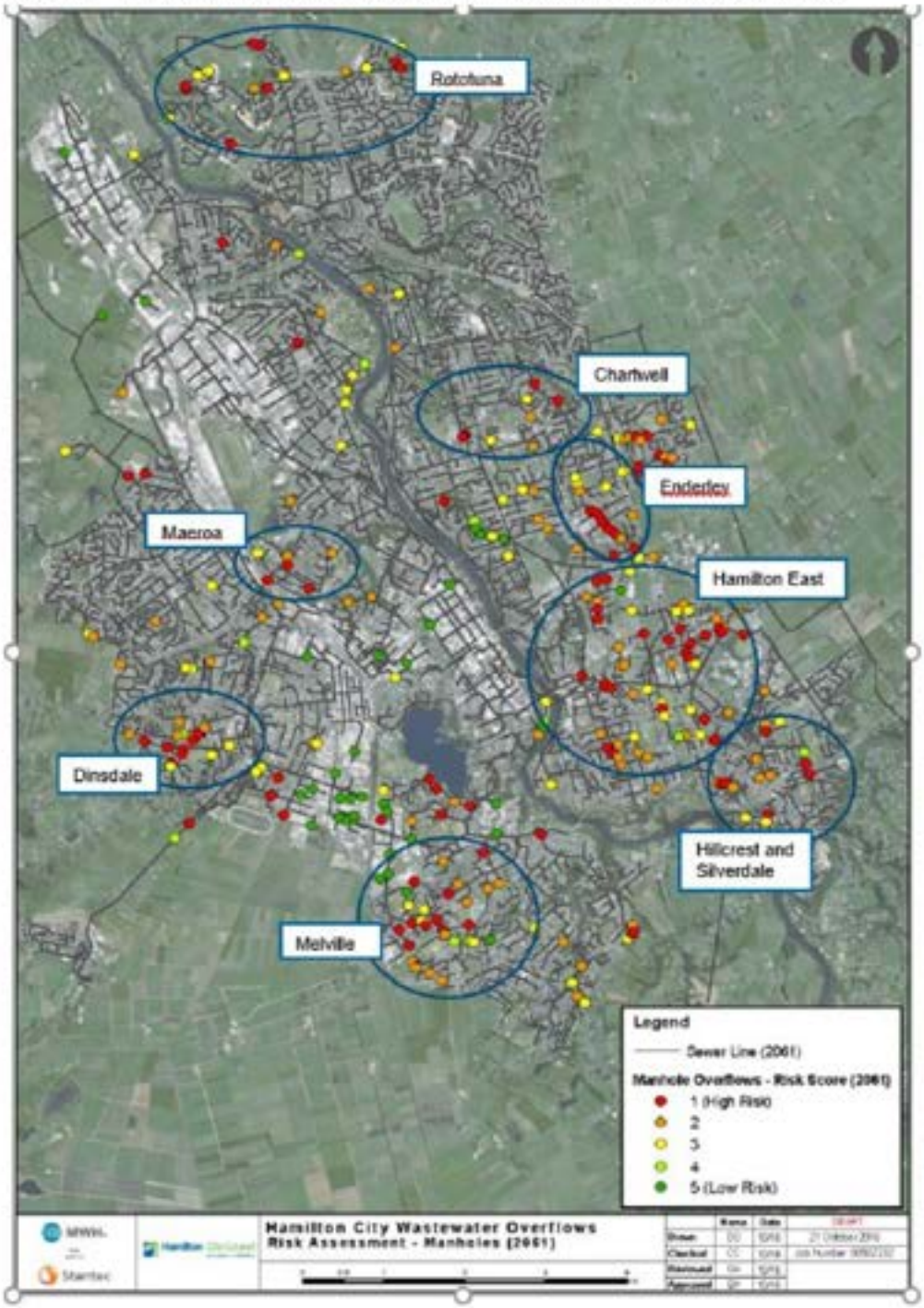
Predicted network overflows at 2061 (based on 2015 growth projections) are shown in Figure SC - 7:.

HCC has developed a conveyance network investment programme involving new interceptors, bulk storage facilities (particularly to manage wet weather flows and provide system resilience), trunk network upgrades, infiltration and ingress reduction programmes and asset renewals. However, the planned investment programme does not reflect the additional pressures and demand contemplated by Metro Spatial Plan (2020), the NPS-Urban Development, and the RMA (Enabling Housing) amendment Bill.

As demand increases more pressure will be placed on the conveyance network and a step change in investment in the conveyance network will be required. It is not uncommon for strategic wastewater

conveyance costs (especially at a city-wide scale) to be equal to, or greater than, the capital cost of treatment facilities. There will be a trigger point at which it will be more efficient to invest in diverting flows to an alternative treatment location than upgrading the existing conveyance networks to the Pukete WWTP.

Figure SC - 7: Predicted network overflows at 2061 (based on 2015 growth projections)



2.4.2 Ngaruawahia WWTP

The Ngaruawahia WWTP services the main township of Ngaruawahia and the communities of Hopuhopu, Horotiu and Taupiri. Wastewater is collected from the towns and pumped to the Ngaruawahia WWTP. The Ngaruawahia WWTP is located at Hopuhopu and comprises inlet screening, oxidation pond, solids removal (Actiflo), UV disinfection, gravel channels and a discharge to the Waikato River.

The Ngaruawahia WWTP is generally compliant with its current consent conditions; however transgressions can occur.

2.4.3 Airport Industrial Precinct Wastewater Services

The airport precinct including activities such as the Hotel, Airport terminal and ancillary activities, and the International Aviation Academy have been operating for many years. They are generally serviced by their own, on-site wastewater treatment and disposal systems, each of which will have a small treatment plant and an associated discharge to land. The industrial parks around the airport proper, such as Titanium Park, have been developing for the past 10 years or so. It is understood that the industrial park precincts are serviced by a combination of on-site systems and tankering of accumulated wastewater to Cambridge WWTP for treatment and discharge to the Waikato River.

2.4.4 Cambridge Wastewater System

The bulk of Cambridge wastewater is collected via a gravity reticulation system from domestic areas in Cambridge and Leamington, as well as wastewater from commercial/light industries in the central part of Cambridge. The wastewater is conveyed to the WWTP via a pipeline running along the south bank of the Waikato River. The WWTP also receives inflows from septage (septic tanker disposal), the Karapiro Water Treatment Works, St Peters School septic tank sludge, and trade waste from Inghams Chicken.

The treatment plant is a pond-based system with preliminary and primary treatment. Wastewater is screened on entry to the site, including grit removal. The wastewater then enters the anaerobic pond, which settles out the solids, and biologically degrades organic matter. A pumpstation pumps the partially treated wastewater over the aerated pond for secondary treatment. The aerated basin is hydraulically connected to the sedimentation tank (clarifier), the activated sludge settles at the bottom. The secondary treatment wastewater then flows onto the wetlands before discharging via a UV system onto the Rapid Infiltration Beds which ultimately discharge into the Waikato River.

The Cambridge WWTP has historically operated outside its consent conditions (nitrogen) for almost 20 years. In 2021, Waipā DC secured a short-term (6 year) consent to authorise a level of treatment that the plant can achieve without long-term upgrades. While the plant is now compliant, and improvements in phosphorus and *E.coli* discharge loadings have been achieved there has not been any vast improvement in terms of nitrogen.

Figure SC - 8: Cambridge WWTP

Graphic Designer – Include an image of the Cambridge WWTP in laid up version.

2.4.5 Te Awamutu Wastewater System

The Te Awamutu Wastewater system is a gravity and pumped network system that collects wastewater from the Te Awamutu township, including Kihikihi and the Waikeria Prison. The trade waste composition of the system is considered minor.

The treatment plant consists of a grit channel, screening, Biological Nutrient Removal (BNR), transfer pumps, clarifier, tertiary filtration, UV disinfection, and rock filter before discharge to the Mangapiko Stream. AS per the current consent, the plant will be upgraded again in 2030.

2.4.6 Other Minor WW Systems

The other plants in the Metro Area are serviced by pond-based systems or other very small and basic treatment plants. Mātangi and Te Kowhai currently practice discharge of their treated effluent to land.

The Te Kowhai WWTP has had issues with its nitrate quality limits. The Mātangi WWTP is currently compliant with its consents.

Tauwhare Pā is serviced by a low pressure pumped sewer network discharging to a very small and basic treatment plants followed by land-based discharge.

Tauwhare Village, Ohaupo and Tamahere villages and surrounding rural residential land uses are serviced through private onsite wastewater systems.

Plant Performance

The performance of each plant is further discussed and investigated in Table SC - 1: and in Section 3.1.3.

Table SC - 1: Current WWTP within the Metro Area

Metro WWTP	Type of plant	Current treatment capacity (m^3/day)	Current average and peak flow (m^3/day)	Consent expiry date	Plant performance
Ngaaruawaahia	Oxidation pond system, Actiflo and UV treatment. Treated effluent discharge to Waikato River	3,120	Avg. – 1,500 Peak – 4,500	31/03/2029	Following the construction of Stage II facilities and the ACTIFLO plant in 2014, the WWTP has been in full compliance with treated wastewater requirements.
Te Kowhai	System of septic tanks, followed by a re-circulating media system. Treated effluent discharge to land via soakage wells.	<100	Avg. – <100 Peak – <200	31/10/2033	Consent renewed for 15 year term in 2018.
Pukete	Activated sludge, Modified Ludzack Ettinger (MLE) moving toward 4-Stage Bardenpho, and UV treatment. Treated effluent discharge to Waikato River via diffuser.	60,000	Avg. – 10,400 Peak – 240,000	18/09/2027	High level of compliance (based on Annual Report 1 July 2019 – 30 June 2020) and 2018-19 annual audit.
Mātangi	System of septic tanks, followed by a re-circulating media system. Treated effluent discharge to land via irrigation.	<100	Avg. – <100 Peak – <200	30/09/2021	The WWTP is generally complaint. Waikato DC are in the process of securing a new discharge consent for Matangi for a term of 15 years. Planned and funded upgrades will be implemented to reduce TN in treated wastewater and improve land discharge area.
Cambridge	Anaerobic and Aerated lagoons, wetlands, Dosing for phosphorus removal, UV disinfection and discharge to rapid infiltration beds adjacent to the Waikato River	7,200	Avg. – 5,800 Peak – 10,000	Currently hold a short term (6 year) consent expiring 1 December 2026.	WWTP compliant with short term consent limits issued in 2020. However, the short-term consent conditions simply increased the allowable contaminant discharge limits for the plant to achieve compliance. Improvements in phosphorus and E.coli removal have been achieved, but no significant improvement in nitrogen removal has been achieved.
Te Awamutu	Activated sludge, five stages, UV treatment. Treated wastewater discharged to Mangapiko Stream via rock diffuser.	6,300	Avg. – 4,500 Peak – 16,200	30/06/2043	A high level of compliance with consent conditions has been achieved since 2012.

Metro WWTP	Type of plant	Current treatment capacity (m^3/day)	Current average and peak flow (m^3/day)	Consent expiry date	Plant performance
Tauwhare Pā	System of septic tanks, followed by a re-circulating media system then final disposal to land via irrigation	<100	Avg. – <100 Peak – <200	31/10/2035	The existing plant is near capacity and is currently breaching wastewater discharge quality consent limits. Limited ability to cater for increased flows.
Airport (private)	Very small treatment facility, sludge transported and managed at Cambridge.	<100	Avg. – <100 Peak – <200		In accordance with consent requirements.
Ngāruawāhia	Oxidation pond system, Actiflo and UV treatment. Treated effluent discharge to Waikato River	3,120	Avg. – 1,500 Peak – 4,500	31/03/2029	Following the construction of Stage II facilities and the ACTIFLO plant in 2014, the WWTP has been in full compliance with treated wastewater requirements.

2.5 Previous investigations

This project builds on previous wastewater servicing investigations for the Metro Area. The most recent investigations relevant to this DBC are the *Pukete Buildout Capacity Review (2021), Hamilton Metro Spatial Wastewater Feasibility Study (2020), Waikato Three Waters Sub-Regional Strategic Business Case (2019), Current State Report: Three Waters Sub-Regional Strategic Business Case (2019), and the Cambridge WWTP IBC (2019).* All of these investigations aim to give effect to *Te Ture Whaimana o Te Awa o Waikato: The Vision and Strategy for the Waikato River*[27] by delivering 'Best for River' outcomes. The relevance of these investigations to this DBC are summarised in Table SC - 2: below.

In addition, a summary of other previous wastewater servicing investigations focussed on the Southern Metro area is included as Appendix A. This summary provides an overview of the scope and findings of these studies and also highlights the long-standing nature of wastewater servicing challenges in the Southern Metro Area.

Table SC - 2: Summary of previous wastewater servicing investigations and their relevance to DBC

Previous investigations	Relevance to the DBC
Pukete Buildout Capacity Review Memorandum, Beca, 2021 Client: Hamilton City Council,	The memorandum records the high-level reassessment of the potential Pukete Wastewater Treatment Plant (WWTP) site buildout capacity to assess how future population growth and a more stringent effluent quality scenario could be accommodated at the site
Hamilton Metro Spatial Wastewater Treatment Feasibility Study, 2020 Client: Future Proof	This study was the most recent pre-cursor to this DBC. The assessment was developed collaboratively with local authority staff and iwi/mana whenua representatives. This feasibility assessment undertook a high-level comparative assessment of wastewater servicing areas to determine whether centralised wastewater servicing solutions for the Metro Area should be considered in more detail both as part of the Sub-Regional Three Waters Strategic Case and the Cambridge Wastewater Treatment Project. An initial list of 13 concepts and 120 variations were identified, ranging from centralised facilities for the entire metro area to decentralised solutions. This list evaluated and refined to six concepts included in the final assessment. The preferred concept was to have two metro wastewater facilities: a northern site (the existing Pukete site in Hamilton) and a southern site (new site), as well as keeping the existing Te Awamutu plant. This shortlist of metro options identified through the Feasibility study have provided the starting point for the options considered and further developed as part of this DBC.
Waikato Three Waters Sub-Regional Strategic Case, 2019 (part of the Sub-regional Three Water Programme (ongoing)) Client: Future Proof	This Waikato Sub-Regional Three Waters Strategic Business Case (Strategic Case) sets out the case for change in urban water management in the Waikato and Waipā River catchment. Changes are needed because of: • increasing freshwater water quality standards and the desire for Best for River environmental and social outcomes • forecast population increases and changes in land use • the need to deliver services more efficiently • concerns around community affordability. The problems and opportunities identified in the Strategic Case are directly relevant to this DBC and have been used for this DBC as a guide to explore and describe specific problems and opportunities associated with wastewater

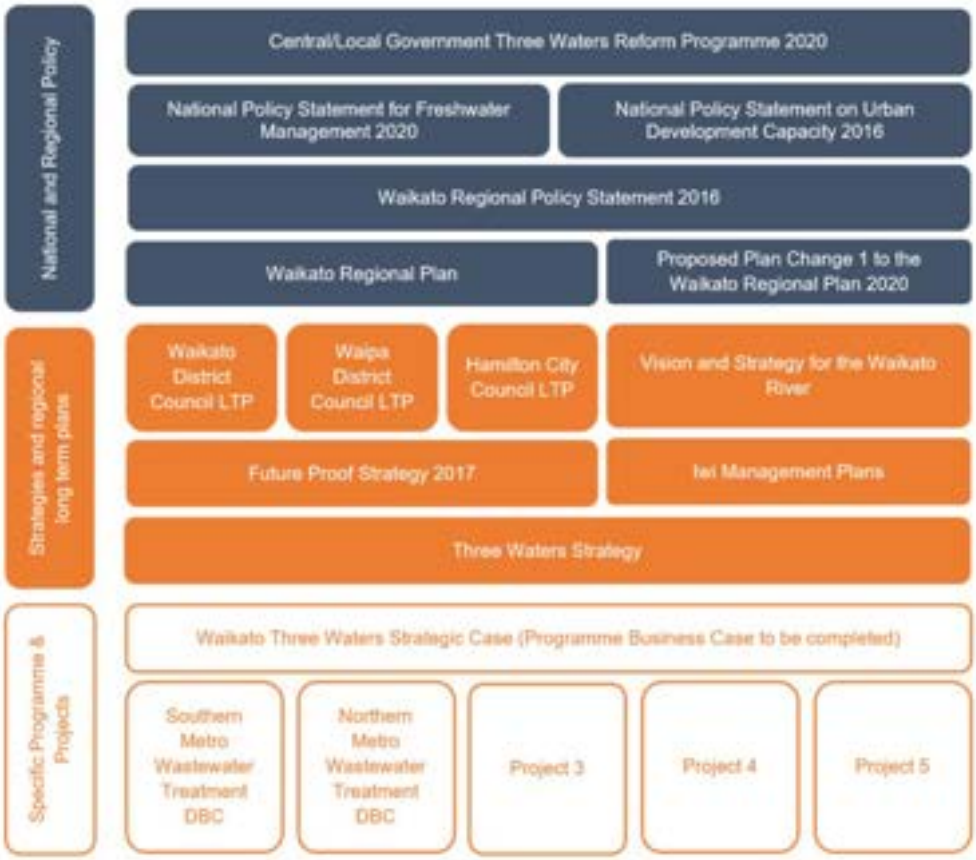
[27] Te Ture Whaimana o Te Awa o Waikato: The Vision and Strategy for the Waikato River is the primary direction setting document for the Waikato River and its catchments. It calls for an integrated, holistic and co-ordinated approach to the management of the natural, physical, cultural and historic resources of the Waikato River, and the restoration and protection of the health and wellbeing of the Waikato River. There are also significant expectations for swimming and fishing in the wider community.

Previous investigations	Relevance to the DBC
	servicing in the Metro Area. The approach taken in this DBC has sought to respond to the problems identified in the Strategic case The vision and objectives established in the Strategic Case are also relevant to this DBC and have informed the vision and objectives developed in this DBC. The strategic business case is part of the Sub-Regional Three Waters Project, which responds to Te Ture Whaimana o Te Awa o Waikato – the Vision and Strategy for the Waikato River, Future Proof objectives, and national and regional policy directives.
Three Waters Current State Report, GHD & BECA, 2019 Client: Future Proof	This report provides an evidence base for existing problems with three waters servicing for urban settlements in the Hamilton to Auckland Corridor. Provides an evidence base to support the Waikato Three Waters Sub-Regional Strategic Case, 2019 The report documents the current state of wastewater treatment infrastructure within the Hamilton to Auckland Corridor including treatment capacities, performance standards and existing consent compliance.
Cambridge WWTP Indicative Business Case, 2019 Client: Waipā District Council	The Cambridge Wastewater Treatment IBC was first undertaken to identify a long-term solution to the currently non-compliant WWTP at Cambridge. The IBC was led by Waipā District Council and collaboratively progressed with Iwi partners, Hamilton City Council and Waikato Regional Council. This work also provided an interim consent while Waipā District Council investigated and implemented a long-term solution that addressed all underlying problems. As part of this process, a number of short-term upgrades were commissioned to the existing plant. Long term upgrade options were also explored, including a long term joint sub-regional solution for the Southern Metro Area, which serviced Hamilton City Council and delivered a significant upgrade to the current WWTP. However, the impacts of a southern centralised treatment plant on the future planning of the surrounding areas was not evaluated as part of this study. It is critical to bring the plant up to a compliant level to reduce annual operating and maintenance costs over time and to support future planning. The plant needs to achieve considerably higher standards, particularly in relation to Nitrogen removal, to meet its consenting conditions. Significant action is required to achieve optimal outcomes and ensure future development plans and the Te Ture Whaimana strategy and vision are achieved.

2.6 Relevant policies, regulation and plans

National and regional policies, plans and strategies relevant to this DBC are in Figure SC - 9: below. High-level commentary on the relevance of the policies, plans and strategies to this project is included in Appendix B.

Figure SC - 9: Existing strategies tree diagram



Graphic Designer to updated with Vision and Strategy to be at National policy level; Accords and JMAs to be at national level.

Key strategies that outline the collective vision, regional plan and targets for Waikato River water quality are further detailed in Appendix B: Relevant policies, regulation and plans.

2.7 Population and land use assumptions

Hamilton City is the largest population centre in the sub-region with a population of around 181,500 people as at 2021[28]. It is the fourth most populous and one of the fastest growing cities in New Zealand. Projections indicate that this growth is set to continue for the foreseeable future.

Waipā district has a population of around 58,300 as at 2021[29], largely living in the district's two well-founded towns – Cambridge and Te Awamutu. The Waikato district has a population of around 84,300[30] as of 2021. The district is projected to continue to experience strong growth, particularly in the main urban areas.

[28] NIDEA, 2021. *Population (Low, Medium and High) 2018 projection outputs.*

[29] NIDEA, 2021. *Population (Low, Medium and High) 2018 projection outputs.*

[30] NIDEA, 2021. *Population (Low, Medium and High) 2018 projection outputs.*

The existing pattern of urban growth in the Metro Area comprises of infill, brownfield and greenfield development. The majority of infill and brownfield developments are located in Hamilton city, while greenfield development at various scales occurs across the entire Metro Area. Job growth generally occurs in existing centres and identified employment areas.

Both residential and non-residential population and growth assumptions are fundamental inputs to this DBC. They have been used to determine the indicative scale and timing of new conveyance systems and wastewater treatment plants and when upgrades are required for existing treatment plants. The sources and process for developing the growth assumptions used for this DBC are detailed in Growth Assumptions for Population and Growth Assumptions Memorandum[31].

The projected population and economic growth within the Metro Area requires an appropriate infrastructure servicing response. Servicing will require significant capacity increases through new or upgraded networks and plants. Not providing adequate infrastructure capacity will constrain the sub-region's growth potential. This will likely have a negative economic impact with potential developers, employers and businesses looking elsewhere for expansion opportunities.

2.7.1 General

This DBC uses population equivalence (PE) to understand existing wastewater servicing issues and constraints and to develop servicing solutions. PE is the equivalent wastewater flow or load from one person. It is made up of residential and non-residential components.

2.7.2 Residential Landuse

Projected residential population growth for each of the communities (and rural/residential areas) within the Metro Area is shown in Figure SC - 10: . The projections are in 10-year horizons from 2021 to 2061. An ultimate figure is also provided (based on projected land use development at 2019).

The NPS-UD seeks to encourage, and in some cases require, higher density residential development to occur in urban environments[32], in locations which are close to centres and in locations that are accessible by active or public transport.

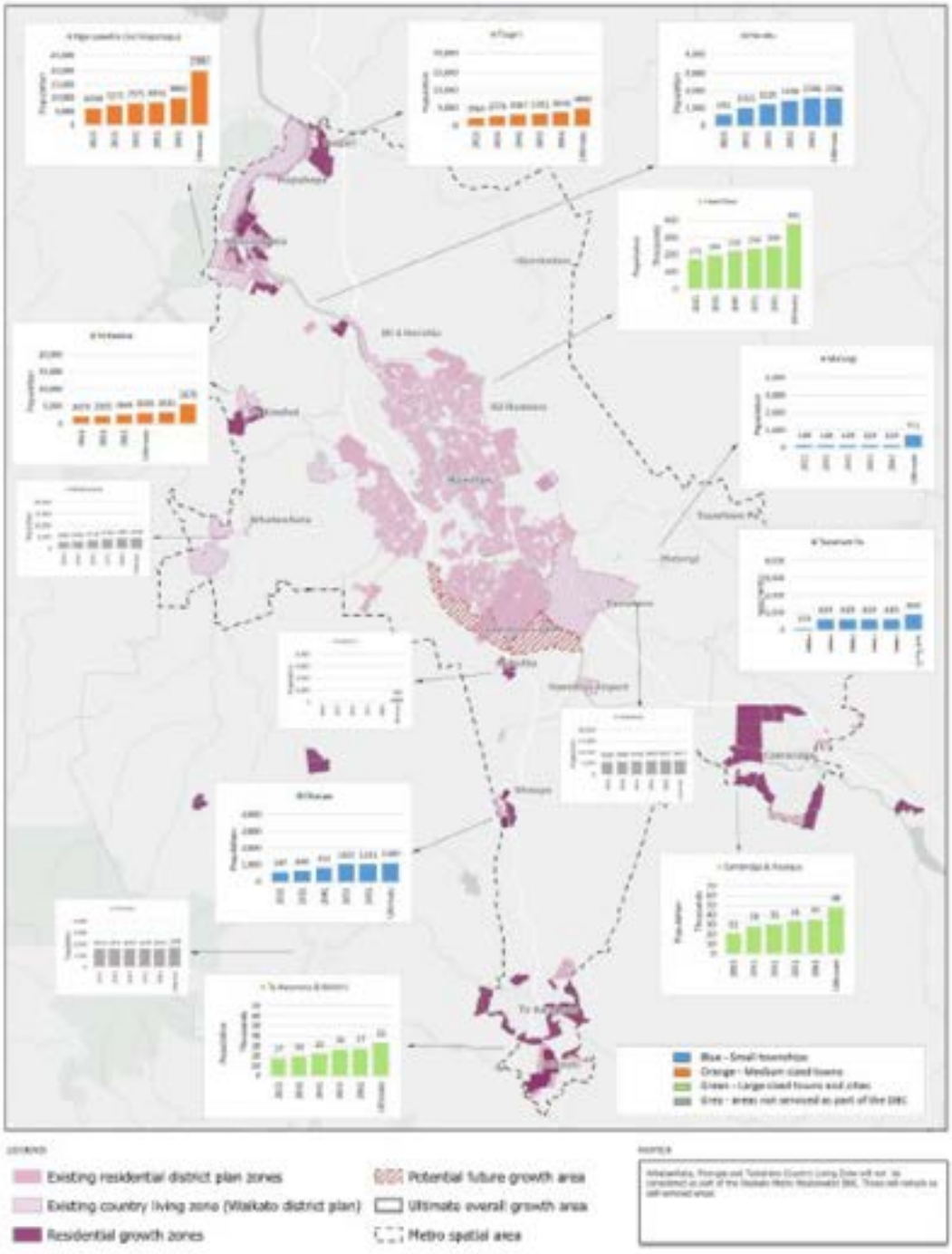
Under the NPS-UD, Ngaaruawaahia and Hamilton meet the definition of Tier 1 urban environments. Cambridge, Te Awamutu, Kihikihi and Pirongia meet the definition of Tier 3 urban environments. This means there are requirements to enable intensification in certain locations in these settlements.

The growth assumptions used for this DBC have not fully considered the implications of the NPS-UD which has the potential to enable increased rates and scale of growth in the Metro Area. Responding to growth enabled by NPS-UD may require earlier and larger scale investment than indicated (with respect to conveyance and treatment) and should be considered as part of detailed design investigations.

[31] GHD, Beca, Oct 2020. Growth Assumptions for the Waikato Metro Wastewater DBC Memorandum.

[32] The NPS-UD defines urban environments as being any area of land (regardless of size, and irrespective of local authority or statistical boundaries) that (a) is, or is intended to be, predominantly urban in character; and (b) is, or is intended to be, part of a housing and labour market of at least 10,000 people.

Figure SC - 10: Projected population growth in the Metro Area[33]



[33] GHD, Beca, 2020. Growth Assumptions for Waikato Metro Wastewater DBC. Hamilton City Council.

The projected residential population for each of the communities considered in this DBC are shown in Table SC - 3.

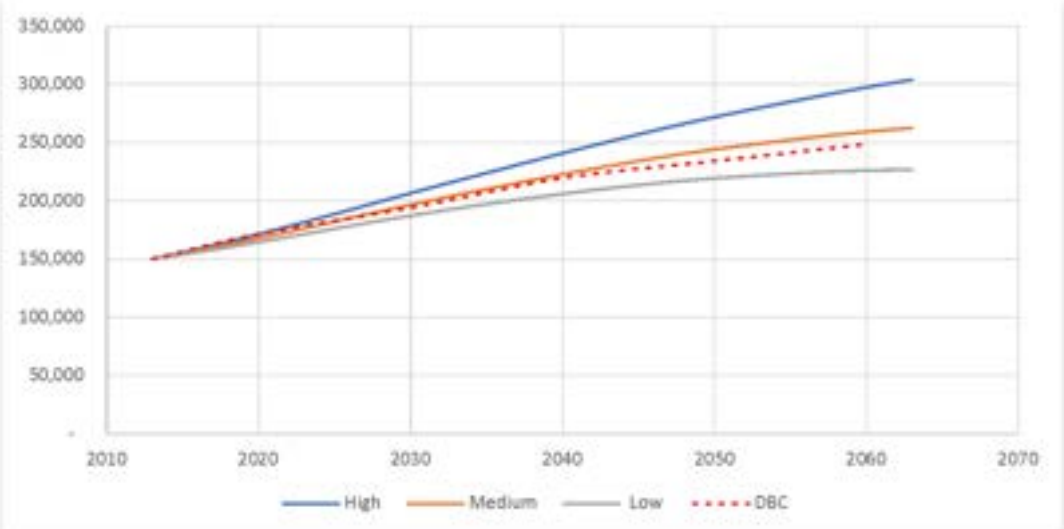
Significant increases in residential populations are expected in in Taupiri, Ngaruawahia, Te Kowhai, Hamilton, Cambridge and Te Awamutu. Smaller rural communities are currently expected to have very limited or static growth.

Table SC - 3: Residential population assumptions[34]

Area	2021	2031	2041	2051	2061	Ultimate
Taupiri	2,060	2,780	3,170	3,390	3,660	4,800
Ngaaruawaahia (incl Hopuhopu)	6,230	7280	7980	8390	9890	19, 870
Horotiu	650	1,020	1,230	1,440	1,600	1,600
Te Kowhai	2,080	2,270	2,650	3,060	3,330	5,670
Mātangi (including Tamahere Hub)	150	150	150	150	150	711
Tauwhare Pa	120	620	620	620	620	890
Hamilton	171,610	194,190	219,740	234,190	248,650	380,000
Out of boundary areas	N/A	N/A	N/A	N/A	N/A	60,000
Ohaupo	550	630	810	1,030	1,030	1,100
Cambridge (incl Hautapu and Karapiro)	20,520	26,310	30,540	33,010	35,140	47,760
Te Awamutu & Kihikihi	17,490	19,160	22,070	26,150	27,170	33,180

Projections for the communities not included in this DBC are in Appendix A (i.e. Gordonton, Whatawhata, Tamahere Country Living Area, Rukuhia, Pirongia).

Figure SC - 11: Hamilton City population growth projections NIDEA 2018



[34] GHD, Beca, Oct 2020. Growth Assumptions for the Waikato Metro Wastewater DBC Memorandum.

Waipā and Waikato District residential growth projections are based on the mid-point NIDEA projections while Hamilton City growth projections are based on the low projection with additional allowance for infill as identified in the Hamilton Waikato Metro Spatial Plan. For Hamilton City, the low NIDEA population forecast in 2060 is 226,000, and the medium forecast is 259,000, a difference of 33,000. The DBC has adopted the low NIDEA population forecast of 226,000, with additional allowance for infill of 18,000 in 2060 (and 72,000 for the city full scenario), giving a total of 244,000. As shown in Figure SC - 11: the difference between this adopted forecast and the medium NIDEA forecast is relatively minor. The assessment criteria for flexibility and adaptability (KPI 5.1) of solution considers the ability of servicing solutions to be staged / developed over time to meet the needs of the community including the potential to service higher or lower demands.

It is recognised that since this work was undertaken, NIDEA has rebased and updated its projections to reflect the COVID 19 pandemic. On the new series, all territorial authorities are using the new NIDEA high growth projections, which are reflected in the Future Proof Strategy.

2.7.3 Non-residential Growth

Providing enough serviced land for non-residential land uses is a key aspect of growth management and growing the economy of the Future Proof sub-region.

Existing non-residential land uses that generate significant wastewater demand include industrial, commercial, business areas.

The strategic industrial locations where greenfield industrial growth is expected to occur includes Horotiu/Te Rapa North/Rotokauri, Ruakura/Ruakura East, Hamilton Airport/Southern Links, and Hautapu (table 2).

Key commercial and business areas include Hamilton City Centre[35]; specialised centres[36], Metropolitan centres[37], and town centres across Hamilton City.

Wastewater generated from these existing non-residential activities, and their demand on the network and plants, are captured through existing trade waste agreements (which include flow and load limits) or through applying appropriate population equivalent (PE) design assumptions.

Future demand on the networks is assessed based on anticipated demand for non-residential land and appropriate PE design assumptions.

The demand for industrial land in the Metro Area is projected to be 411 hectares over the next 10 years, increasing to 752 hectares over the next 30 years[38]. Current capacity (i.e., industrial land currently zoned for development) is in excess of 1,250 hectares.

A summary of the available industrial demand and capacity information from the study is provided in Table SC - 4: . This analysis pre-dates the Future Proof Housing and Business development capacity analysis that is shown in the draft Future Proof Strategy.

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[35] The Hamilton central city area is the primary commercial, employment, recreational and civic hub with a strong residential function which is provided at a regional scale. This centre contains significant office, retail and other commercial activities, education facilities including the WINTEC campus, a vibrant arts and museum precinct, central library and public squares. It has the greatest diversity, scale and intensity of activities in the metro area.

[36] Waikato Hospital and Waikato University are the two identified specialised centres in the Future Proof sub-region and form important employment areas and provide essential specialised services.

[37] The five centres expected to grow into metropolitan centres over the course of time are Te Rapa, Chartwell, Ngāruawāhia, Cambridge and Te Awamutu. Hopuhopu is located near to the Ngāruawāhia township. It is envisioned that it will strengthen its role as the headquarters of Waikato-Tainui and the home of the Waikato-Tainui Endowed College.

[38] Future Proof Industrial Land study (GMD March 2020)

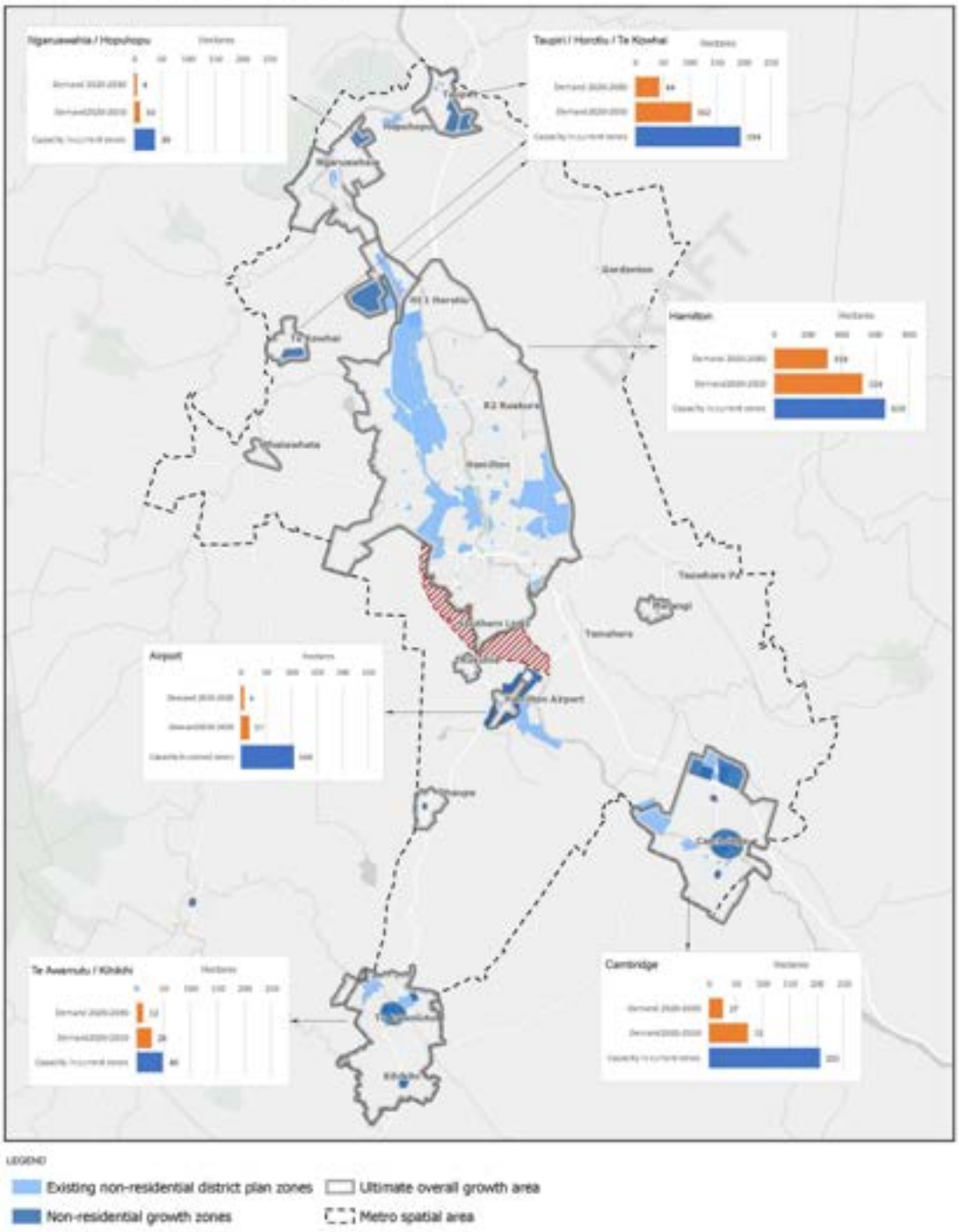
Table SC - 4: Industrial demand and capacity in the Metro Area[39]

Location	2020-2030 hectares	2020-2050 hectares	Capacity in current zones
Ngaaruawaahia / Hopuhopu	4	10	39
Taupiri / Horotiu / Te Kowhai	44	102	194
Hamilton	318	524	659
Airport	6	17	104
Cambridge	27	72	205
Te Awamutu	12	28	49
Total	411	752	1,250

The geographic extents of current non-residential land use zoning is shown in Figure SC - 12:.

[39] GHD, Beca, Sept 2020. Growth Assumptions for the Waikato Metro Wastewater DBC Memorandum.

Figure SC - 12: Non-residential land use zoning



2.7.3.1 Wet Industrial Activities

At present, the Metro Area local authorities do not specifically plan for, or design infrastructure to include capacity for new wet industrial (or high-water use) activities. This DBC, alongside relevant land-use planning projects, provides an opportunity to implement more integrated and considered infrastructure planning approaches.

While the portion of industrial land capacity to be allocated to wet industries is uncertain, on an area basis it is expected to be small. The servicing of new high-water users (wet industry) will be partially limited by water allocation and WWTP network capacity, rather than land capacity unless there are changes to the water allocation regime under the Waikato Regional Plan.

This DBC has included for wet industrial activities concentrated in:

- Te Rapa North
- Ruakura
- Airport
- Near the existing Cambridge WWTP.

2.7.4 Hamilton City Growth

A more detailed breakdown of population equivalent projections which includes both residential, commercial and industrial inputs within Hamilton City is shown in Figure SC - 13. These have been sourced from the *Hamilton City Wastewater Master Plan (Version 3), 2020*. The population growth information will be used to determine the expected flows to be treated at the existing Pukete WWTP which, due to the significant growth in Hamilton City is likely to put greater capacity constraints on the Pukete WWTP within the next 5 to 10 years.

Greenfield development areas such as Ruakura, Te Rapa North, and Rotokauri will require additional wastewater reticulation infrastructure for industrial (and potential wet industry) purposes. Without this type of infrastructure, the area will not be able to reach its full development and employment potential. Other greenfields growth areas, such as Temple View and Peacockes, will focus on residential development, increasing population densities.

There are three additional future development areas currently outside the Hamilton City boundary area, but subject to an agreement with Waikato District Council regarding future transfer to the city (WA, HT1 and R2). These areas will only be considered as part of the ultimate scenario. The area located between the Southern Links Roading Designation and Hamilton City is only considered as part of the ultimate scenario.

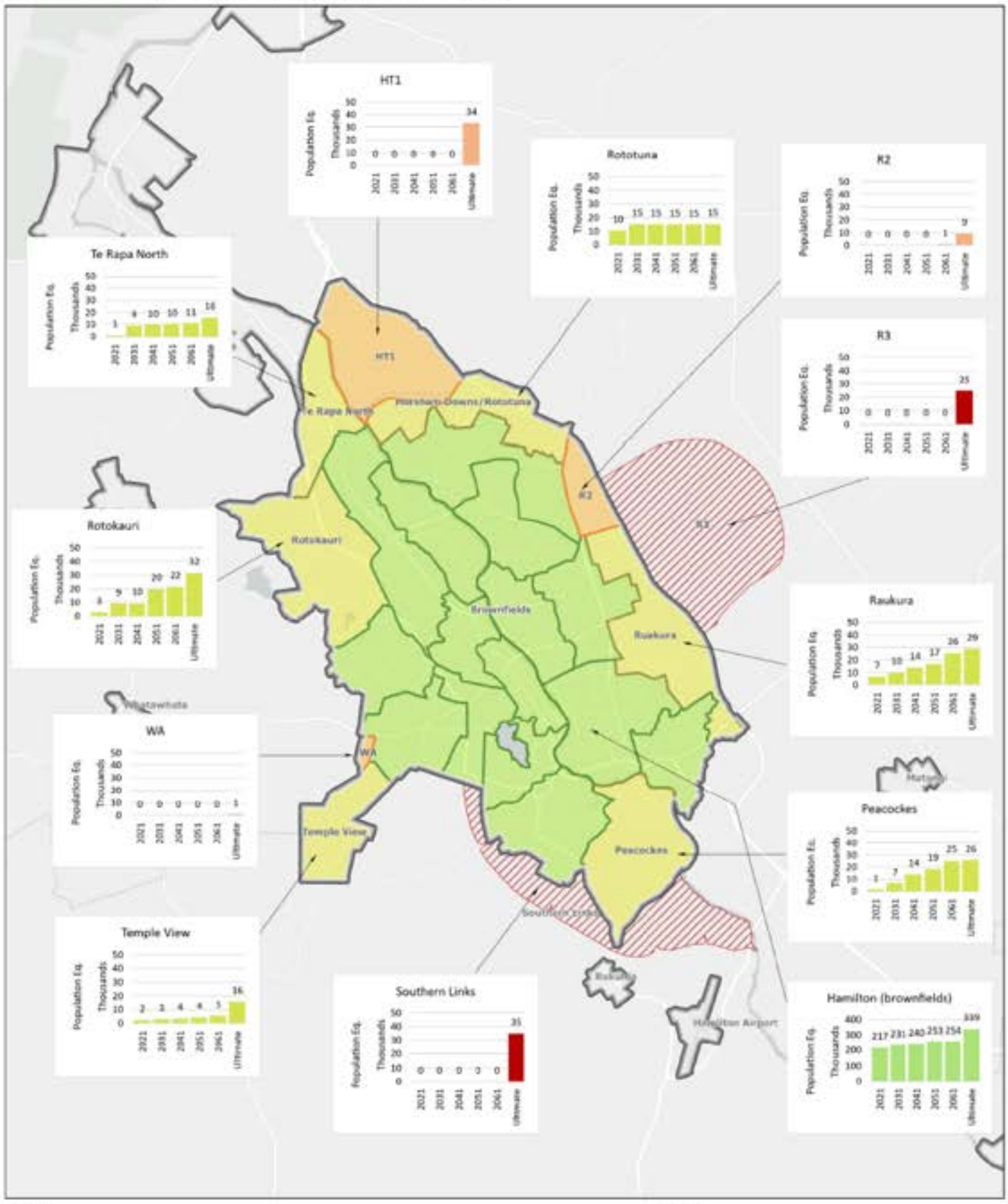
Table SC - 5: Hamilton City population equivalence growth estimates[40]

Growth Cell	2021	2031	2041	2051	2061	Ultimate
Te Rapa North	1,167	9,073	9,677	10,280	10,884	15,898
Ruakura	6,816	10,127	13,965	17,014	25,697	28,769
Peacockes	1,346	6,532	14,161	18,648	25,489	25,607
Temple View	2,031	2,681	3,550	4,419	5,289	15,860
Rotokauri	2,697	9,129	9,567	19,913	21,570	31,624
Rototuna	10,433	15,165	15,068	14,972	14,875	15,264
WA	0	0	0	0	0	1,000
HT1	0	0	0	0	0	33,591
R2	179	179	179	0	1,048	9,450
East of Ruakura						30,000
Southern Links						35,000
MSP Additional Infill		2,311	6,934	11,557	16,180	72,278
Hamilton (brownfields)	217,377	231,480	239,636	253,447	254,244	339,475
TOTAL	**242,246**	**286,677**	**312,737**	**350,250**	**375,276**	**653,836**

A number of potential future growth areas are not included in the wastewater model currently. These include Southern Links to the south of Peacockes, and R3 to the east of Hamilton. These areas also have an 'ultimate' population equivalence estimate.

[40] GHD, Beca, Oct 2020. Growth Assumptions for the Waikato Metro Wastewater DBC Memorandum.

Figure SC - 13: Population equivalence growth in the Hamilton City



3. Case for Change

This section sets out the case for investment in wastewater treatment services for the Metro Area. It summarises the scale and significance of key problems and drivers for change, including misalignment between the current state and desired future state.

This DBC refines and builds on the Sub-Regional Three Waters case for change, providing more detailed evidence of the specific issues associated with wastewater treatment in the Metro Area and in particular the southern area. The DBC evaluates a long list of strategic wastewater servicing options and identifies an options shortlist for the full (northern and southern) Metro Area. The assessment and evaluation then focuses in on and identifies a preferred option for the Southern Metro Area. A DBC is currently underway to confirm the preferred option for the Northern metro area.

The option development and assessments (refer to the Economic Case) seek to give effect to *Te Ture Whaimana o Te Awa o Waikato: The Vision and Strategy for the Waikato River*[41] and the growth aspirations of the Metro Area and in doing so deliver 'Best for River, Best for Community' outcomes.

3.1 Problem Development

The issues identified in the Waikato Sub-Regional Three Waters Strategic Case (2019) were consolidated into four programme level problem statements. The programme problem statements are relevant to wastewater management within the Metro Area.

These problem statements have been agreed with partners and stakeholders and have been adopted (endorsed by the Governance Group). The programme problem statements are significant and relate to systemic issues where change is needed to deliver enduring improvements in three waters management and achieve "Best for River" outcomes.

The relevance of each problem statements to wastewater treatment within the Metro Area are summarised below in Table SC - 6: . Supporting evidence is also outlined below.

Table SC - 6: Programme problem statement and relevance to the project

Problem	Programme Problem Statement	Relevance to Wastewater Treatment within the Metro Area
Problem One	Lack of integrated catchment management and urban waters long-term planning, founded on: - a common vision and agreed future outcomes unconstrained by territorial boundaries - the application of both Maatauranga Māori and conventional science methods, and - appropriate funding provisions	This problem relates to a lack of consistent and integrated land and water management practices, which has led to reactive and short-sighted wastewater infrastructure decisions. Development and land use changes often occur without full appreciation of the impacts on wastewater infrastructure and the investment needed to provide capacity for long-term growth. As a result, existing wastewater infrastructure is expected to cater for unforeseen or unplanned flows and growth. The impact of

[41] Te Ture Whaimana o Te Awa o Waikato: The Vision and Strategy for the Waikato River is the primary direction setting document for the Waikato River and its catchments. It calls for an integrated, holistic and co-ordinated approach to the management of the natural, physical, cultural and historic resources of the Waikato River, and the restoration and protection of the health and wellbeing of the Waikato River. There are also significant expectations for swimming and fishing in the wider community.

Problem	Programme Problem Statement	Relevance to Wastewater Treatment within the Metro Area
	is resulting in inefficient near-sighted decision making and degraded health and well-being of the Waikato River.	these short-sighted and unplanned investment decisions are further evidenced in problem two.
Problem Two	Historic land confiscations coupled with inconsistent, short-term and parochial regulatory, planning and investment decisions on land use and urban water resource management have contributed to: - cultural disconnect, - degraded water quality, - poor ecosystem health and over allocated resources. As a consequence, the relationships and aspirations of communities with the Waikato River and the ability of Waikato River iwi to exercise mana whakahaere or conduct their tikanga and kawa have been severely compromised.	Problem two further investigates how short-sighted and reactive investment decisions have affected river water quality, river ecosystems and contributed to the cultural disconnect. Currently individual councils react to wastewater issues as they occur, making it difficult to apply consistency and planned decision making to the wider wastewater treatment network. This means some wastewater treatment facilities are consistently falling short of environmental and cultural standards and impacting the health and wellbeing of the river.
Problem Three	Reactive infrastructure planning practices coupled with: - light-handed regulation and compliance - inconsistent management practices, standards and performance expectations has led to variable urban water system performance across the region and has adversely impacted the health and well-being of the Waikato and Waipā Rivers.	Reactive infrastructure planning practices are evidenced in problem statements one and two. This problem focuses on the issues of regulation, compliance and inconsistent and changing practices, standards and performance expectations across the three councils concerning the treatment of wastewater and how this has led to variable performances of WWTPs.
Problem Four	The legacy of under-investment in urban water systems coupled with: - infrastructure reaching end of life - increasing regulatory requirements - environmental expectations - climate change impacts - greater growth demands has created a significant investment deficit resulting in unaffordable current and future costs for new infrastructure, maintenance and	This problem further investigates issues related to affordability, ageing infrastructure and assets, climate change impacts and growth and capacity impacts. All have led to a wastewater infrastructure deficit across the Metro Area.

Problem	Programme Problem Statement	Relevance to Wastewater Treatment within the Metro Area
	operations and human capacity and capability challenges within the waters sector.	

The remainder of this section provides evidence to support the scale and significance of the four problem statements related to the Metro Area.

3.1.1 Problem Statement One

> Lack of integrated catchment management and urban waters long-term planning, founded on a common vision and agreed future outcomes that are unconstrained by territorial boundaries, the application of both Maatauranga Māori and conventional science methods, and appropriate funding provisions is resulting in inefficient near-sighted decision-making and degraded health and well-being of the Waikato River.

Cause: Lack of integrated catchment management and urban waters long-term planning, founded on a common vision and agreed future outcomes that are unconstrained by territorial boundaries, the application of both Maatauranga Māori and conventional science methods, and appropriate funding provisions.

As highlighted in the national Case *for Change: Transforming the System for Delivering Three Water Services*[42], the lack of integrated catchment management and urban waters long term planning is not unique to the Metro Area. The national Case for Change summarises the current situation as:

> *"While there are pockets of good performance, in many parts of the country communities cannot be confident that their drinking water is safe, that the three waters sector is achieving good environmental outcomes, that it can accommodate population and housing growth, that the rights and interests of iwi/Māori are being upheld, and that climate change and natural hazard risks are being successfully managed."*

The lack of integration can be partly attributed to the number of territorial boundaries, which have limited integrated catchment planning of wastewater activities. This has resulted in variable wastewater system design objectives, standards, performance and consent compliance.

Currently in the Metro Area each individual council provides wastewater management services for their districts largely in isolation from neighbouring authorities. This creates significant inefficiencies within the system for delivering these services, including:

- a lack of strategic and co-ordinated asset planning at a regional or greater level,
- limited opportunities to consider catchment-level outcomes,
- a lack of funding and pipeline certainty to create competitive pressures in the supply chain.

The lack of capacity and capability that tends to be associated with larger-scale entities; and

- a wider variation in three waters funding and financing strategies and approaches.

[42] Transforming the system for delivering three waters services the case for change and summary of proposals, 30 June 2021, Te Tari Taiwhenua Internal Affairs, New Zealand Government

Despite attempts at integrated planning across the Metro Area through partnerships such as Future Proof, each Council has continued to focus investment on the needs of their individual communities in isolation rather than applying a broader sub-catchment level approach. This is evidenced by:

- The numerous previous investigations and studies highlighting the servicing challenges in the Southern Metro area and possible joined up solutions that have not been taken through to delivery (refer to Appendix A),
- The lack of any major cross-boundary wastewater management investment to date, despite it being the most practical approach in some situations. As an example, the township of Horotiu is currently serviced through the Ngaruawahia WWTP despite being located closer to the Pukete WWTP
- There are some existing connections that cross boundaries for individual customers, but these are a result of legacy issues rather than the result of intentional, integrated planning
- Differing approaches to overall asset management (including renewals, replacement, design, funding) across the Metro Area
- Varying levels of pro-active long-term planning (e.g., not starting consenting processes early, or not investing in system upgrades until required for compliance purposes). This DBC represents the first real attempt at implementing a co-ordinated wastewater planning approach
- Differing requirements and expectations on treatment performance/standards, operation, maintenance, iwi/Mana Whenua and stakeholder engagement, monitoring and reporting across the existing municipal WWTPs
- Different consent standards and requirements
- Varying levels of compliance with resource consents and inconsistent enforcement action taken by regulators when non-compliances occur
- Each of these existing activities (Te Awamutu, Cambridge, Hamilton City, Ngaruawahia) are managed, and their impacts considered separately, despite the rivers hydrological catchment crossing multiple council boundaries
- Multiple wastewater discharges to the river and environment across a relatively short reach of the Awa.

These issues are likely to be exacerbated in the future with the likelihood of accelerated and high rates of development and intensification within the Metro Area. This results in variable consent conditions and permitting land use activities that can be economical in the short-term, yet potentially harmful to the sub-regional freshwater environment.

This is particularly pertinent to the Metro Area, which has higher population densities and significantly higher demand for industrial land use activities. Without consistent and aligned land use allocations in the future, wastewater treatment will continue to be reactive, addressing short-term, immediate changes to demand within the wastewater network, instead of proactively planning for future demands.

Further, existing wastewater networks and plants are likely to become inundated with unplanned flows. Both outcomes result in the degraded health and wellbeing of the Waikato River and work against the delivery of the Te Ture Whaimana objectives.

Maatauranga Māori and Conventional Science Methods

Māori express a relationship with water as kaitiaki. Māori do not distinguish their rights and interests in freshwater from the three waters; they are viewed as a connection to the water environs and its systems.

While Te Ture Whaimana provides the basis for a common vision across the river catchment it is not integrated into TLA planning instruments or strategic documents.

Despite being in place for more than ten years, Te Ture Whaimana does not appear to be used as the primary direction setting document for development in the Waikato River catchment as was intended at the time of the Waikato Raupatu River Settlement.

There are differences in the way individual councils engage with Iwi and Mana Whenua on wastewater activities across the Metro Area. Currently each council engages with Mana Whenua on an individual project basis, at varying levels, despite many of the same groups and individuals being involved in different projects across the whole Metro Area.

Historically, wastewater servicing solutions adopted engineering design standards based on conventional science and have not been informed by Maatauranga Māori science built up over hundreds of years. This has resulted in wastewater solutions that impact the mauri of the environment, including the Waikato River.

There are different views on te mana o te awa, the roles of the Waikato River and the environment and how they are factored into sustaining the needs of people. Historically, a western world view dominated the approach to wastewater management in New Zealand, as evidenced by Te Tiriti o Waitangi Settlement and the guiding principles of Te Mana o te Awa and Mana Whakahaere.

Consequently, municipal wastewater servicing across the Metro Area was designed and implemented to meet a standard acceptable from a western perspective and to achieve varying levels of service. These systems were implemented over many decades and \ were developed to meet different standards. At that time, there was no common guidance or vision on wastewater management, which has resulted in:

- current treatment plant locations, situated as close to the river as possible for discharge purposes,
- current standards and discharge methods to the Waikato River.

In 2008 Waikato-Tainui and the government of New Zealand signed the Waikato Raupatu (Waikato River) Settlement and Te Ture Whaimana emerged as a mechanism to provide a common vision and objectives. However, these objectives have not been applied consistently across the different councils when developing individual wastewater management plans. As a result, Maatauranga Māori has not informed the wastewater management approach adopted in the Metro Area.

Appropriate Funding Provisions is Resulting in Inefficient Near-Sighted Decision Making

Constrained funding and conflicting priorities during long term plan processes results in TLA's prioritising other services which leads to underinvestment in capital and operational wastewater costs, as evidenced by a legacy of under-investment in wastewater services across the Metro Area.

Councils also self-impose debt to revenue ratios that are lower than those set out in the Local Government Act (LGA). This results in less funding being available for capital investment in council assets, including wastewater treatment upgrades. As an example, Waipā District Council has self-imposed a debt to revenue ratio lower than the limit set out in the LGA.

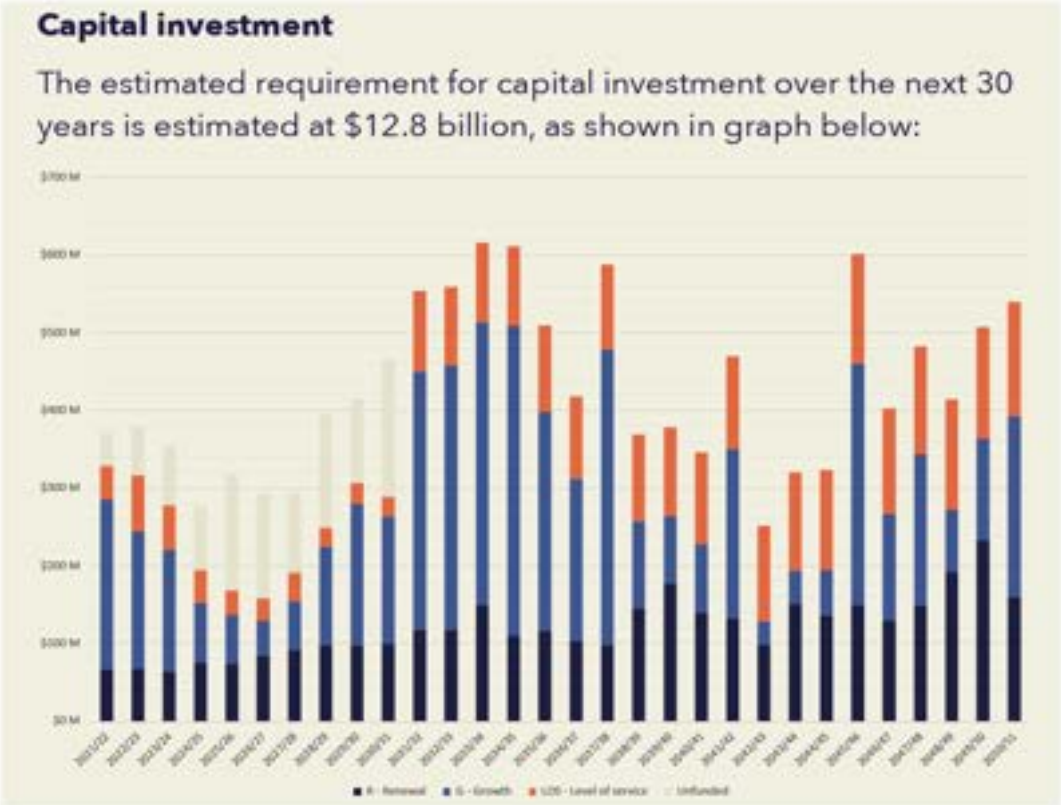
As noted above, there is also a disconnect between land use decisions, infrastructure needs and funding decisions. Limited historical funding support for councils from Central Government has made it challenging to effectively implement and enable nationally set policy and priorities. For example, at a national level land use planning directions (such as the NPS-UD) are requiring councils to enable urban land-use intensification without any consideration of the scale of investment needed in wastewater networks (conveyance and treatment) to service the land use change.

Land-use decisions through district planning and RMA processes are also often made without a funding plan in place for the infrastructure needed to service the land use. For example, development contributions

collected as part of land use decisions do not cover the level or timing of investment needed to support the approved land-use.

The level of investment needed to support the level of development enabled by current District Plans is not currently funded in council Long Terms Plans. For example, the HCC Infrastructure Strategy (2021-2051) shows the estimated requirement for capital investment over the next 30 years is $12.8 billion. A large portion of this investment is required in the first ten years however, this is currently unfunded due to budget constraints as shown in Figure SC - 14:.

Figure SC - 14:Estimated capital investment – Hamilton City Council Infrastructure Strategy (2021-2051)



This consequence is inefficient near-sighted decision-making, which is inferred in the evidence above and is expanded on in Problem Statement 3.

Effect: As a consequence, inefficient near-sighted decisions are made, and health and well-being of the Waikato River degraded

Degraded Health and Well-Being of the Waikato River.

Poor water quality and the current ecosystem health of the Waikato River is evidenced in problem statement two below.

3.1.2 Problem Statement Two

Inconsistent, short-term and parochial regulatory, planning and investment decisions on land use and urban water resource management have contributed to cultural disconnect, degraded water quality, poor ecosystem health and over allocated resources. As a consequence, the relationships and aspirations of communities with the Waikato River and the ability of Waikato River iwi to exercise mana whakahaere or conduct their tikanga and kawa have been severely compromised

Problem statement two links the historical decisions noted in problem statement one, with the degradation of the Waikato River and environment and the relationships of iwi and communities with the river. As outlined in problem statement one, historical decision-making has been ineffective and short sighted. Historic decisions have had significant consequences to the health and wellbeing of the river.

Cause: Inconsistent, short-term and parochial regulatory, planning and investment decisions on land use and urban water resource management have contributed to cultural disconnect

As noted in problem statement one, the lack of an integrated strategy has contributed to short-term decision-making, which has delivered limited progress towards Te Ture Whaimana outcomes. In addition, short-term decision-making has exacerbated wastewater capacity issues because networks and systems have had to service unplanned growth in residential, commercial and industrial activity ahead of infrastructure investment.

Historically decisions were made based upon current influences and issues, without a full understanding of how growth patterns, land use and environmental standards could change over time. It is therefore important that solutions considered as part of this DBC are based on robust growth forecasts and are adaptable to changing circumstances.

Table SC - 7: summarises several historic decisions related to wastewater treatment in the Metro Area and how these decisions were compromised because of land use, population and regulatory inconsistencies.

Table SC - 7: Previous decision-making issues at existing WWTPs

WWTP	Historical decisions which have led to capacity and quality issues
Hamilton (Pukete)	The current upgrades at Pukete (Pukete 3) is aimed at extending the capacity of the plant to meet demand out to 2028. The upgrades have been designed to meet existing treated wastewater discharge consent conditions (which are load based, and therefore require treatment improvements to accommodate increased discharge volumes). The treatment and discharge approach does not take a holistic approach to urban water management and does not take advantage of the valuable resources (water, nutrients, energy) produced through the process. In addition, the footprint of Pukete WWTP and associated buffers to surrounding land uses is constrained so there is a 'build-out' capacity for the site. While the site has space for some further expansion the build-out capacity will be reached in the future requiring a supplementary treatment solution to help meet the needs of Hamilton.

WWTP	Historical decisions which have led to capacity and quality issues
Cambridge	The Cambridge WWTP was not originally designed for municipal treatment. In 1995 Waipā District Council purchased the Weddel Crown Meatworks wastewater treatment facility and retrofitted the existing ponds and RIBs. This was a more cost-effective solution; however the treatment plant was unable to treat the high flow loads to the quality required to meet its resource consents. As such, the plant did not meet its consenting requirements for almost 20 years until late 2020. Despite the clear violations against the consent conditions, Waipā District Council received no penalty or reprimand from the regulator (in this case Waikato Regional Council) between 1997 and 2017. It was generally accepted that the existing infrastructure at the WWTP could never achieve 100 percent compliance and therefore no significant action was undertaken to address the issue until 2011. The plant now has a new resource consent increasing the allowable limits for Nitrogen and has been compliant since late 2020.
Te Kowhai	The existing WWTP at Te Kowhai will not be sufficient if and when more dense residential development occurs in this area. Waikato District Council has indicated it does not want to operate and maintain a multitude of small package plants. A long-term servicing solution has not been developed or funded to meet the long-term needs of Te Kowhai.
Mātangi	The 50-year Wastewater Strategy (2014) noted the following: *"the historic peak discharge flows [for the Mātangi WWTP] have exceeded this [its maximum flow constraints] and is expected to consistently exceed this from 2020. The buffering of peak flows through the plant cannot be estimated due to the lack of WWTP inflow data".* The lack of certainty around population and industrial growth implied from the lack of WWTP inflow data, limits the ability for Waikato District Council to adequately plan for future developments at the plant. Centralised wastewater treatment options were considered; however, both were ruled out due to septicity issues associated with conveyance of low flows over long distance and costs.
Tauwhare Pa	The 50-year Wastewater Strategy (2014) noted the following: *"It is not clear what the future design ADWF [Average Design Wastewater Flow] and PWWF [Peak Design Water Flow] (i.e. capacity) for the existing WWTP is, however the resource consent application gives a future ADWF and PWWF of 45 m³/day and 119 m³/day, respectively".* This suggests there is uncertainty around the capacity constraints of the plant. However, the current consent limits the flows to 63 m3/day, and it is therefore assumed that capacity is at least as large as the stated existing design ADWF.

Effect: have contributed to cultural disconnect, degraded water quality, poor ecosystem health and over allocated resources

A lack of effective oversight and stewardship arrangements, and weaknesses in the regulatory environment, have contributed to cultural disconnect. Iwi and Mana Whenua have not historically been involved in, or empowered to, make decisions in relation to wastewater management in the Metro Area as documented in problem statement one.

This includes input into the level of investment that should be made in wastewater services or involvement in proposed discharge methods. Instead councils make all the funding (capital and operational) decisions in relation to the wastewater activities through the LTP process. The Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 has provided for an Iwi Commissioner to be appointed to the hearings panel for activities that impact the Waikato River, however, this does not resolve the cultural disconnect that exists.

As an example, Waikato iwi do not approve of discharge to waterways of effluent from wastewater treatment plants and view land disposal as the only acceptable option for wastewater. They have a strong cultural

belief that wastewater should be cleaned through contact with land before returning to water bodies and in doing so preserve the mauri of their tupuna[43].

Diffuse run-off and leaching of contaminants to groundwater from farms is currently the major source of pollution in the Waikato River (ADD SOURCE). While point source discharges of treated sewage and industrial wastewaters do contribute significant contaminant loadings to the river, in general, the discharge from WWTPs contributes relatively small amounts to the total contaminants.

For example, the Cambridge WWTP short-term consent has a median value of 15 kg/day and a 90th percentile value of 30 kg/day for Total Phosphorus. The Cambridge WWTP short-term consent has a median value of 330 kg/day up to 31 December 2023, and 385 kg/day for Total Nitrogen for the remaining duration of the short-term consent. HCC currently has consent to discharge up to 100 kg of Total Phosphorus per day and 450 kg of Total Nitrogen per day to the Waikato River.

The lack of proactive decision-making regarding wastewater treatment and land use management has contributed to substandard water quality. Water quality trends at key sites along the Waikato River show a general trend of degradation, as the concentration of contaminants has increased.

Results of the 2018 water quality dataset are highlighted in Figure SC - 15:. This shows the key contaminants that have contributed to poor water quality in the Waikato River such as Nitrogen, Phosphorus, Turbidity, Ammonia, and Escherichia coli (E.coli).

Six monitoring sites along the Waikato River have been operating over the last five-year period[44]:

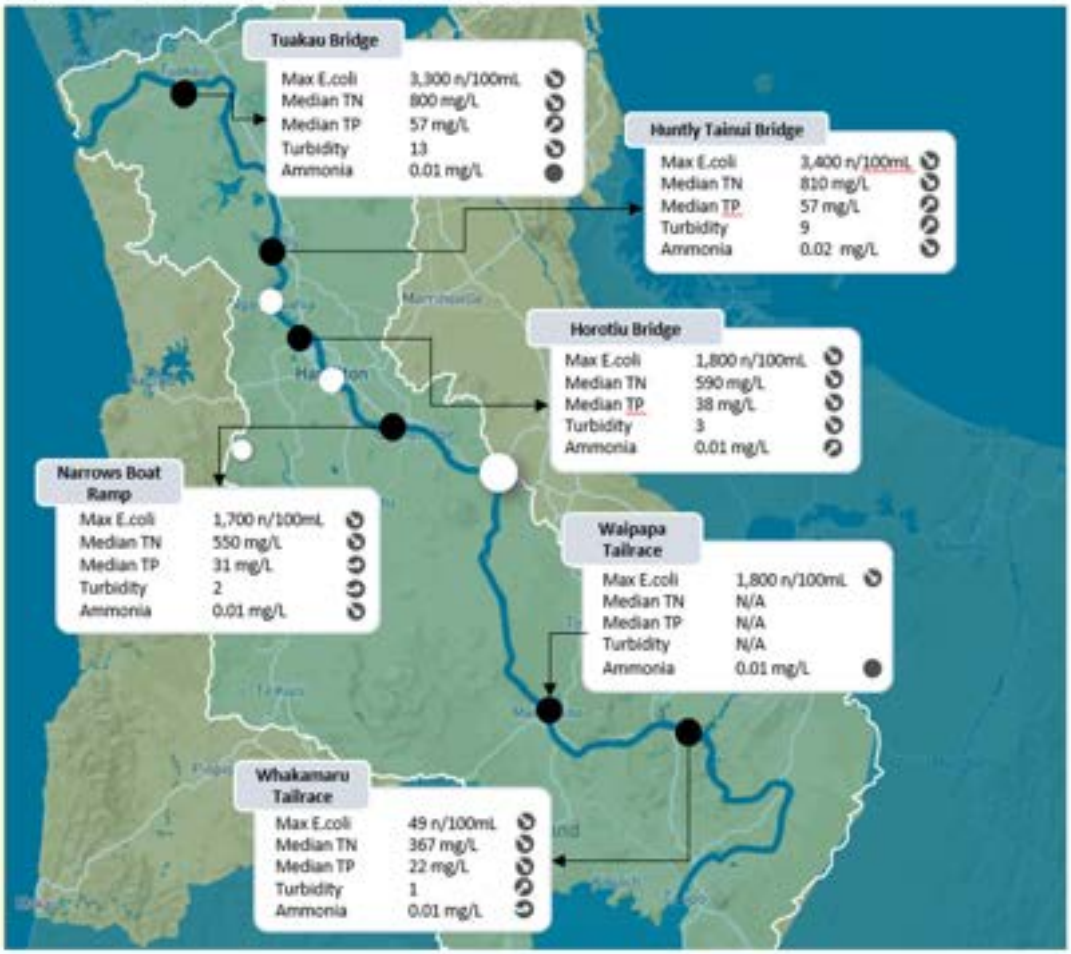
- Tuakau Bridge
- Huntly Tainui Bridge
- Horotiu Bridge
- Narrows Boat Ramp
- Waipāpa Tailrace
- Whakamaru Tailrace.

The general containment trends at these sites are presented in the Figure SC - 15: below.

[43] Water River Independent Scoping Study, NIWA, 2010

[44] LAWA, 2020. Source: https://www.lawa.org.nz/explore-data/waikato-region/river-quality/waikato-river

Figure SC - 15: Water quality of the Waikato River[45]



[45] LAWA, 2020. RiverWQMonitoringData_northIsland_2014-18. Source: https://www.lawa.org.nz/download-data/#river-water-quality

Figure SC - 16: Life of the Waikato River – Macroinvertebrate (MCI) 11

The results shown in Figure SC - 15: and Figure SC - 16: suggest high levels of E. coli, total nitrogen, total phosphorus and reductions in visual clarity. These measurements indicate poor and degraded water quality and ecosystem health in many locations within the lower catchment of the Waikato River. This is likely to limit the cultural and recreational interactions people have with the Waikato River.

It should be noted the monitoring sites above give an indication of the wider river catchment, which is impacted by numerous point and non-point sources of contaminants. The point source contribution to the low water quality is relatively small compared to the non-point source contribution (i.e., runoff from farms and stormwater). In general, the discharge from municipal wastewater treatment plants contributes relatively small amounts to the total contaminants.

However, because of the population served by the Pukete WWTP, the nutrient loads discharged from Pukete and Cambridge to the Waikato River are some of the highest point source discharges in the entire catchment. The discharges have both localised impacts on the river at the point of discharge, and cumulative impacts downstream.

Effect: As a consequence, the relationships and aspirations of communities with the Waikato River and the ability of iwi to exercise mana whakahaere or conduct their tikanga and kawa have been severely compromised.

Cultural disconnect from the Waikato River

Tāngata Whenua have a unique relationship with the Waikato River which is considered by many to be tupuna (ancestor) or a taonga (treasure). Historically, the river was a key source of food and water, an important transport corridor and a place of healing with its own mauri and spiritual healing.

There are many who consider the water of the Waikato River to be akin to the blood flowing through their veins and the health and wellbeing (mauri or life force) of the river is inextricably linked to that of taangata whenua who have lived along its banks.

It is believed that this relationship with the river brings with it the responsibility to ensure the wellbeing of the river. As such a co-governance and co-management affiliation was set up for the management of the Waikato River and its catchment which acts under the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010[46].

The ongoing development which has occurred along the length of the river over the last century has seen an increase in target nutrients and the contamination of the river from industries, communities and farmland. The discharge of waste, particularly human waste, to the Waikato River or its tributaries, whether direct or diffuse, is particularly abhorrent to Tāngata whenua.

A minimum benchmark has therefore been agreed to achieve the best practicable discharge quality which adheres to objectives as defined within the *Te Ture Whaimana o Te Awa o Waikato, Vision and Strategy for the Waikato River*. Objectives H and K are the most prevalent to the discharge of wastewater into the river:

- Objective H: The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities.
- Objective K: The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length.

Actions (or inaction) taken which move further away from the above objectives (and the other 11 objectives outlined within *Te Ture Whaimana o Te Awa o Waikato* would be considered unacceptable.

During workshops undertaken as part of the Cambridge Wastewater Treatment IBC and the Waikato Sub-Regional Three Waters Strategic Case, iwi groups reiterated the importance of implementing a solution which seeks to improve relationships with the river. The ability to swim and take food from the river, along with the improved ecological health of the river were identified as key drivers for betterment and positive change. This was not just to improve the cultural relationships with the river, but to also improve the wider community's interactions with the river. The river should be a source of pride for the region, celebrated by all.

3.1.3 Problem Statement Three

Reactive infrastructure planning practices coupled with light-handed regulation and compliance and inconsistent management practices, standards and performance expectations has led to variable urban water system performance across the region and has adversely impacted the health and well-being of the Waikato and Waipā Rivers.

Problem statement three relates to inconsistent and changing regulatory standards, practices and performance expectations that have led to the variable infrastructure performances, particularly wastewater performances within the Metro Area. This affects the ability to achieve Te Ture Whaimana.

[46] Cambridge Wastewater Treatment Plant Tāngata Whenua Effects Assessment 2011

Cause: Reactive infrastructure planning practices

The dispersed nature of the roles and responsibilities within the system, spread across many TLAs, means no one entity is currently responsible for monitoring or delivering the performance of the whole system. As evidenced in previous problem statements, long-term population growth and development forecasts across the Metro Area have historically been misaligned and inconsistent, This has contributed to reactive and poorly decision-making regarding wastewater treatment.

The Metro Area includes several areas either zoned for development or with significant development potential located on the periphery of existing urban settlements. Many of these areas, such as Te Kowhai, and the Airport industrial area, currently have limited wastewater services. In some cases, no servicing is planned, despite a lack of wastewater services constraining development. This means the land is zoned for development without sufficient long-term servicing solutions, or it prevents land that could unlock significant economic potential from being zoned and developed.

In many cases, previously projected population growth exceeded forecast projections, leading to discrepancies between what was expected and what was required in terms of key wastewater infrastructure. One example is the 2011-2021 HCC Long-Term Plan, which forecasted that Hamilton City would reach a population of 150,000 by 2021. Hamilton City reached this level by 2016. This growth rate has resulted in additional pressure on the city's infrastructure, including the Pukete WWTP. Further details on future growth areas, capacity limitations and the need for wastewater treatment infrastructure provisioning is outlined in section 3.1.4.

In addition, land use decisions in serviced areas have been made without long-term sustainable servicing solutions that are compatible with the broader needs of the Metro Area. For example, the Airport precinct is undergoing rapid development and is currently serviced through a mixture of small onsite WWTPs and storage and tanked wastewater to the Cambridge WWTP. Other developments in rural zones have been approved based on small, decentralised solutions.

Furthermore, recent asset upgrades have been driven by reactive measures to meet abatement notice requirements, or prosecutions rather than a proactive approach to address known asset deficiencies.

Cause: coupled with light-handed regulation and compliance and inconsistent management practices, standards and performance expectations

Under performing sites are often neglected until enforcement action is taken to provide incentive for upgrades/compliance to occur. Councils are often not proactive in this space, and approaches are inconsistent.

As an example, up until late 2020, the Cambridge WWTP never fully complied with its resource consent conditions. This situation occurred for more than 20 years, primarily because of the lack of regulatory drivers or enforcement and because of Waipā District Council's decisions not to invest in any upgrade.

In addition, plan changes being approved and adopted without funded and planned infrastructure projects often result in 'plug and play' solutions that exceed existing network capacity and result in poor system performance (e.g. network overflows, poor levels of treatment, consent non-compliance). In some instances, his has resulted in short-term, unconnected land development and associated wastewater solutions (e.g. WRAL, Te Kowhai rural-residential, Mātangi and Tamahere rural-residential).

The consenting requirements and levels of enforcement consistency within HCC, Waipā District Council and Waikato District Council differ significantly (refer to Table SC - 9:). The source of misalignment could be attributed to each councils' individual interpretation and approach to Part 2 RMA where it is considered

appropriate to trade off or balance economic, societal and environmental matters[47]. This has resulted in varied discharge standards and levels of compliance. In many instances, consent conditions and their enforcement (or lack of enforcement) have resulted in extended periods of non-compliance with environmental standards and mis-alignment with iwi's strategic vision for water quality of the Waikato River.

One example of misaligned performance measures and expectations is the misalignment between the NPS Freshwater Management and the more recent Plan Change 1 requirements.

A plant must legally meet its RMA resource consents but must also comply with the water quality baseline standards as defined by the NPS for Freshwater Management. The NPS guidelines provide a range of targets and categorises them into attributes, with Attribute A being the highest standard. Ideally water quality should stay within Attribute A or B target ranges.

However, in recent years central and local Government regulations around improving the quality of freshwater have been introduced in response to changing community environmental expectations and Te Ture Whaimana. This is seen through the Plan Change 1. Plan Change 1 sets out an 80-year timeframe for achieving water quality that is swimmable and safe for food collection along the entire length of both the Waikato and Waipā rivers and their tributaries. In achieving this, Waikato Regional Council has set a higher standard than the requirements stipulated within the NPS for Freshwater Management for some water quality parameters such as Nitrate, Ammonia and E.coli. This is shown in Table SC - 8: which compares the Plan Change 1 standards against the NPS standards for two locations along the river (one upstream and one downstream)[48].

It should be noted that the NPS target ranges for Total Phosphorus (TP) and Total Nitrogen (TN) are for lakes. The NPS for Freshwater Standards/Management? does not stipulate a standard for TP and TN for Rivers. As such the NPS target ranges for TP and TN are a higher level of quality (i.e. lower levels of nutrient) than what is recommended in Plan Change 1. These differing requirements make it difficult for local authorities to develop consistent and aligned consenting conditions.

Whilst this misalignment currently exists, recent water reform policies (as described in section 0), require NPS for Freshwater Management to be updated to better align with the Plan Change 1 standards. It is assumed this misalignment will be resolved by the end of the 2022.

Table SC - 8: Plan Change 1 and NPS standards comparison at Whakamuru Tailrace and Tuakau Bridge

			Waikato at Whakamuru		Waikato at Tuakau		Lakes and/or rivers	
Parameter		Unit	Short term targets	Long term targets	Short term targets	Long term targets	NPS Target A	NPS target B
Chlorophyll a	Annual Median	mg/m^3	5.0	5.0	10.6	5.0	≤2	>2 and ≤ 5
	Annual Max	mg/m^3	25	25	35	25	≤10	>10 and ≤ 25
Nitrate-N (NO_3- N)	Annual Median	mg/L	0.101	0.101	0.325	0.325	≤1	>1 and ≤ 2.4

[47] WRC, July 2017. Waikato Freshwater Strategy, *1.7.3 Policy Misalignment*. Retrieved 22 August 2019, from https://www.waikatoregion.govt.nz/assets/PageFiles/40487-lets-talk-water/Fresh-water-strategy-2017-COMBINED-web.pdf

[48] Plan change 1 identifies different quality standards for different monitoring sites.

			Waikato at Whakamuru		Waikato at Tuakau		Lakes and/or rivers	
	Annual 95%ile	mg/L	0.251	0.251	0.890	0.890	≤1.5	>1.5 and ≤ 3.5
Ammonia (NO_4 - N)	Annual Median	mg/L	0.003	0.003	0.003	0.003	≤0.03	>0.03 and ≤ 0.24
	Annual Max	mg/L	0.01	0.01	0.008	0.008	≤0.05	>0.05 and ≤ 0.40
Total Phosphorus	Annual Median	mg/L	25	25	49	38	≤10	>10 and ≤ 20[43]
Total Nitrogen	Annual Median	mg/m^3	329	300	576	500	≤160	>160 and ≤ 350[11]
E. Coli	Annual 95%ile	cfu/100mL	60	60	1388	540	≤540	≤1000
Clarity	Annual Median	m	1.37	2.2	0.48	1.0	N/A	N/A
Clarity	Annual Median	m	1.37	2.2	0.48	1.0	N/A	N/A

One of the other issues highlighted within this problem statement is the inconsistent standards being adopted by each territorial authority. Table SC - 9: outlines the discharge quality consenting requirements for each of the WWTPs currently discharging into the Waikato and Waipā River within the Metro Area.

This shows that the plants further upstream are expected to achieve higher consenting standards than those further downstream, with the exclusion of Pukekohe which, following the completion of its upgrades will be able to achieve very high quality of discharge (producing less than TN of 5 mg/m3) and therefore meet significantly higher consenting conditions. This reflects the additional quality expectations associated with larger and more sophisticated facilities. Smaller plants struggle to produce higher quality discharges. High quality discharges only become feasible for larger servicing areas (i.e. a larger funding base means larger, more sophisticated plants are more financially feasible).

[43] The NPS target ranges for Total Phosphorus and Total Nitrogen are for Lakes. The NPS for Freshwater does not stipulate a standard for TP and TN for Rivers. As such the NPS target ranges for TP and TN are a higher level of quality (i.e. lower levels of nutrient) than what is recommended in Plan Change 1.

Table SC - 9: Quality of discharge consents of WWTPs (for river only discharges)

Parameter	Cambridge WWTP	Pukete WWTP	Ngaaruawaahia WWTP	Te Awamutu WWTP
Flow	Average of 6,000 m^3/day until 31 December 2023 and an average of 7,000 m^3/day for the remaining duration of the short-term consent. Max of 10,000 m^3/day	Max of 224,000m^3/day		
cBOD5 concentration	Shall not exceed a median value of 20 grams per cubic metre and the 90th percentile shall not exceed 50 g/m^3	Over each calendar month, no more than 8 exceedances over 10 g/m^3 and each quarter no more than 3 exceedances over 50 g/m^3	Median five day shall not exceed 30 g/m^3 and 90th percentile shall not exceed 60 g/m^3	Shall not exceed 10 g/m^3 for more than 10% of samples taken in one year, no sample shall exceed 20 g/m^3
Suspended Solids concentration	Shall not exceed a median value 20 grams per cubic metre and the 90th percentile shall not exceed 50 g/m^3	Over each calendar month, no more than 8 exceedances over 15 g/m^3 and each quarter no more than 3 exceedances over 100 g/m^3	Median suspended solids concentration shall not exceed 30 g/m^3 and 90th percentile shall not exceed 60 g/m^3	Median suspended solids concentration shall not exceed 15 mg/L and the 90th percentile shall not exceed 35 mg/L
Total Nitrogen	Shall not exceed a median value of: (a) 330 kg/day median value up to 31 December 2023; and (b) 385 kg/day median value from 1 January 2024 and for the remaining duration of the consent.	Over each 26 week period, no more than 50% of the samples shall exceed 450 kg/day in summer and 1500kg/day in winter	Median shall not exceed 20 g/m^3 (summer) Median for Ngaaruawaahia and Huntly combined shall not exceed 57 kg/day (summer)	Annual average total nitrogen load shall not exceed 50 kg/day
Total Phosphorus	Total Phosphorus in the discharge shall not exceed a median value of 15 kg/day and a90th percentile value of 30 kg/day.	Over each 26 week period, no more than 50% of the samples shall exceed 95 kg/day in summer and 700kg/day in winter	Median shall not exceed 8 g/m^3 (summer) Median for Ngaaruawaahia and Huntly combined shall not exceed 17.3 kg/day (summer)	Annual average total phosphorus load shall not exceed 25 kg/day
E.coli	*E. coli* levels shall not exceed a median value of 126 Colony Forming Units (CFU) units per 100 millilitres	Over each calendar month, no more than 8 exceedances of E.coli over 126 cfu/100mL. Over each quarter no more than 3 exceedances over 2000 cfu/100mL	Median E.coli concentration shall not exceed 126 cfu/100mL	Faecal coliforms shall not exceed 400 cfu/100mL and the 90th percentile shall not exceed 4,000 cfu/100mL

To achieve the water quality standards outlined within Plan Change 1, WWTPs discharging into the Waikato River should be achieving consistent performance levels. One of the key objectives of the *Te Ture Whaimana* is to make the entire length of the river safe for swimming and the collection of kai. This means achieving a high water quality standard for the entire length of the river, regardless of plant location.

Each WWTP's resource consents should also be measured against consistent consenting parameters and conditions on the basis of a standard performance standard. In some cases, the parameters and conditions are different across WWTPs, making it difficult to monitor and compare across jurisdictions. All new standards (in both the NPS and Plan Change 1) use Total Nitrogen and Total Phosphorus as the main nutrient parameters for measurement and should be applied throughout the Metro Area.

Waikato District Council, Waipā District Council and HCC are responsible for their respective WWTPs, and the monitoring of discharge parameters undertaken. Each council can propose resource consent conditions (including parameters and limits).

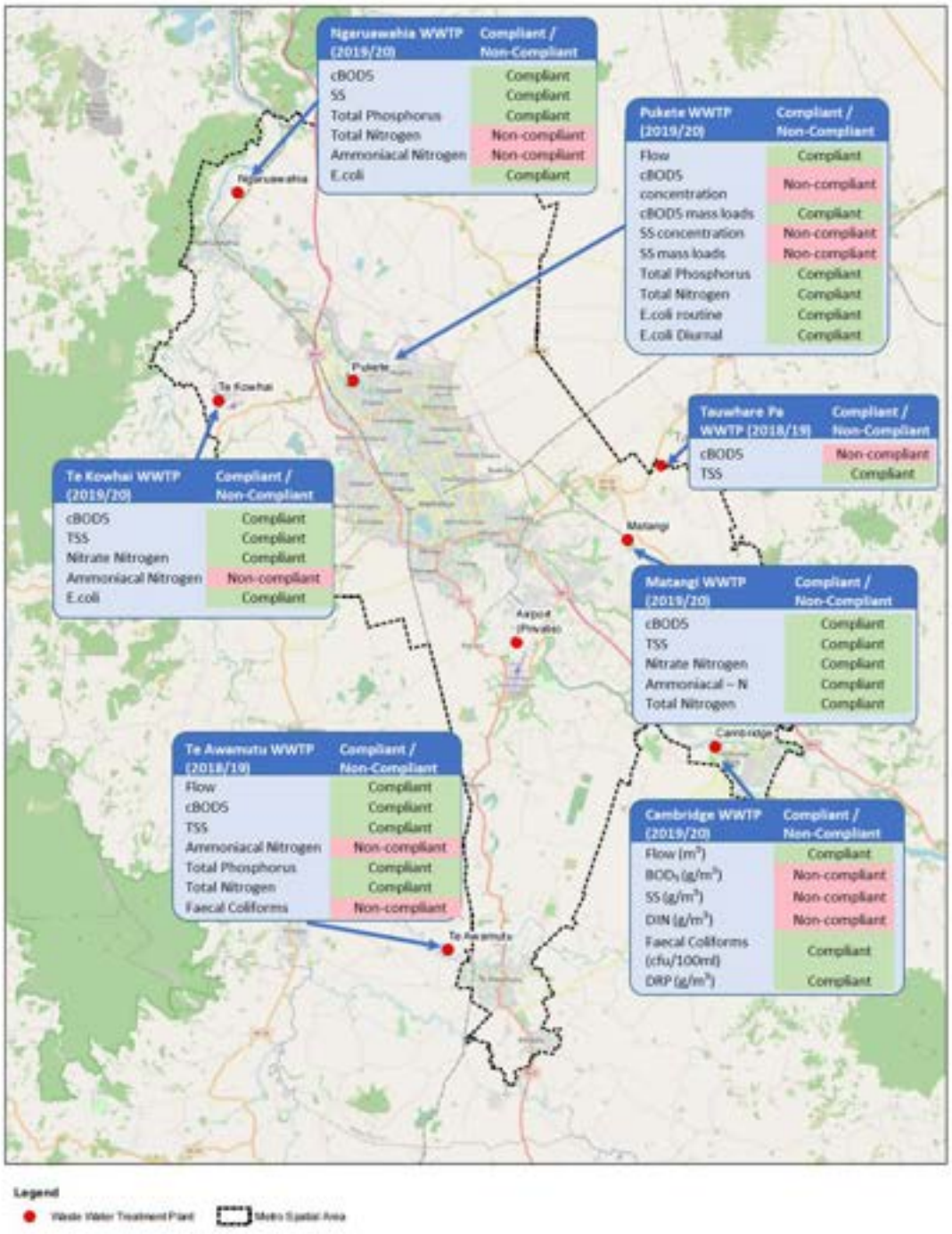
However, Waikato Regional Council is responsible for approval of the resource consents for WWTP discharges, the conditions imposed and their enforcement. Both the regional council and the district (city) councils will therefore be responsible for applying, maintaining and enforcing consistent and aligned monitoring of the WWTP discharges and consent requirements.

The above consents only investigate the discharges to the Waikato and Waipā River. Land discharges are set to a different standard. The performances of these plants is discussed below.

Effect: has led to variable urban water system performance across the region and has adversely impacted the health and well-being of the Waikato and Waipā Rivers

In addition to the inconsistent consenting requirements, many existing plants in the Metro Area are unable to meet the existing consenting conditions. Figure SC - 17: shows the compliance outcomes of the seven municipal WWTPs operating within the Metro Area. The tables represent the most recent compliance monitoring data available.

Figure SC - 17: Compliance of WWTPs in Metro Area



As shown in Figure SC - 17:, Cambridge WWTP has been non-compliant since 1997 when its original consent was issued. Up until 2020 (when a new short-term consent was secured permitting a high total nitrogen discharge load) the plant was significantly non-compliant for Total Nitrogen with 100% of all samples exceeding its current consent limit for Dissolved Inorganic Nitrogen, despite its recent short-term improvements. There is also a compliant issue around the water quality as 38% of its actual samples exceeded the required consent limit.

Pukete WWTP and Te Awamutu WWTP are normally compliant and able to perform at a higher level, including higher quality discharges delivery. However, these plants have shown recent non-compliances particularly in relation to Ammoniacal Nitrogen and Total Suspended Solids (water clarity) parameters.

Te Kowhai WWTP and Tauwhare Pā WWTP have land-based discharges and are currently struggling to meet Ammoniacal Nitrogen and cBOD consent requirements respectively.

Mātangi WWTP also relies on land-based discharges. Whilst this plant shows compliance for the 2019/20 year, the plant does not have capability or functionality in reducing Total Nitrogen and Total Phosphorus. This will cause non-compliances in the future as standards are increased.

Operating outside of compliance limits is likely to harm aquatic animals, instream ecology, and may negatively affect a water body's recreational use in the Waikato River. To achieve *Te Ture Whaimana*, the long-term solution must achieve better consenting conditions by having consistent regulatory standards, practices and performance expectations.

Effect: Adversely impacted the health and well-being of the Waikato and Waipā Rivers.

Problem statement two provides evidence of the impact these issues have on the health of the Waikato and Waipā Rivers.

3.1.4 Problem Statement Four

The legacy of under-investment in urban water systems coupled with infrastructure reaching end of life and increasing regulatory requirements and environmental expectations, climate change impacts and greater growth demands has created a significant investment deficit, resulting in unaffordable current and future costs for new infrastructure, maintenance and operations and human capacity and capability challenges within the waters sector.

Problem statement four identifies a number of issues leading to ongoing operational challenges currently being experienced by three waters infrastructure and management. These include:

- an ongoing trend of under-investment in urban water systems, typically due to a lack of funds and affordability constraints
- ageing infrastructure, which has, or is close to reaching the end of its asset life and has not been replaced
- increasing environmental expectations leading to a higher standard of regulatory requirement
- the effects of climate change on water supply
- current and future growth demand placing additional pressures on supply and capacity and cost.

Cause: The legacy of under-investment in urban water systems

As noted in problem statement one, appropriate funding provision as a result of competing priorities for council funding have constrained investment in wastewater infrastructure.

Accordingly, there is significant investment required in the Metro Area to upgrade treatment plants discharging into freshwater, to meet the objectives set out in the NPS for Freshwater Management. An estimated investment of between $240 and $360 million[50] is required to achieve the NPS for Freshwater Attribute B targets, with an additional increase in operating costs estimated between $6.5 and $9.7 million.

Cause: coupled with infrastructure reaching end of life

Approximately 12 per cent of wastewater pipelines within the Metro Area are assessed as being in poor or very poor condition[51] with an average age of 37.19 years[52]. Pipelines in poor condition carry increased risks of failure, which can lead to water loss and inefficiencies in the network. In some case, pipes are no longer fit for purpose and may have already exceeded the end of their useful life. As a result, operational and capital expenditure costs associated with service delivery are likely to increase unless action is undertaken.

In 2019, HCC was fined $54,000 for overflow of wastewater including human sewage (a discharge of untreated wastewater) into the Waikato River from the Pukete WWTP[53]. This issue occurred because the overflow protection system failed.

The national "Case for Change" report recognises that discharges from WWTPs are harming the environment in many parts of New Zealand, particularly where multiple plants are scattered across a catchment or are operating poorly, similar to the Metro Area.

Cause: increasing regulatory requirements and environmental expectations, climate change impacts and greater growth demands

In addition to increasing regulatory requirements, community expectations regarding environmental regulations have increased over the past few years.

Figure SC - 18: below shows the percentage of respondents residing within the Waikato Region who indicated they were pro, mid (apathetic) or anti ecological regulation. Since 2008, the percentages of respondents indicating a pro-ecological attitude towards environmental regulation has increased from 16 percent to 40 per cent and the number of those apathetic or anti ecological regulation has decreased.

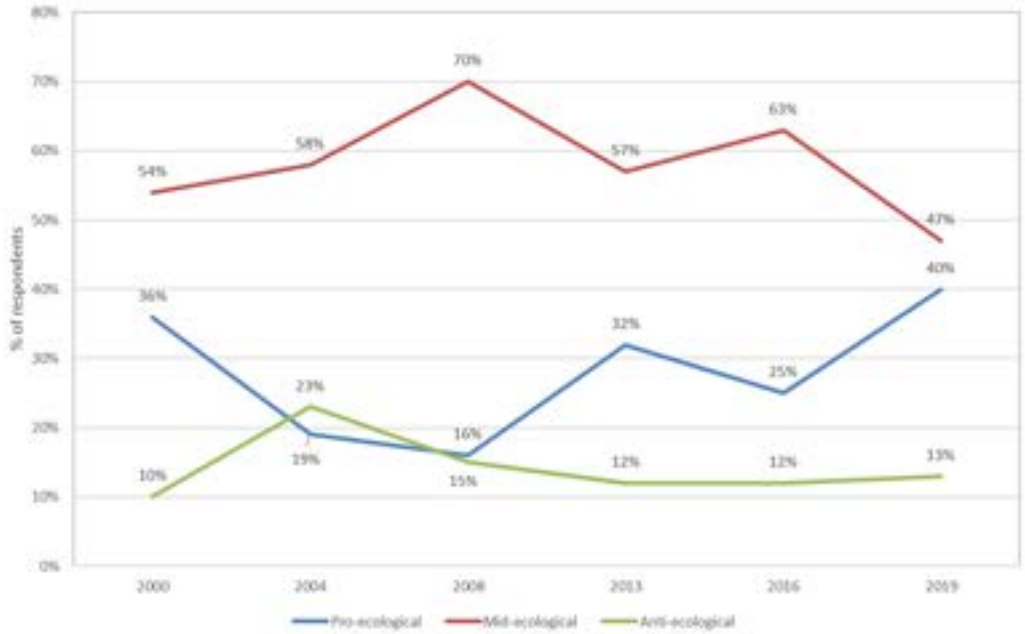
[50] DIA, 2018. GHD, Boffa Miskel, Three Waters Review, Cost Estimates for Upgrading Wastewater Treatment Plants to meet objectives of the NPS for Freshwater. Source: https://www.dia.govt.nz/diawebsite.nsf/Files/Three-waters-documents/$file/Costs-of-wastewater-upgrades-GHD-Boffa-Miskel-Final-report-Oct-2018.pdf

[51] WaterNZ, 2020. Pipeline Condition. Source: https://www.waternz.org.nz/Category?Action=View&Category_id=1008

[52] WaterNZ, 2020. Pipe Age. Source: https://www.waternz.org.nz/pipeage

[53] TVNZ, 2019. Hamilton City Council fined $54k for overflow of wastewater, including human sewage, into Waikato River. Source: https://www.tvnz.co.nz/one-news/new-zealand/hamilton-city-council-fined-54k-overflow-wastewater-including-human-sewage-into-waikato-river

Figure SC - 18: People's environmental attitudes to regulation



The key climate change risks for the Waikato region, especially the Metro Area, are more severe weather extreme events, such as increased flooding from more frequent and intense rainfall events. A higher risk of drought conditions is also expected due to higher temperatures and less rainfall events.

Storms and flooding increase the inundation and erosion risk to infrastructural assets and the services they provide. To address these risks, wastewater infrastructure must be developed and managed to be sustainable over the long-term and resilient to climate change impacts. These are likely to increase the costs associated with managing and maintaining facilities.

Land drainage and flood protection may not be able to cope with more intense and frequent rainfall events. Consequently, wastewater networks may be overloaded by increased inflow, leading to potential wastewater overflows. This will result in increasing impacts on receiving water environments as wastewater treatment facilities are impacted by changes in baseline conditions.

Longer summers with higher temperatures and less rainfall will increase drought risk and thus decrease water availability. This will have an impact on the performance and maintenance of wastewater systems and treatment facilities as river flows are likely to be lower in summer. Higher water temperature may also cause algae growth which will potentially affect overall water quality in the Waikato River.

Significant population growth, particularly within Hamilton City and the northern communities of Te Kowhai, Ngāruawāhia and Taupiri means wastewater flows will create capacity constraint issues at existing plants. Further details about these anticipated capacity constraints and timeframes are outlined in Table SC - 10: .

Table SC - 10: Capacity constraints at existing WWTPs

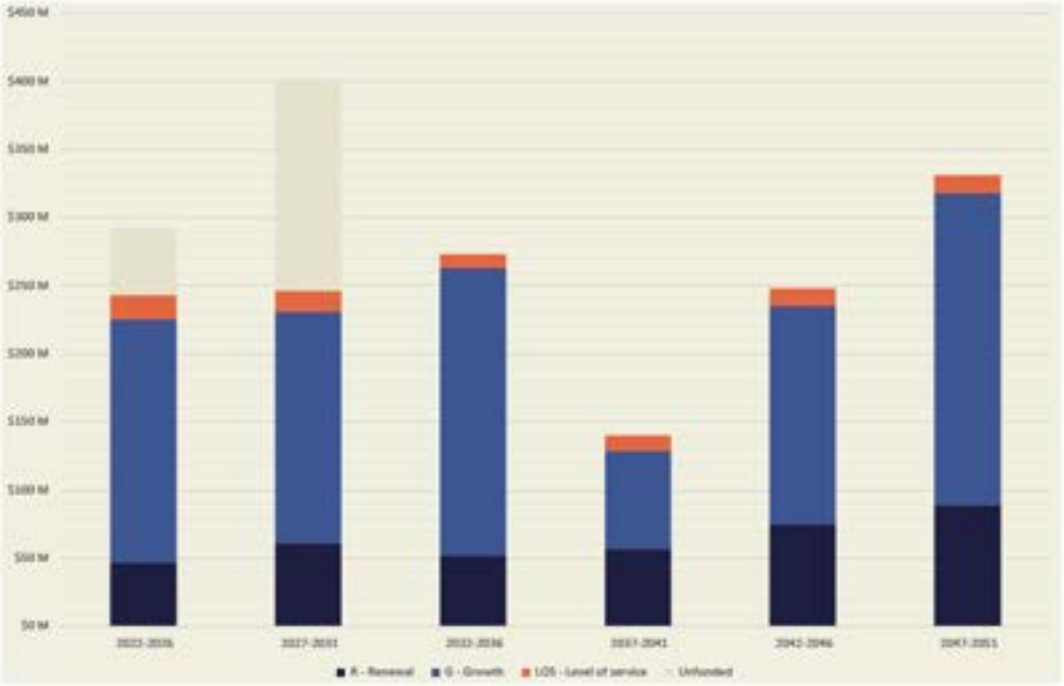
Serviced Areas	Current Average flows (m3/day)	2061 Average projected flows (m3/day)	Capacity constraints
Taupiri			

Serviced Areas	Current Average flows (m3/day)	2061 Average projected flows (m3/day)	Capacity constraints
Ngāruawāhia (incl Hopuhopu) Horotiu	1,600	6,700	Actiflo and UV systems have fixed capacity. Pond system has limited capacity to remove nutrients
Te Kowhai	7 (part of community only)	500	Treatment and infiltration system at capacity
Mātangi (village only)	30 (part of community only)	90	Land disposal system overloaded
Tauwhare Pā	27	55	Land disposal system at capacity
Hamilton	53,000	90,000	P3 upgrade underway to provide additional secondary treatment capacity. Other processes are nearing capacity (e.g. inlet works, primary sedimentation tanks, digesters)
Cambridge (incl Hautapu and Karapiro)	4,800	9,000	7,800 m^3/day target average daily flow for short term upgrade recently completed. Limited ability to remove nitrogen in pond system
Te Awamutu & Kihikihi	4,650	7,200	Stage 3 upgrade nearing completion targets average daily flow of 6,200 m^3/day

Effect: has created a significant investment deficit resulting in unaffordable current and future costs for new infrastructure, maintenance and operations

The required level of investment in wastewater systems is summarised in Hamilton City Council's Infrastructure Strategy (2021-2051). The graph below highlights the significant amount of investment that is currently unfunded in the first decade.

Figure SC - 19: Forecasted Capital Expenditure for Wastewater – Five Yearly Periods 2021-2051 (Hamilton City Council's Infrastructure Strategy)



Effect: and human capacity and capability challenges within the waters sector

Operational, human capacity and capability challenges are being experienced across New Zealand's three waters sector. The Waikato sub-region is no different. The DIA Three Waters Review in 2018[54] found that the industry experienced capacity, capability and sustainability challenges, particularly in smaller organisations.

The DIA review found that scale plays a role in relation to service quality, compliance, asset management, and governance capability. Smaller local authorities generally have fewer resources, spread more widely across many activities. The large land area and number of water and WWTPs (7) in the Metro Area can lead to occasions where resources are further stretched.

[54] DIA, April 2018. Review of three waters infrastructure: key findings and next steps, retrieved 03 Oct 2019, from https://www.dia.govt.nz/diawebsite.nsf/Files/Three-Waters-Review-Cabinet-papers-April-2018/$file/Review-of-three-waters-infrastructure-key-findings-and-next-steps-April-2018-a.pdf

3.2 Benefits, Opportunities and Constraints

3.2.1 Benefits

Three benefit statements were developed as part of the Waikato Sub-regional Three Waters Strategic Case. It is expected that this project, whilst only focusing on wastewater treatment within the Metro Area will work towards delivering these benefits. These benefit statements have been agreed with partners and stakeholders and have been adopted (endorsed by the Governance Group). The benefit statements outlined below have been retained from the Waikato Sub-Regional Three Waters Strategic Case as they align with the investment objectives outlined in Section 3.3 which provide more specific outcomes and measures.

The Benefit statements and supporting evidence is outlined below.

Benefit Statement 1

River health and quality is enhanced and people's connection with the River is restored. 45%

By addressing the problems identified above it is expected the Project will be able to deliver a wastewater treatment solution, which is able to:

- improve the health and wellbeing of the river; and
- improve people's connection to the river.

Water quality, in particular, can be improved by seeking to deliver higher performing WWTPs, which can reduce the level of contaminant in any potential discharges to the environment or directly to the river.

The need to improve the level of discharge quality (or removing discharges to the river altogether) is becoming increasingly urgent as environmental expectations increase, regulatory standards increase, and water resources become scarcer. This approach is consistent with the Three Waters Reform objective of "significantly improving the environmental performance of wastewater systems".

Improving human relationships with the river can also be achieved through this Project. An integrated and planned wastewater treatment solution across the Metro Area can help to reduce the level of E.coli, and other harmful contaminants in the river. Improving the water quality will increase the proportion of the river, which is suitable for swimming and other recreational activities as well as collecting kai. The Waikato River and region's waterways can be used more actively and commonly for customary, recreation and education practices by the community.

This specific benefit stream aims to give effect to *Te Ture Whaimana* by directly contributing to the following objectives:

- Objective A: The restoration and protection of the health and wellbeing of the Waikato River.
- Objective H: The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities.
- Objective G: The recognition and avoidance of adverse cumulative effects, and potential cumulative effects, of activities undertaken both on the Waikato River and within its catchments on the health and wellbeing of the Waikato River.
- Objective K: The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length.

Achieving this benefit will also indirectly contribute to other *Te Ture Whaimana* objectives including:

- Objective B: The restoration and protection of the relationship of Waikato-Tainui with the Waikato River, including their economic, social, cultural, and spiritual relationships.

- Objective C: The restoration and protection of the relationship of Waikato River iwi according to their tikanga and kawa, with the Waikato River, including their economic, social, cultural and spiritual relationships.
- Objective D: The restoration and protection of the relationship of the Waikato region's communities with the Waikato River including their economic, social, cultural and spiritual relationships.
- Objective I: The protection and enhancement of significant sites, fisheries, flora and fauna.
- Objective L: The promotion of improved access to the Waikato River to better enable sporting, recreational, and cultural opportunities.

Benefit Statement 2

Commitment and dedication to a collaborative and integrated approach to land, water, community planning that is holistic, integrated, aligned with community aspirations, and provides opportunities for involvement by the wider community. 35%

The project is intended to deliver an integrated, holistic and collaborative wastewater treatment solution. The scope of the project (i.e. the Metro Area) considers wastewater treatment as a wider network, as opposed to having solutions considered in isolation by individual councils.

By assessing solutions in a boundaryless way, the Project is well placed to achieve a collaborative response to the wastewater treatment issues in the Metro Area. This approach is also consistent with the Three Waters Reform objective of "improving resource coordination and unlocking strategic opportunities to consider national infrastructure needs at a larger scale".

Wider land use and development decision-making has also been incorporated into the Project to deliver a fully integrated approach. It is expected that the Metro Spatial Plan (as outlined in Appendix B) will evolve to align with the metro wide wastewater treatment strategy to be developed as part of this project.

A core outcome is to improve consistency across resource consents and operational and management practices for WWTPs. The intention is for treatments plants in the Metro Area to have a singular and aligned vision, monitored against consistent standards and on a consistent basis.

This specific benefit stream aims to give effect to *Te Ture Whaimana* by directly contributing to the following objectives:

- Objective E: The integrated, holistic and coordinated approach to management of the natural, physical, cultural and historic resources of the Waikato River.
- Objective F: The adoption of a precautionary approach towards decisions that may result in significant adverse effects on the Waikato River, and in particular those effects that threaten serious or irreversible damage to the Waikato River.

Achieving this benefit will also indirectly contribute to other objectives including:

- Objective A: The restoration and protection of the health and wellbeing of the Waikato River.
- Objective H: The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities.
- Objective K: The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length.
- Objective J: The recognition that the strategic importance of the Waikato River to New Zealand's social, cultural, environmental and economic wellbeing is subject to the restoration and protection of the health and wellbeing of the Waikato River.

Benefit Statement 3

Deliver Best for River solutions and approaches for managing growth and resource sustainability. 20%

This project will seek to deliver Best for River approaches that can sustainably cater for growth and development within the Metro Area. As outlined in Benefit Statement 2, the project will incorporate land use and development considerations to better align with future demands on the wastewater network. The intention is to minimise reactive maintenance by creating more flexible and futureproofed wastewater treatment solutions, which can more easily respond to changing circumstances.

Resource sustainability can be achieved by considering solutions, which consolidate or reduce energy and carbon requirements, reuse treated wastewater and rehabilitate land where possible.

This specific benefit stream aims to give effect to the *Te Ture Whaimana* by directly contributing to the following objectives:

- Objective M: The application to the above [the other 10 Te Ture Whaimana objectives] of both Maatauranga Māori and latest available scientific methods.

Achieving this benefit will also indirectly contribute to all other *Te Ture Whaimana* objectives (refer to Appendix B). There are also strong linkages between this benefit and the targets and outcomes sought in the *World Future Council, Regenerative Cities Report*:

Initiating comprehensive political, financial and technological strategies for an environmentally enhancing, restorative relationship between urban communities and the ecosystems from which they draw resources for their sustenance[55].

3.2.2 Opportunities

Opportunities were identified through the *Waikato Sub-Regional Three Waters Strategic Case*. These related to the benefits which could be realised through integrating river restoration and infrastructure and resourcing opportunities. Both opportunities can be realised as part of this project and are outlined below.

River restoration opportunities

There is a special relationship between Waikato River iwi and the river, reflected in Te Ture Whaimana. Many of Waikato's communities also have strong connections to rivers in the region. An opportunity exists to strengthen these relationships by contributing to the restoration of the health and wellbeing of the Waikato River (through reducing contaminant loading) and increasing the number of customary, recreation and education interactions.

Investment in three waters servicing practices will be insufficient.

Wider catchment land use management changes and investment in restoration will also be required alongside an investment in three waters servicing practices and the adoption of a more integrated approach between three waters services, land use planning and development practices. This Project will inform and be informed by the spatial planning, blue-green corridor and environmental markets work streams being delivered through the Future Proof[56]. Through combining these workstreams, there is an opportunity to better integrate land and water management, which will assist with identifying and prioritising restoration and enhance investment decision-making. This will deliver better outcomes for the river, accelerate progress towards restoring "the health and wellbeing of the awa" and support growth and economic prosperity within the sub-region.

Specifically, the following opportunities to invest in river restoration are available:

- Rehabilitation of existing plant sites that are no longer needed (if centralised solutions are preferred)

[55] World Future Council, October 2010. Regenerative Cities Report. Retrieved 04 Oct 2019, from https://www.worldfuturecouncil.org/regenerative-cities/

[56] Waikato Business News, 03 April 2019. Pioneering plan sets out blueprint for Corridor growth. Source: http://wbn.co.nz/2019/04/03/pioneering-plan-sets-out-blueprint-for-corridor-growth/

- Offsetting techniques such as vegetation zones and exclusion zones
- Wetlands as an additional treatment process

As noted below, the consolidation of wastewater treatment facilities across the Metro Area may deliver efficiencies that reduce the overall expenditure on the wastewater network, and may increase funding availability for restoration projects.

Infrastructure and resourcing opportunities

The state of wastewater infrastructure and Waikato River water quality varies greatly in the Waikato sub-region. Local authorities, iwi, communities and industry face significant challenges in meeting current and future wastewater service needs efficiently, while promoting Best for River outcomes. However, significant opportunities also come with these challenges, including economies of scale, greater network resilience and the opportunity for project partners to set strong environmental examples.

In 2015, the operational cost saving for adopting a holistic approach to three waters infrastructure management was estimated at around 10 per cent or $91 million net present value (NPV) over a 28-year period (when compared to business as usual activities™). Cost efficiencies could be achieved through lower operating costs, savings in capital expenditure and innovative procurement strategies. Specific savings would depend on actual size of communities, scope of services, infrastructure spend, distances, technologies and state of existing infrastructure. The cost efficiencies realised through this approach could be utilised to expedite progress towards Best for River outcomes.

Further opportunities exist to improve overall network resilience. As outlined, the condition of three waters infrastructure in the study area varies across assets and the three councils. If greater collaboration and resource sharing is achieved, funding and resources could be shared and targeted at areas of the network that are most at risk of failure. Approaches that provide backup water servicing solutions could be explored or implemented. This in turn will minimise the likelihood of negative environmental and community health and safety impacts.

A wider network approach to wastewater infrastructure will also provide greater consistency across discharge consents, creating further efficiencies for monitoring and enforcement.

Partnering with private industry

Currently several industries in the Metro Area own and operate private WWTPs. This is typically due to the high strength flows which industries produce and the inability for municipal plants to accommodate these flows. Private facilities include Fonterra Hautapu, Fonterra Te Rapa, Fonterra Te Awamutu, AFFCO and the airport.

However private facilities could benefit by partnering with local authorities and conveying wastewater flows to municipal plants (instead of operating a private facility). It would reduce the treatment requirements onsite, minimise operation and maintenance costs and minimise consenting requirements.

A co-funding arrangement between private and public enterprises benefits local authorities by providing additional funding opportunities and allowing for more consistent quality across plants. It also provides greater opportunities for industrial growth as municipal plants can treat high strength flows.

Fonterra Hautapu located just north of Cambridge, indicated an interest in partnering with HCC, Waipā District Council and Waikato District Council as part of this project (i.e. the Waikato wastewater treatment DBC). The opportunity to service Fonterra Hautapu through municipal wastewater systems was explored as part of this DBC. Refer to the Economic Case for more details.

3.2.3 Constraints, Dependencies

The following constraints, dependencies and risk areas will place certain limitations on the types of solutions identified for wastewater treatment in the Metro Area (see Table SC - 11:). These are investigated throughout the other Cases with specific technical risks articulated in the Economic Case (Section 5.10) and all risks are detailed within the Management Case (Section 1.5).

Table SC - 11: Key constraints, dependencies and risk areas

Constraint, Dependency or Risk Area	Description
Funding limitations	Currently each council have planned (LTP) funding available for wastewater treatment infrastructure and upgrades. Based on high level cost estimates undertaken in previous investigations, it is expected a preferred solution may require additional funding sources or a reallocation of funds. Funding limitations and constraints will be further investigated within the Financial Case.
Population growth	As identified in Problem 4, the current wastewater treatment network has limited capacity. Growth and development in the Metro Area will mean upgrades and expansions at existing plants will be necessary regardless of the outcomes of this Project. The DBC will seek to develop an option to meet these expectations, but options will still need to be flexible to ensure the network is resilient enough to respond to changes.
Partner expectations	The options investigated may not meet partner expectations which may impact ability to implement the recommendations, consent the preferred solution. Relationships may also be adversely impacted because of poor engagement and project not delivering on 'best for river' outcomes.
Land use	Current and future land uses across the Metro Area will shape where potential new facilities should be located. More detailed constraints mapping exercises will be undertaken to determine ideal locations for new plants and/or pipes. Land use planning is currently being undertaken across the Hamilton metropolitan area which may influence the demand for wastewater in the southern area.
Resource consents and designations	The options investigated may not be consentable, or the costs to deliver a consentable solution may be prohibitive. Consenting timeframes for plants across the Metro area may not align, resulting in more challenging consenting processes, and un-coordinated overall programme delivery.
3 Waters Reform	Reform of the Three Waters sector may impact the ability or commitment to implement the DBC programme recommendations.
Water quality standards	Increases in national water quality standards will have an influence on the option development and assessment process as well as on the water quality standards considered within the assessment process and specifically potential discharges into the Waikato River.
Integrated delivery	Need for councils to deliver an integrated programme may be challenging and poor integration may result in misalignment of objectives and not achieving 'Best for River' principles.
Carbon emission reductions	Treatment of wastewater creates carbon emissions. These can be offset and the requirements to do so are likely to increase and potentially be included as part of consents.
Environmental / Ground Conditions	There will be a need to consider cultural significance and values, environmental impacts and ground conditions in relation to conveyance corridors, WWTP locations and potential land discharge locations. Some of these matters are outlined in relevant reports and investigations relating to site options, discharge options and conveyance options in the business case and subsequent phases on planning and investigation.

Constraint, Dependency or Risk Area	Description
Existing utilities	Existing utilities, such as the power grid network, road network and existing reticulation network will be key constraints when determining a potential location for a new plant. More detailed constraints mapping exercises will be undertaken to determine ideal locations.
Wet industry demand	Need to continually monitor potential wet industry demand in the airport precinct and the potential impact on staging timeframes for development of a southern WWTP.
Geographical constraints	Geographical constraints include soil types and topographical constraints. Energy savings can be achieved if the reticulation network can utilise gravity where possible. More detailed constraints mapping exercises will be undertaken to determine ideal locations for new plants and/or pipes.
Conveyance corridor protection	Need to secure conveyance corridors in advance oof implementation to reduce adverse impacts from development and other land infrastructure decisions.
Technology constraints	Currently Pukekohe WWTP represents the best available treatment technology (for liquid streams) in New Zealand which is expected to achieve an effluent total nitrogen of 3mg/L. New solid stream and energy efficient technologies will be further investigated as part of this project. This may go beyond what is currently seen in New Zealand but has been demonstrated in other countries.

3.3 Investment Objectives

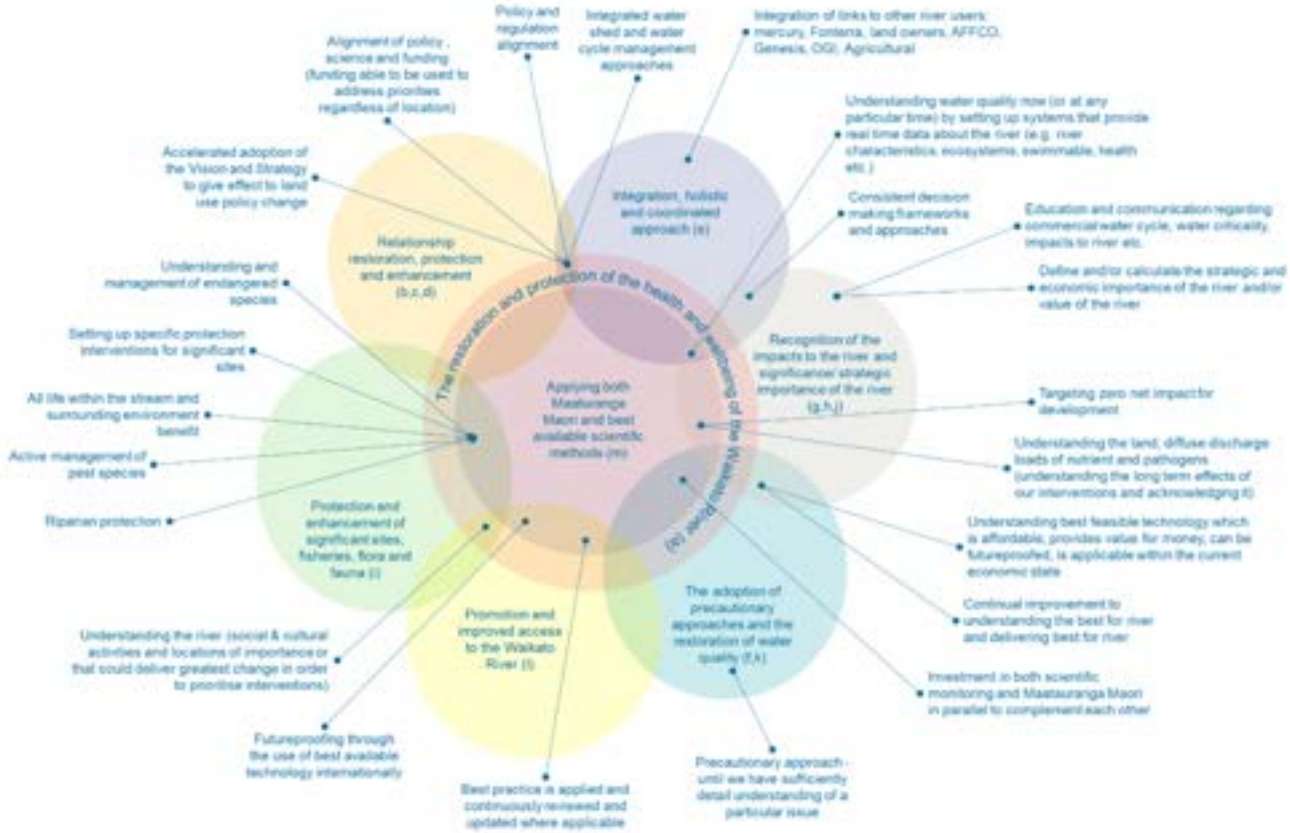
3.3.1 Best for River Definition

There is significant room for improvement to achieve the water quality targets and objectives of *Te Ture Whaimana*, as demonstrated through evidence collated when developing the problem statement.

The Best for River definition provided below, was developed as part of the Three Waters Sub-Regional Strategic Case to ensure progress is made towards current, and proposed, central and local Government regulatory targets. This definition is intended to be used as the basis for all three waters projects and assessments completed in the sub-regional area.

Figure SC - 20: below shows the objectives of *Te Ture Whaimana* grouped by theme and Best for River statements being assessed against their ability to give effect to those objectives.

Figure SC - 20: Best for River definition statements and their alignment with Te Ture Whaimana o Waikato – the Vision and Strategy for the Waikato River



Best for River Statements[57] were collated into the following 10 draft high level objectives:

1 The health and well-being of the Waikato River is restored and enhanced.

2 All life within the River (which extends beyond the main stem) and surrounding environment benefit.

3 All of the community (including industry and businesses) understand and are committed to caring for and protecting the River.

4 Cultural connectivity with the River is restored and enhanced.

5 Access to the River to enable customary, sporting, recreational, and cultural opportunities is improved.

6 All water and land resource policy, regulations and decision-making frameworks across the catchment are consistent and fully aligned to achieve Te Ture Whaimana, including RMA instruments and catchment based management approaches.

7 All water and land management decisions are based on robust and comprehensive knowledge and understanding of the river system, including real time and long-term data, sites of significance, social and cultural activities.

8 Achieve net benefit to the environment.

9 Increase the efficient use of resources and maximise resource recovery and contribution toward carbon neutrality and energy neutrality.

10 Apply and maintain best practice to all three waters management and infrastructure which allows for the sustainable future growth of the Waikato region.

3.3.2 Project Objectives

For the purpose of this DBC, the high-level objectives developed from the Best for River Statements need to be tailored and refined to become SMART objectives (Specific, Measurable, Attainable, Relevant and Time bound)[58]. They must be tailored to reflect wastewater-specific issues within the Metro Area, as the project has limited ability to directly influence other three waters issues. The project can indirectly influence water supply, water resilience outcomes through the solutions adopted and through integrated planning and water services. The following objectives have been developed to align with *Te Ture Whaimana* and the Best for River definition.

Table SC - 12: DBC Objectives and alignment to Best for River

Best for River definition	Corresponding Metro DBC Objective
1. The whole of river water quality is improved 8. Achieve net benefit to the environment	1. Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect kai from the river and connected waterways; thereby contributing to the restoration and protection of the health and wellbeing of the river.
2. All life within the River (which extends beyond the main stem) and surrounding environment benefit 8. Achieve net benefit to the environment	2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and around water bodies is enhanced through the reduction of wastewater treatment and discharge impacts before 2050.
4. Cultural connectivity with the river is restored and enhanced	3. Wastewater treatment solutions contribute to restoring and enhancing cultural connectivity with the river so that

[57] Note: Best for River definition statements are displayed around the outside of the Venn diagram. Te Ture Whaimana objectives are grouped by theme and shown in the shaded circles. The lines between the Best for River definition statements and the Te Ture Whaimana objectives demonstrate the linkages between the two.

[58] As per Better Business Case Guidelines

Best for River definition	Corresponding Metro DBC Objective
5. Improve access to the Waikato River to better enable sporting, recreational, and cultural opportunities.	before 2050, marae, Hapuu and Iwi access to the river and other sites of significance for cultural and customary practice within the Metro Area are no longer impeded by wastewater treatment solutions.
9. Increase the efficient use of resources, maximise resource recovery and contribute towards carbon neutrality and energy neutrality	4. Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from wastewater treatment systems before 2050
10. Apply and maintain best practice to all three waters management and infrastructure which allows for the sustainable future growth of the Waikato region.	5. The wastewater solution provides sufficient capacity to ensure sustainable growth in the Metro Area in accordance with growth projections for the next 100 years.

The above Metro DBC SMART objectives capture the majority of the Best for River outcomes with the exception of the following:

3. All of the community understand and are committed to caring for and protecting the River

6. All water and land resource policy, regulations and decision-making frameworks across the catchment are consistent and fully aligned to achieve the V&S, including RMA instruments and catchment-based management approaches.

7. All river and land management decisions are based on robust and comprehensive knowledge and understanding of the river system, including real time and long-term data, sites of significance, social and cultural activities.

It is proposed that these elements are captured elsewhere within the design and assessment process (refer to Table SC - 13:).

Table SC - 13: Additional Best for River considerations.

Best for River Definition	How it is being considered in the Metro DBC
3. All of the community (including industry and businesses) understand and are committed to caring for and protecting the River.	The project itself will have limited ability to influence this outcome. However, *Community Acceptability* is proposed as part of the MCA criteria. This assesses options from a community perspective, highlighting whether it is likely the community will accept the option. As part of the implementation process, community engagement and consultation are also expected to occur to provide affected communities with a greater understanding of the specific project. This will occur regardless of the option chosen.
6. All water and land resource policy, regulations and decision-making frameworks across the catchment are consistent and fully aligned to achieve the V&S, including RMA instruments, catchment-based management approaches.	This is better placed as a design principle when considering future consenting conditions of the plants (and options). The alignment of consenting conditions to better reflect Te Ture Whaimana will be required for all options. As part of the development of options, consistent standards will be applied. There will be a more specific focus on the preferred option to ensure best for river outcomes are being delivered.[59]

[59] Waikato Regional Council is currently in a Regional Plan variation process. The variation is designed to give effect to Te Ture Whaimana and will result in policy that point source and diffuse dischargers will need to respond to.

Best for River Definition	How it is being considered in the Metro DBC
	Additionally, as part of the formation of Taumata Arowai (the new drinking water regulator), national wastewater standards are expected to be developed which will also assist with the standardisation of consents. An additional criterion has been added to the MCA which assesses the risk of options breaching consenting requirements as this has been identified as an ongoing issue in the region.
7. All river and land management decisions are based on robust and comprehensive knowledge and understanding of the river system, including real time and long-term data, sites of significance, social and cultural activities.	Like above, this will be considered as part of the design process. All options will be developed based on the most up to date information and consider longer-term data sources to allow for future demands. Data capture opportunities as part of the project will be leveraged to enhance the quantity and quality of available data

Figure SC - 21: provides a map of the problems, benefits, best for river definition and objectives

Figure SC - 21: Investment Logic Map

3.3.3 KPIs and measures

The following Key Performance Indicators (KPIs) were identified as the best measures to reflect Project objectives. These KPIs use the most up to date sources and real time data to ensure baselines and targets are accurate and quantifiable.

Table SC - 14: KPIs and relevant data sources

Objective	KPI	Source
1. Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect kai from the river and connected waterways thereby contributing to the restoration and protection of the health and wellbeing of the river	KPI 1.1: Public health risks caused by the concentration of E.coli within the WWTP discharges KPI 1.2 Concentration of Total Nitrogen contaminants impacting the river and connected waterways from WWTPs KPI 1.3: Concentration of Total Phosphorous contaminants impacting the river and connected waterways from WWTPs	Develop monitoring system to measure E.coli, Nitrogen and Phosphorous levels from specific discharges and the associate point source balance for each plant within the Metro Area which we are affecting and compare against Baseline. Indicative values can be estimated based on baseline nutrient assessment.
	KPI 1.4: Proportion of plants which are compliant against discharge quality consent conditions	WWTP Compliance monitoring data sourced from local councils
2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and around water bodies is enhanced through the reduction of wastewater treatment and discharge impacts before 2050	KPI 2.1: Amount of algal biomass in the Waikato River as measured by chlorophyll a concentration attributable to treated wastewater discharges	Develop monitoring system to measure Chlorophyll a concentration at specific locations along the river.
	KPI 2.2: Health and abundance of mahinga kai species	Surveys of mahinga kai in terms of species health, variety and number. Sites for this will need to be determined based on sites which may be affected most by the current wastewater network.
	KPI 2.3: Number and variety of terrestrial species at specific locations within the Metro Area	Surveys of terrestrial species with regards to their health, variety and number to be developed at sites which are identified for rehabilitation
	KPI 2.4: Area coverage of native riparian vegetation surrounding water bodies and within the catchment area	Native vegetation coverage (hectares) across the Metro Area can be determined using GIS 2018 data sources for land cover. Coverage of wetland vegetation can also be determined using this data source.
3. Wastewater treatment solutions contribute to restoring and enhancing cultural connectivity with the river so that before 2050 Marae, Hapuu and Iwi access to the river and other sites of significance for cultural and customary practice within the metro spatial area are no longer impeded by wastewater treatment solutions	KPI 3.1: Maatauranga Maaori Cultural Health Index / Cultural impact assessment	To be determined through further engagement and development with iwi and hapu
	KPI 3.2: Number and quality of access points to the river for cultural and recreational activities and quality of the interaction with the river	Waikato Fishing and Game website. Hamilton City River Plan Other sources to be determined Quality of access points to be determined
4. Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from	KPI 4.1: Water reuse, water allocations and accounting	Currently no plant in the Metro Area which is capable of re-using water. Data sources for capturing this will need to be established as technology is advanced for water re-use.

Objective	KPI	Source
wastewater treatment systems before 2050	KPI 4.2: Carbon footprint / Energy requirements of plant and plant systems (i.e. pumps)	Average energy consumption per plant (including pumping stations) soured from councils. Carbon accounting systems will need to be developed in the future.
	KPI 4.3 Proportion of biosolids that are able to be safely reused for beneficial purposes	Currently no plant in the Metro Area which is capable of re-using biosolids. Data sources for capturing this will need to be established as technology is advanced.
5. The wastewater solution provides sufficient capacity to ensure sustainable growth in the metro spatial area in accordance with growth projection assumptions for the next 100 years	KPI 5.1: Flexibility and adaptability of solution to be staged / developed over time to meet the needs of the community.	Measures can be taken by assessing the staging attributes of the option and ability to adapt the solution to changing populations and land use.
	KPI 5.2: Proportion of industrial areas which are serviced by municipal plants sustainably	Baseline the industrial areas in the Metro Area which are currently serviced by municipal plants (and those serviced by private facilities)
	KPI: 5.3 Proportion of residents in the Metro Area serviced by municipal treatment plants sustainably	Baseline the number of households in the Metro Area which are currently serviced by municipal plants

Weightings were discussed and considered for the criteria and in particular the investment objectives. It was agreed that weightings were difficult to apply as various criteria are likely to have different levels of importance at different time horizons. For example, the ability the meet higher growth in the longer term may not materialise for 30 years. Therefore, it was agreed to assess option on the balance of outcomes and the assessments as a whole rather than a weighted score. The options considered to achieve appropriate level of outcomes were identified and progressed.

Baselines and Targets

Many of the above data capture and monitoring sources need to be developed as part of this Project. Baseline and target measures will be developed once the monitoring systems are in place. Nutrient baselines have been developed for each of the existing plants, which can provide indicative measures for water quality. Plan Change 1 targets will form the basis of water quality targets.

3.3.4 Strategic Alignment of objectives

The following section outlines how the above project objectives align with overarching strategic goals for the Waikato region, Futureproof partners, Iwi and Central Government.

Three Waters Reform Programme

The recently announced Three Waters Reform Programme, co-ordinated by DIA, outlines six key objectives. The Waikato Wastewater Treatment DBC aligns with these objectives in the following way:

A. Significantly improving safety and quality of drinking water services and the environmental performance of wastewater and storm water systems.

- Objective 1 and 2 of the DBC directly relate to the improved environmental performance of wastewater infrastructure within the Metro Area, from a water quality and water ecosystems perspective.

B. Ensuring all New Zealanders have access to three waters services

- Objective 5 refers to providing wastewater services to maintain sustainable growth within the Metro Area. This objective specifically measures the proportion of residents who are serviced by municipal plants.

C. Improving resource coordination and unlocking strategic opportunities to consider national infrastructure needs at a larger scale

- Objective 5 again refers to providing wastewater services which allow for the sustainable growth of the Metro Area. This includes measuring the ability to unlock additional growth areas for both residential and industrial purposes which align to overarching strategic planning goals. It should be noted that large scale infrastructure is one of the mechanisms for achieving this and that this, itself, is delivered through the collaboration of the DBC partners.

D. Increasing resilience of three waters service provision to both short and long-term risks, particularly climate change and natural hazards

- Resilient wastewater infrastructure hasn't strictly been identified as one of the key five objectives. But it has been identified as a critical success factor to be included as a key criteria for the MCA. Options resilient to climate change and natural hazard risks will be scored more highly.

E. Moving services to a more financially sustainable footing, and addressing the affordability and capability challenges faced by small suppliers and councils

- This has not identified as one of the five key objectives for the Project. However funding potential of options has been identified as a critical success factor. Options will consider larger-scale options and potential co-governance and co-funding systems. Again, the collaboration of the DBC partners provides greater ability to fund and finance the project.

F. Improving transparency and accountability in cost and delivery of three waters services, including the ability to benchmark performance of service providers.

- This can be achieved through the better business case process, which provides transparency throughout the decision-making process. Additionally, the benefits realisation plan will ensure performance measures are benchmarked and monitored throughout the lifespan of the Project.

Sub-Regional Three Waters Strategy

Table SC - 15: below provides an outline of how this project aligns with the goals identified within Futureproofs Sub-regional Three Waters Strategy.

Table SC - 15: Strategic alignment with Sub-regional Three Waters Strategy

Sub-Regional Three Waters Goals	Alignment to DBC objectives
Proactively protect, promote and improve public health and safety.	Objective 1 refers to improving the quality of the water to make it safe for swimming and the collection of kai. A KPI specifically measures public health risk.
Provide for the water needs of the sub-region for the next 50 years in an efficient and sustainable manner.	Objective 5 refers to providing wastewater services which allow for the sustainable growth of the Metro Area to 2080.
Ensure an understanding of, and the provision for, changing future needs, demands and issues within the sub-region.	
Promote an understanding of, and ensure appropriate planning for, the effects of climate change.	A key criterion of the MCA will consider the resilience of wastewater infrastructure to climate change effects. Options which are more resilient to climate change and natural hazard risks will be scored more highly.

Sub-Regional Three Waters Goals	Alignment to DBC objectives
Promote the sustainable and economic use and delivery of Three Waters resources and services.	Objective 4 works towards achieving net zero greenhouse emissions and sustainable use of resources.
Ensure the efficient utilisation of existing assets.	
Co-operatively manage and plan for Three Waters in the sub-region.	Options will consider larger scale options and potential co-governance and co-funding systems.
Provide for the water needs for the sub-region for the next 50 years in an efficient and sustainable manner.	Objective 5 refers to providing wastewater services that allow for the sustainable growth over the next 50 year period.
Promote the sustainable use of resources.	Objective 4 works towards achieving sustainable use of resources, including water and energy
Promote the recognition of cultural values.	Objective 3 refers specifically to enhancing cultural connectivity and improving access to the river. The restoration of the health and wellbeing to the river is core to the overall project.
Give effect to Te Ture Whaimana o Te Awa o Waikato, The Vision and Strategy for the Waikato River	All objectives refer back to the Te Ture Whaimana through Best for River objectives
Promote the restoration and protection of the health and wellbeing of our waterways and their catchments.	Both Objective 1 and 2 refer to improving the quality of water and the quality of water ecosystems.

United Nations Sustainable Development Goals

The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. They address global challenges, including those related to poverty, inequality, climate change, environmental degradation, peace and justice. The 17 Goals are all interconnected, and in order to leave no one behind, it is important that we achieve them all by 2030[60]. Of the 17 goals, this project can actively contribute to eight (see Table SC - 16:). The project does not have any objectives that are inconsistent with the UN Sustainable development goals.

Table SC - 16: Strategic alignment with UN Sustainable development goals

UN Sustainable Development Goals	Alignment to DBC
Goal 3: Good Health and Well-Being Ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development.	A key objective is to ensure the river is safe for swimming and the collection of kai. This links to ensuring public health objectives are achieved
Goal 6: Clean Water and Sanitation Clean, accessible water for all is an essential part of the world we want to live in	This project focuses on the restoration and improvement of the health and wellbeing of the river and also providing access to the river

[60] Source: https://www.un.org/sustainabledevelopment/sustainable-development-goals/

UN Sustainable Development Goals	Alignment to DBC
Goal 7: Affordable and Clean Energy Energy is central to nearly every major challenge and opportunity.	Objective 4 works towards achieving sustainable use of resources, including water and energy
Goal 9: Industry, Innovation, and Infrastructure Investments in infrastructure are crucial to achieving sustainable development.	The project focuses on improvement of wastewater infrastructure in order to improve the quality of the water and to sustainably cater for growth
Goal 11: Sustainable Cities and Communities There needs to be a future in which cities provide opportunities for all, with access to basic services, energy, housing, transportation and more.	The project focuses on delivering wastewater services to areas which currently do not have access to these facilities.
Goal 13: Climate Action Climate change is a global challenge that affects everyone, everywhere.	Resilience to climate change has been identified as a critical success factor to be included as a key criteria for the MCA. Options resilient to climate change and natural hazard risks will be scored more highly.
Goal 14: Life Below Water Careful management of this essential global resource is a key feature of a sustainable future	Objective 2 focuses on restoring and enhancing aquatic ecological habitats and biodiversity
Goal 15: Life on Land Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss	Objective 2 focuses on restoring and enhancing terrestrial ecological habitats and biodiversity

National Policy Statement (NPS) for Freshwater Management 2020

The objective of this NPS is to ensure that natural and physical resources are managed in a way that prioritises:

- first, the health and well-being of water bodies and freshwater ecosystems
- second, the health needs of people (such as drinking water)
- third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

This DBC directly aligns with the first objective given that the restoration of the health and wellbeing of the river is core to the overall project. Ensuring that both water and terrestrial ecosystems are no longer impacted by wastewater treatment also plays a key role within this project. Public health and wellbeing to the community has been identified as a KPI, as has the ability to maintain cultural connectivity and access to the river for the wider community. Therefore there is alignment to all three key objectives.

Waikato-Tainui Environmental Management Plan

The Waikato-Tainui Environmental Plan (the Environmental Plan), Tai Tumu Tai Pari Tai Ao, is designed to enhance Waikato-Tainui participation in resource and environmental management and provides a baseline for approaching environmental matters of importance to Waikato-Tainui. A key strategic objective outlined within the Waikato Tainui Environmental Management plan is to maintain tribal identity and integrity, including "to grow our tribal estate and manage our natural resources."

The Plan provides is a tool to provide clear high-level guidance on Waikato-Tainui objectives and policies with respect to the environment to resource managers, users and activity operators, and those regulating such activities, within the Waikato-Tainui rohe.

The Plan seeks to have waters that are drinkable, swimmable, and fishable and contains objectives and policies to achieve this. Some of the key objectives from the plan that align with the DBC are included below. This is not a comprehensive analysis of all of the areas of alignment, but provides examples, of how the DBC gives effect to many of the objectives sought through the plan.

Table SC - 17: Strategic alignment with Tai Tumu Tai Pari Tai Ao

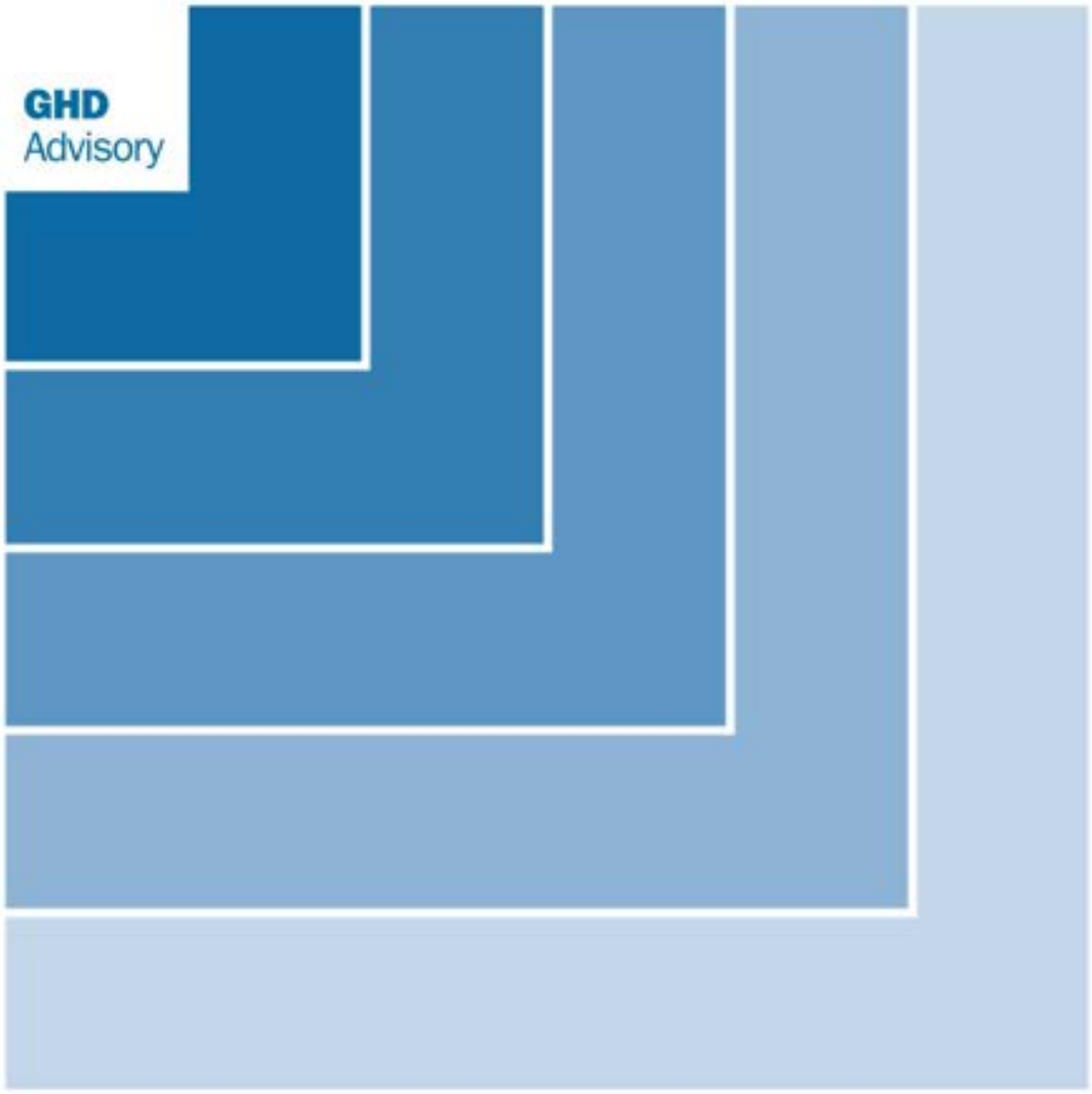
Tai Tumu, Tai Pari, Tai Ao Objectives	Alignment to DBC
Alignment with Whakatupuranga 2050	Of the 10 strategic objectives outlined within the Whakatupuranga 2050, this project can work towards the following three: • Objective 3: to preserve our tribal heritage, reo and tikanga • Objective 4: to grow our tribal estate and manage our natural resources • Objective 10: to develop and sustain our economic capacity
Strategic objective 10.3.2 Tribal identity and integrity	Sites of cultural significant will be identified and preserved through any land development activities. Additionally, access to sites of cultural significance (including access to the river for customary activities) will be considered for enhancement where possible.
Strategic objective 10.3.4 Tribal Social and Economic Wellbeing	One of the key objectives of the project is to provide wastewater services to support the economic prosperity of the Metro Area in a manner that contributes to the restoration and protection of the Waikato River.
Objective 19.4.1 _ Waikato-Tainui engage and participate in the highest level of decision-making on matters that affect waters in the Waikato-Tainui rohe.	Waikato-Tainui and mana whenua have developed this DBC alongside Council partners. The contribution has been made throughout the project delivery and at all levels from technical input through to project governance and decision making.
Objective 19.4.2 Water quality is such that fresh waters within the rohe of Waikato-Tainui are drinkable, swimmable and fishable in all places (with water quality to the level that Kiingi Taawhiao could have expected in his time).	The DBC seeks to give effect to the enhancement principles outlined in the plan. There is a high level of alignment between the plan and the project, specifically the investment objectives: - 1. Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect kai from the river and connected waterways thereby contributing to the restoration and protection of the health and wellbeing of the river - 2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and around water bodies is enhanced through the reduction of wastewater treatment and discharge impacts before 2050 - 3. Wastewater treatment solutions contribute to restoring and enhancing cultural connectivity with the river so that before 2050, marae, Hapuu and Iwi access to the river and other sites of significance for cultural and customary practice within the Metro Area are no longer impeded by wastewater treatment solutions - 4. Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from wastewater treatment systems before 2050
26.3.1 Infrastructure development, upgrade and maintenance within the Waikato-Tainui rohe occurs in partnership with Waikato-Tainui	
26.3.2 Infrastructure development, upgrade and maintenance manages economic, social, cultural, spiritual and environmental effects.	
26.3.3 Liquid, solid and hazardous waste management is best practice and manages social, cultural, spiritual and environmental effects.	

Ngāti Hauā Environmental Management Plan

The Ngāti Hauā Environmental Management Plan expresses the values, aspirations and position statements in relation to taiao (environment), covering topics such as the health and wellbeing of the lands and waters and wetlands, urban developments, cultural heritage and development of Maori land. This DBC aligns with several of the objectives identified within this plan (see Table SC - 18:).

Table SC - 18: Strategic alignment with Ngāti Hauā Environmental Management Plan

Ngāti Hauā Environmental Management Plan	Alignment to DBC
1. The Plan Purpose - The health and well-being of our lands, air, waters and wetlands and fisheries	This is related to a number of the investment objectives including: - for land, investment objective 2 - aquatic and terrestrial habitat and biodiversity - for water and wetlands, investment objective 2 - ability of people to swim and collect Kai from the river and connected waterways
8. Wai – water is considered to be the life blood of Papatuanuku (earth mother), that falls upon her as the tears of Ranginui (sky father)	Related to Investment Objective 1 and reflects the centrality of Wai to this project - Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect kai from the river and connected waterways thereby contributing to the restoration and protection of the health and wellbeing of the river
9. Sustainable land use and development Relevant issues identified include impacts on water quality, contaminated soils and increased use of agri-checmicals	Related to problem statements 1 & 2 relating to land and water management practices; specifically that development and land use changes often occur without full appreciation of the impacts on wastewater infrastructure and the investment needed to provide capacity for long-term growth
9.3 Encourages water and energy use efficiency measure	Related to Investment Objective 4 - Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from wastewater treatment systems before 2050
11. Te Wai Māori – Water This section of the plan has significant detail on the issues, objectives and relevant policies. Some key aspects include: - Te Mana o Te Wai is recognised and demonstrated - Develop a way of measuring the health of our rivers, streams and aquifers from a cultural point of view	There is a high level of alignment between the plan and the project, specifically the investment objectives: - 1. Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect kai from the river and connected waterways thereby contributing to the restoration and protection of the health and wellbeing of the river - 2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and around water bodies is enhanced through the reduction of wastewater treatment and discharge impacts before 2050 - 3. Wastewater treatment solutions contribute to restoring and enhancing cultural connectivity with the river so that before 2050, marae, Hapuu and Iwi access to the river and other sites of significance for cultural and customary practice within the Metro Area are no longer impeded by wastewater treatment solutions



Appendices

Appendix A Previous Investigations

Previous investigations	Relevance to the DBC
Sub-Regional Wastewater Strategy, Opus, 2009 Client: Hamilton City Council	An initial phase sub-regional wastewater treatment strategy for the Metro Area that looked at northern and southern areas. For the Southern Area, identified three options: Diverting south Hamilton and environs to upgraded Cambridge WWTP; diverting south Hamilton to Pukete via upgraded western interceptor or building new WWTP near Peacockes to service southern environs of the city. Summarised previous wastewater servicing options completed by Opus for the Metro area including those completed for South Hamilton, Airport and Cambridge. Used to inform the long list of options.
Southern Sector Report, Beca, 2010 Client: Future Proof	Provided a review of land use and infrastructure issues in the area and recommended a future land use pattern in the Southern Sector (i.e. area including South Hamilton, Airport Precinct, Matangi, Rukuhia, Tamahere) for consideration in Future Proof Strategy Recommended future infrastructure planning and actions to give effect to planned land use including development of 3 waters strategy, with potential focus on options to service the Southern Sector and possibly southern Hamilton areas as one and with particular attention given to non-reticulated wastewater approaches for growing towns and villages. Used for rationale for change; evidence was updated to use more current data sources. Highlighted issues that still exist today, including that: - Existing water infrastructure will not be sufficient to meet projected population and employment demands - Reliance on wastewater point source discharge to water will likely need to be reconsidered given changing governance environment with a role of the Waikato River Authority being to give effect to the Waikato River Vision and Strategy. - Growth of the Tamahere Country living Zone area without reticulated wastewater has potential to create cumulative adverse effects in the medium and long term. - There is a general (and urgent) need to better co-ordinate three waters infrastructure planning and provision across the study area.
Southern Area Wastewater Study, MWH, 2011 Client: Hamilton City Council, Waipa District Council	A high level sub-regional engineering-based assessment of wastewater management solutions focused on the Southern Metro area. The study considered many of the options that have been considered as part of this DBC. Twelve Long-List options were identified and evaluated using high-level screening approach. Five options were short-listed for development and comparative assessment. The Short-listed options were: - SL1: Base Case: Peacockes to Pukete WWTP, Airport and Cambridge to Upgraded Cambridge WWTP - SL2: All wastewater conveyed to Pukete WWTP - SL3: All wastewater conveyed to Cambridge WWTP - SL4: New WWTP in Peacockes/Mystery Creek area to service all of the Southern Area - SL5: New WWTP to service Southern Area with land discharge. The work did not recommend a preferred option instead noting that the short-list evaluation was too close to call. Recommended further consideration of SL1 – SL4. Previous wastewater servicing options completed to 2010 were also summarised in the study providing useful context and background to the historic wastewater servicing challenges in the Southern Metro Area. Many of these are still valid today and highly relevant to this DBC and used for rationale for change; evidence was updated to use more current data sources.

Previous investigations	Relevance to the DBC
Southern Area Wastewater Options Study Phase 2 – Decision Making Inputs Project, MWH, June 2012 Client: Waipa District Council	This study builds on the previous 2011 Southern Area Wastewater Study to identify preferred options. The study did not recommend a single preferred option, but rather identified SL1 and variations of SL2 (as noted above) as preferred. The work noted that SL2A (involving a simple pipeline from Cambridge to Peacockes and then joint conveyance to HCCs Far Eastern Interceptor for conveyance and treatment at Pukete WWTP) best met the requirements of a regional integrated solution. However, the alternative preferred option SL1 (Cambridge WWTP upgrade with Airport piped to Cambridge and all of Hamilton serviced through Pukete WWTP) was recommended if time was not available and/or agreements could not be reached of future joint approaches.
Southern Growth Corridor Strategic Land Use & Infrastructure Plan, 2015 Client: Future Proof	Refreshed assessment of landuse and infrastructure needs, and challenges associated with the Southern Growth Corridor (previously referred to as the Southern Sector (2010) which includes Peacocke, the Hamilton Airport and adjacent lands, Tamahere, other rural residential areas, Rukuhia and the rural environment. Notes continued challenges associated with wastewater servicing in the Southern Growth corridor, in particular the Airport and adjacent lands, and rural/residential areas.
Cambridge Wastewater Treatment Indicative Business Case, GHD, 2018 Client: Waipa District Council	The Cambridge Wastewater Treatment IBC was first undertaken to identify a long-term solution to the 1 non-compliant WWTP at Cambridge. The IBC was collaboratively undertaken between Iwi partners, Hamilton City Council and Waikato Regional Council. This investigation identified a shortlist of options that included a centralised southern wastewater facility which services multiple territorial areas.
Three Waters Review, 2018, GHD & Boffa Miskell Client: Department of Internal Affairs	Cost estimates for upgrading WWTPs to meet Objectives of the NPS Freshwater. The review provides high level summary of consenting issues and investment options previously investigated for the Cambridge WWTP as a case study. This review was used in the development of the Metro Wastewater Consent Strategy (2021).
Cambridge WWTP Operational Review, Beca, 2017 Client: Waipā District Council	This report provides a summary of operational performance of the WWTP with details regarding the plants ability to meet consents before / after short term improvements implemented.
Cambridge WWTP Offsetting Options review - Offsetting Options for Managing Wastewater Discharge from Cambridge WWTP, prepared by GHD for Waipā District Council, 2019	This report discusses and develops a number of offsetting solutions which are later used as part of the initial list of options. A technical MCA is undertaken to determine the most feasible offsetting solutions which will form part of our longlist options. This review was used in the development of the Metro Wastewater Consent Strategy (2021).

Appendix B Relevant policies, regulation and plans

Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010

The Waikato-Tainui Waikato River claim arose from the Crown's Raupatu (confiscation) in the 1860s which denied the rights and interests of Waikato-Tainui in the Waikato River. The river claim was excluded from the 1995 land settlement with Waikato-Tainui and was set aside for future negotiation.

In 2009, Waikato-Tainui entered into a deed of settlement in response of the Raupatu claims over the Waikato River. The Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 (the Waikato-Tainui Act) gave effect to the 2009 deed of settlement. The overarching purpose of the settlement is to restore and protect the health and wellbeing of the river for future generations.

The purpose of the Waikato-Tainui Act, as set out in Section 4 is to:

1. give effect to the settlement of raupatu claims under the 2009 deed:
2. recognise the significance of the Waikato River to Waikato-Tainui:
3. recognise the vision and strategy for the Waikato River:
4. establish and grant functions and powers to the Waikato River Authority:
5. establish the Waikato River Clean-up Trust:
6. recognise certain customary activities of Waikato-Tainui:
7. provide co-management arrangements for the Waikato River:
8. provide redress to Waikato-Tainui relating to certain assets:
9. recognise redress to Waikato-Tainui of the Kiingitanga Accord and other accords provided for in the schedule of the Kiingitanga Accord.

Additionally, the Ngaati Tuuwhareetoa, Raukawa, Te Arawa River Iwi Waikato River Act 2010 and the Ngā Wai o Maniapoto (Waipa River) Act 2012 are important pieces of legislation that give effect to Te Ture Whaimana.

Te Ture Whaimana o Te Awa o Waikato: Vision and Strategy for the Waikato River

Through the Waikato River settlement process between Waikato-Tainui and the Crown, the Guardians Establishment Committee was formed, with the support of other river iwi (Ngati Tuwharetoa, Raukawa, Te Arawa river iwi and Maniapoto). In 2009, this committee finalised Te Ture Whaimana o te awa o Waikato – the Vision and Strategy for the Waikato River (Te Ture Whaimana). Te Ture Whaimana is set out in schedules to the above Acts.

Te Ture Whaimana is the primary direction-setting document for the Waikato and Waipa Rivers and their catchments which include the lower reaches of the Waipa and responds to four fundamental issues:

a. The degradation of the Waikato River and its catchment has severely compromised Waikato River iwi in their ability to exercise mana whakahaere of conduct their tikanga and kawa.

2. Over time, human activities along the Waikato River and land uses through its catchments have degraded the Waikato River and reduced the relationships and aspirations of communities with the Waikato River.
3. The natural processes of the Waikato River have been altered over time by physical intervention, land use and sub-surface hydrological changes. The cumulative effects of these uses have degraded the Waikato River.
4. It will take commitment and time to restore and protect the health and well-being of the Waikato River.

Te Ture Whaimana takes a holistic approach and aims for the restoration and protection of the economic, social, cultural and spiritual relationships that Waikato and Waipā River Iwi have with the Waikato and Waipā Rivers.

Te Ture Whaimana states the vision for the Waikato River as follows:

> **"Tooku awa koiora me oona pikonga he kura tangihia o te maataamuri.**
>
> **The river of life, each curve more beautiful than the last**
>
> ***Our Vision is for a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come."***

Te Ture Whaimana includes 13 objectives that were developed to support achieving the vision:

a) The restoration and protection of the health and wellbeing of the Waikato River
b) The restoration and protection of the relationship of Waikato-Tainui with the Waikato River, including their economic, social, cultural and spiritual relationships
c) The restoration and protection of the relationship of Waikato River iwi, according to their tikanga and kawa, with the Waikato River, including their economic, social, cultural and spiritual relationships
d) The restoration and protection of the relationship of the Waikato region's communities with the Waikato River including their economic, social, cultural and spiritual relationships
e) The integrated, holistic and coordinated approach to management of the natural, physical, cultural and historic resources of the Waikato River
f) The adoption of a precautionary approach towards decisions that may result in significant adverse effects on the Waikato River
g) The recognition and avoidance of adverse cumulative effects, and potential cumulative effects, of activities undertaken both on the Waikato River and within its catchments
h) The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities
i) The protection and enhancement of significant sites, fisheries, flora and fauna
j) The recognition that the strategic importance of the Waikato River to New Zealand's social, cultural, environmental and economic wellbeing is subject to the restoration and protection of the health and wellbeing of the Waikato River
k) The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length
l) The promotion of improved access to the Waikato River to better enable sporting, recreational, and cultural opportunities.
m) The application of both maatauranga Māori (body of Māori knowledge originating from ancestors) and latest available scientific methods.

Te Ture Whaimana includes 12 strategies to support achieving the objectives and vision.

Te Ture Whaimana has status through at least 20 enactments which influence the management and use of the Waikato and Waipa Rivers and their catchments.

Importantly, if there is any inconsistent provision in an RMA planning document, including any national policy statement, Te Ture Whaimana prevails (Waikato Regional Council, 2019). Te Ture Whaimana prevails over the NPS-Freshwater when there are any inconsistencies and requires more stringent water quality conditions to be met. It requires the Waikato River to be safe for people to swim in and safe to take food from over its entire length (Waikato Regional Council, 2019).

The settlement legislation required that Te Ture Whaimana be directly inserted into the Waikato Regional Policy Statement (WRPS) and cannot be altered or changed by any subordinate policy process. The Operative Waikato Regional Plan (WRP), and any subsequent proposed regional or district plan, must give effect to Te Ture Whaimana.

Central and Local Government Three Waters Reform Programme 2020

Central and local Government have been considering solutions to challenges facing delivery of three waters services to communities over the past three years.

In July 2020, the Government announced a funding package of $761 million to provide immediate post-COVID19 stimulus to local authorities to maintain and improve three waters (drinking water, wastewater, stormwater) infrastructure and support economic recovery. Funding will be provided subject to territorial authorities signing a non-binding Memorandum of Understanding (MoU) with the Crown to share information and particulate in the reform of local Government water services delivery arrangements (a good faith agreement to work together). A portion of the initial funding also requires territorial authorities within a region to collaborate with their neighbouring councils.

The Government has indicated that the reform will involve the establishment of multi-regional entities for water service delivery, which can achieve benefits of scale, and reflect neighbouring catchments and communities of interest. It has stated that the new entities must be publicly owned, with a preference that the entities will be in shared ownership of local authorities. Design of the proposed new arrangements will be informed by discussion with the Local Government sector.

There is a shared understanding that a partnership approach between Central and Local Government will best support the wider community interests and ensure that any transition to new service delivery arrangements is well managed and as smooth as possible. This has led to the formation of a joint Three Waters Steering Committee to provide oversight and guidance on three waters services delivery and infrastructure reform.

This DBC is consistent with the objectives of the Three Waters Reform both in terms of anticipated improvements and cross-territorial authority collaboration.

National Policy Statement (NPS) for Freshwater Management 2020

The NPS for Freshwater Management 2020 sets out the objectives and policies for freshwater management under the RMA 1991. It aims to safeguard life supporting capacity, ecosystems, indigenous species, health of people and communities, maintain or improve (where degraded) overall water quality for primary contact more often, and enable communities to provide for their economic wellbeing in sustainably managing freshwater quality within limits.

The NPS-Freshwater 2020 provides an updated national level guidance in the form of freshwater water quality targets for a range of contaminants. Within this guidance the targets are categorised into attributes (A, B and C), with Attribute A being the highest standard. Attributes (e.g. total nitrogen) and

their associated national bottom lines in the NPS Freshwater were selected on the advice of specialist science panels.

In 2017, national attribute targets were introduced for swimmable lakes and rivers. In 2020 additional attributes were developed which require action plans. These include:

- Submerged plants (native)
- Submerged plants (invasive)
- Fish (rivers)
- Macroinvertebrate

The attributes provide greater understanding around the quality of the flora and fauna within freshwater systems and more closely align with the Te Ture Whaimana objectives.

Proposed Waikato Regional Plan Change 1: Waikato and Waipā River Catchments

The 2016 proposed plan change is a response to give effect to objective of Te Ture Whaimana, and the NPS for Freshwater Management 2014. It focuses on restoring and protecting the health and wellbeing of the Waikato River so that it is safe for people to swim in and take food from its entire length. The plan change promotes integrated management to reduce contaminants from land and supports communities with education about the value of water improvements. Plan Change 1, Policy 11 provides a mechanism for council to apply the best practicable option to avoid or mitigate adverse nutrient effects to freshwater. Where all adverse effects cannot be avoided or mitigated, the policy enables the offset of effects to point source discharges to occur at a different location.

Plan Change 1 to the Waikato Regional Plan gives effect to the NPS guidance and Te Ture Whaimana by providing location specific short term and 80 year targets for reducing contaminants. The Plan Change 1 targets were derived from an integrated assessment of the baseline and scenarios based on NPS attribute tables and requirements of Te Ture Whaimana. This was a collaborative approach undertaken by a Collaborative Stakeholder Group made up of a cross section of stakeholders and the wider community, who considered technical information provided by a Technical Leaders Group. On 10th April 2018, the amendments to Proposed Plan Change 1 has been notified such as the reinstatement of the North-Eastern portion of the Waikato region to the area[61].

On 20th April 2020, Federated Farmers appealed against a decision (or parts of the decision) of Waikato Regional Council on Plan Change 1. Federated Farmers considers that the regulatory and non-regulatory methods proposed in Plan Change 1 do not appropriately apply balance environmental, economic, social and cultural considerations, and are not the most efficient and effective means of achieving the objective of the plan change. Federated Farmers supports efforts to improve water quality but with more targeted and balanced economic cost and social disruption. Their view is focusing on the first 10 years with farms adopting good management and farming practices. The alternative framework proposed by Federated Farmers includes the Nitrogen Reference Point Removal, more flexibility for low intensity dry stock farmers, and pathways for both a standardised/tailored permitted Farm Environment Plan[62].

[61] Waikato Regional Council, 2020. Source: https://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-and-Plans/HR/Variation-1/Variation-1-final-doc.pdf

[62] FedFarm, 2020. Source: http://www.fedfarm.org.nz/FFPublic/Policy2/Regional/Regional_Special_Topics/Healthy_Rivers.aspx

Alignment with regional and district council growth strategies

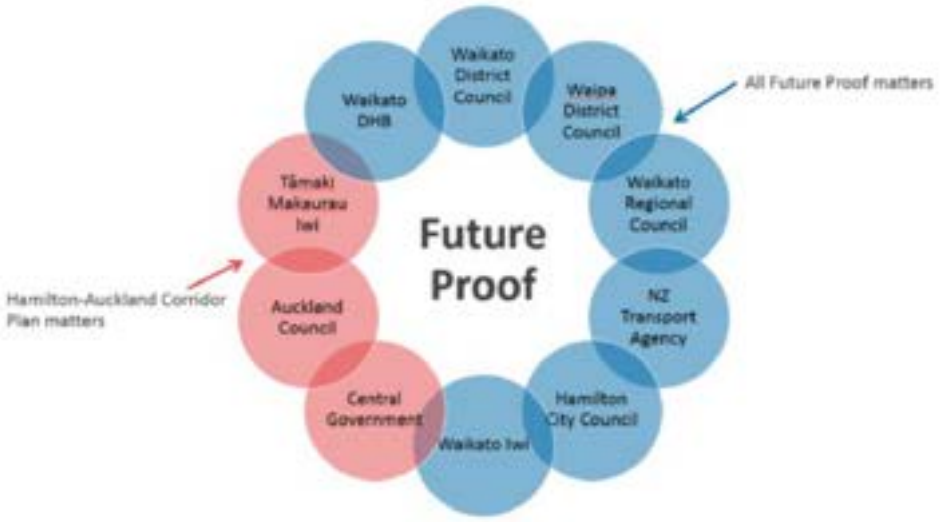
The investment proposal will help to achieve the business goals, strategic aims and plans of Waipā and Waikato District Councils, Hamilton City Council, and the wider Waikato Regional Council. The alignment requirements are complex given the following strategies applying:

- Future Proof Strategy 2017 (Phase 1)
- Sub-Regional Three Waters Strategy 2012
- Waipā District Council District Growth Strategy
- Waipā District Council LTP 2021-2031
- Hamilton Urban Growth Strategy
- Hamilton Infrastructure Strategy 2021 - 2051
- Proposed Waikato District Plan
- Waikato 2070 Growth and Economic Strategy
- Waikato Regional Council Integrated Catchment Management Plan (Zone Management Plan)
- Waikato Regional Council LTP 2021-2031

Future Proof Strategy 2017 (Phase 1) – Future Proof is a 30 year growth strategy and implementation plan specific to the Hamilton, Waipā, and Waikato sub-region. The strategy has been developed jointly by Future Proof Partners including Hamilton City Council, Waikato Regional Council, and Waipā and Waikato District Councils, as well as Tāngata Whenua, the NZ Transport Agency (NZTA), Waikato Iwi and Waikato DHB (see Figure SC - 22:). The Future Proof growth strategy provides a framework for ongoing co-operation and implementation. This will assist with accessing the funding and resources required to deliver and manage infrastructure across the region.

It is anticipated that Phase 2 of the strategy update will be completed in 2021. The update will address the requirements of the NPS on Urban Development Capacity and Government's Urban Growth Agenda, including the outcomes of the Hamilton to Auckland Corridor Plan. A draft of the updated strategy was released for public consultation on 4 October 2021.

Figure SC - 22: Future Proof Partners



Sub-Regional Three Waters Strategy 2012 – The strategy developed by the Future Proof Partners sets out the management of three waters services over a 50 year period. This is to ensure the cultural, social and economic needs of the community are met and the quality of the Waikato River is improved. The strategy will be updated in the near future to align with the outcomes of the Hamilton to Auckland Corridor Plan.

Waipā District Council District Growth Strategy – The Waipā District Council District Growth Strategy, also referred to as Waipā 2050, outlines the districts integrated approach to managing growth. The strategy identifies a need to cater for an additional 25,000 people by 2050 with over 50% of that growth occurring in Cambridge. In addition, there are growth cells located within the Hautapu Industrial Area, which are considered suitable for further industrial development. This type of growth places greater pressure on existing services and facilities.

Waipā District Council LTP 2021-2031 – Waipā District Council's LTP, identifies the district's funding priorities over the ten year period. The plan recognises the capacity limitations of the existing water infrastructure and the need to invest now to cater for the fast growth.

Hamilton Urban Growth Strategy – This strategy outlines Hamilton City Council's spatial vision for the city. The strategy was developed in parallel with the Future Proof strategy and highlights that only 50% of the projected growth can be accommodated in existing areas in the city. The additional growth will require the development of Greenfields. Residential growth will be prioritised in the Peacockes area south of Hamilton City.

Proposed Waikato District Plan – Stage 1 of the Waikato District Plan, highlights the commitment by council to continually improve the water quality of its rivers in accordance with the 'Vision and Strategy' for the river. They have also identified that the Healthy Rivers Plan Change provides an opportunity to approach freshwater management in a more integrated and sub-regional way. The District Plan is currently under review in 2020. Decisions on the Proposed Waikato District Plan will be made in September 2021.

Waikato 2070 Growth and Economic Development Strategy - The purpose of the Waikato District Council Development Strategy is to guide the growth in the district over the next 50 years by informing

future planning, investment and decision making. Its focus areas include growing our communities, building our businesses, embracing our identity and empowering our people.

Waikato Regional Council Integrated Catchment Management Plan – This plan manages the region's catchments in partnership with local communities, to reduce the risk of soil erosion and flooding; reduce the amount of sediment getting into waterways; improve water quality; improve river stability; and improve river environments, for example, creating a better habitat for a wider variety of plants and animals (improved biodiversity).

Waikato Regional Council LTP 2021-2031 – Waikato Regional Council's LTP recognises the need to provide sustainable approaches in managing river and lake quality, which is more suitable for human interaction. They are also working very closely with the communities to improve Waikato River and catchments across the region in order to improve freshwater quality, reduce sedimentation, stabilise river and catchment systems, and enhance biodiversity.

Partners and key stakeholder policies and standards

The following partners and key stakeholders have been identified and associated policies and/or standards of relevance to the Waikato Metro Wastewater Treatment DBC. The strategic goals, visions and objectives of the key policies below have been mapped against the DBC project objectives and detailed in Section 3.3.4.

Table 1 Key stakeholder policies, standards and strategies

Partners and Stakeholder	Policy and/or Standard
Waikato-Tainui	Environmental Management Plan (Tai Tumu Tai Pari Tai Ao)
	Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010
Raukawa	Te Rautaki Taiao A Raukawa 2015
	Raukawa Claims Settlement Act 2014
	Ngati Tuwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act 2010
Ngati Hauaa	Environmental Management Plan (Te Rauataki Ao Taamata Turoa o Hauaa)
Watercare Services	Local Government Act 2002
	Local Government (Taamaki Makaurau Reorganisation) Act 2009
	Local Government (Auckland Council) Act 2009
	Local Government (Auckland Transitional Provisions) Act 2010
	Water Supply and Wastewater Network Bylaw 2015
	Statement of Intent 2018 to 2021
Fish and Game Waikato	Conservation Act 1987
	Wildlife Act 1953
	Freshwater Fisheries Regulations 1983
	Wildlife Regulations 1955
	Fish and Game Council Election Regulations 1990
	New Zealand Game Bird Habitat Stamp Regulations 1993
	Local Government Official Information and Meetings Act 1987
Fonterra	Environmental Policy
	The Way We Work (Code of Business Conduct)
Waikato District Health Board	Waikato District Health Board Strategy 2016
	Waikato DHB Annual Plan 2020-2021
Department of Conservation	Department of Conservation Outcomes Model

Partners and Stakeholder	Policy and/or Standard
	Department of Conservation – Conservation General Policy

Appendix C Case for Change

Table 2 Hamilton Moratorium on wet industry supply case study[63]

HAMILTON MORATORIUM ON WET INDUSTRY SUPPLY CASE STUDY	
In 2009, Hamilton City Council obtained a 35-year consent (from Waikato Regional Council) to extract water from the Waikato River based on forecasted growth (non-high water use activities). This consent expires in 2044 and is based on stepped increases in maximum daily take volumes. The growth forecasts used at the time of consenting did not include provision for servicing new high-water use or wet industry activities (defined as high water users) who also produce significant trade waste discharge either in terms of contaminant load or volume. Following granting of this consent, Hamilton City Council accepted some wet industry water takes based on working with them to obtain a resource consent to add to the existing allocation. The river is now regarded to be over allocated in Hamilton City during low flow summer river conditions and the current prospects of securing new allocations for non-domestic and municipal purposes are extremely low.	Hamilton City Council is occasionally approached by developers seeking to expand or establish new high water use and wet industry activities in the City. Up until June 2019 these approaches were assessed on an ad-hoc basis, as there was no policy guidance in relation to servicing high water use and wet industries. Not only do the high water use and wet industry activities have the potential to consume a large portion of water, but it also puts greater pressures on wastewater treatment infrastructure, with both the volume and level of contaminant potentially increasing. To protect and manage these finite water resources and meet the needs of the City, in June 2019 the Hamilton City Council approved a moratorium on further wet industry supply (high water use) requests while policy guidance is developed to deal with new high water use requests. This moratorium will remain in place until policy to assess high water use and wet industry activities is approved by Council.

Table 3 Unexpected population growth in Cambridge case study[64]

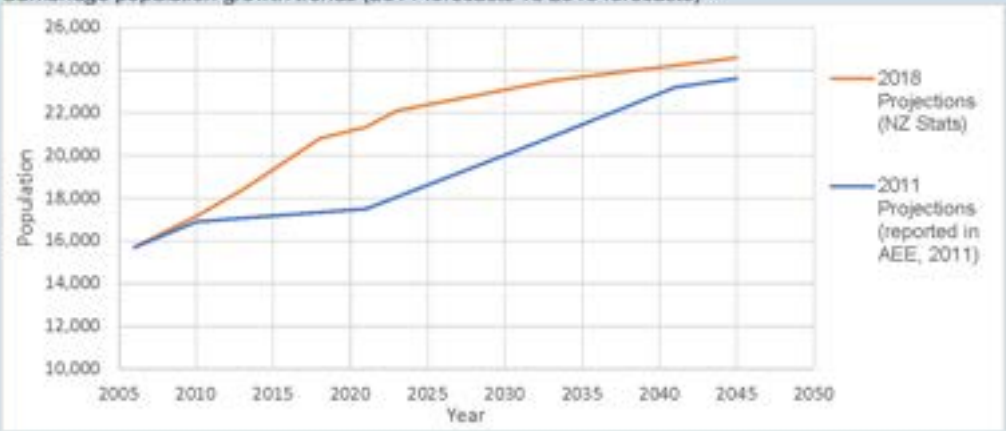
UNEXPECTED POPULATION GROWTH IN CAMBRIDGE CASE STUDY	
Population growth rates have been unexpectedly high in the Cambridge region since 2011, partly as a result of the Waikato Expressway and reflecting growth in the urban areas surrounding Hamilton . The original AEE population forecasts show a steady increase in population through to 2021, where it predicted a total population of 17,500. However, the actual population of Cambridge exceeded this forecast in 2013. New forecasts suggest that by 2021 Cambridge will have a total population of approximately 21,300 (see the figure below). This disparity between what was originally forecast and what is now currently happening has meant that wastewater flows have also increased beyond what was anticipated in 2011.	The 2011 AEE reported average projected daily wastewater flows between 2018 and 2028 increasing at an annual average growth rate of only 1.6% Current (2018) projections anticipate average projected daily wastewater flows between 2018 and 2028 increasing at an annual average growth rate of 5.4% These unexpected increases to wastewater flows will start to put greater pressure on the WWTP and potentially cause further operational and quality issues

[63] HCC, 20 June 2019. Growth and Infrastructure Committee. Source: https://www.hamilton.govt.nz/AgendasAndMinutes/Growth%20and%20Infrastructure%20Open%20Agenda%20-%2018%20June%202019.pdf

[64] GHD, 2019. Cambridge Wastewater Treatment Plant Long Term Consent – IBC

UNEXPECTED POPULATION GROWTH IN CAMBRIDGE CASE STUDY

Cambridge population growth trends (2011 forecasts vs 2018 forecasts)[65]



Poor water quality and ecosystem health of the Waikato River

Bacteria levels

E. coli bacteria is a harmful micro-organism in water that can cause minor illnesses such as ear infections or diarrhoea, and therefore its prevalence is a risk to human health. Effluence from farm animals is likely to be the dominant source of E. coli bacteria, which has contributed to the poorer water quality in the Waikato River and elevated human health risks. This has restricted contact recreation such as swimming, boating or fishing. When E. coli in rivers and lakes are detected above 550 per 100 mL, swimming is not recommended[66] and if detected above 1,000 per 100 mL, it would have increased human health risk by 5% while swimming[67]. A trend of degradation at all of the sites is observable. This is particularly concerning given the maximum levels of E.coli detected at all of the sites, except for Whakamaru Tailrace, is already well above the safe levels for swimming and other recreational activities.

Total Nitrogen

Nitrogen is an effective fertiliser and essential plant nutrient, but increased concentrations in water can cause negative environmental effects and direct harm to aquatic life, such as fish and macroinvertebrates. High levels of nitrogen in water can be a result of degraded WWTPs and runoff and leaching from agricultural land.

Ideally, total nitrogen levels in water should be less than 500 milligram per cubic metre to prevent excessive growth of nuisance plants[68]. All of the five monitoring sites except for Whakamaru Tailrace site had median levels of total nitrogen higher than the desirable value.

Total Phosphorus

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[65] Source: AEE, 2011 and NZ Statspi

[66] LAWA, 2020. Source: https://www.lawa.org.nz/learn/factsheets/faecal-indicators/

[67] WRC, 2020. Health risks associated with faecal - contaminated freshwater. Source: https://www.waikatoregion.govt.nz/assets/PageFiles/28959/14/254%20-%203465551.pdf

[68] WRC, 2020. Source: https://www.waikatoregion.govt.nz/Environment/Natural-resources/Water/Rivers/healthyrivers/Water-quality-glossary/

Phosphorus is an essential nutrient for plants but can also encourage the growth of nuisance aquatic plants such as algae or biomass. Infrastructure such as degraded wastewater treatments plants and agricultural and urban land use can add more phosphorus to waterways, which can cause deterioration of river habitats. The total phosphorus levels in water should be less than 40 milligrams per cubic metre to prevent excessive growth of nuisance plants[Error! Bookmark not defined.]. The median levels of total phosphorus especially around the northern part of the Waikato region show degradation trends which exceeded the satisfactory level. This may result in the growth of algae which can also affect the river colour and clarity.

Turbidity

Turbidity is a measure of water's cloudiness, reflecting the amount of suspended sediment in the waterways. Water with high turbidity can be caused by disturbance of the riverbed through direct discharges and heavy machinery. To support aquatic plants for their photosynthesis, turbidity should be less than 5 nephelometric turbidity units (NTU)[Error! Bookmark not defined.]. The 2018 median levels of turbidity in the lower catchment of the Waikato River such as Tuakau Bridge and Huntly Tainui Bridge monitoring sites exceeded the thresholds for clarity. High level of turbidity reduces the penetration of sunlight into water which can limit the photosynthesis of aquatic plants and the amount of dissolved oxygen available for them to breath. Consequently, this may result in adverse effects on the river ecosystems and cause water to be unsafe for swimming and potentially harmful to aquatic life.

Macroinvertebrates

Macroinvertebrates are sampled for assessing stream health as they play a central role in stream ecosystems by feeding on algae, macrophytes, dead leaves and wood. They are extremely important food source for animals such as wading birds and fish. Macroinvertebrate health is linked to upstream land cover. Measuring macroinvertebrates help explain the effects from point source discharges, diffuse discharges, urbanisation, agricultural and silviculture activities.

The Macroinvertebrate Community Index (MCI) score shown in Figure SC - 16: for all four monitoring sites: Port Waikato Road, Lake Road, River Road (Patterson Road) and River Rd (Kay Road) is used as an indicator of water quality and overall stream health which are based on the presence (or absence) of invertebrates. The MCI scores are expressed as median values for the year 2018. A national bottom line MCI score of 80 is recommended for wadeable streams[69].

Lower MCI scores indicate more polluted rivers, poor stream conditions, poor water quality and/or poor habitants at the sampled site[70]. Comparing the results, the median MCI scores at sites in the urban and city area were significantly lower than the recommended MCI score of 80. This suggests the lower catchment of the Waikato River (north of Hamilton City) may have less biodiversity within the stream and potentially cause a reduction in food for animals higher in the food chain such as fish, birds and terrestrial insects.

[69] MfE 2020, a macroinvertebrate attribute to assess ecosystem health of New Zealand waterways for the national objectives framework. Source: https://www.mfe.govt.nz/sites/default/files/media/Fresh%20water/a-macroinvertebrate-attribute-to-assess-ecosystem-health-waterways_0.pdf

[70] LAWA 2020. Source: https://www.lawa.org.nz/learn/factsheets/benthic-macroinvertebrates/

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Disclaimer

This report: has been prepared by GHD/BECA for Hamilton City Council as the lead agent for the Waikato - Hamilton Metro Area Wastewater Detailed Business Case Project. The Waikato - Hamilton Metro Area Wastewater Detailed Business Case Project is being delivered and funded by the project partners Hamilton City Council, Waipa District Council, Waikato District Council, Waikato-Tainui (Te Whakakitenga o Waikato) and mana whenua from the Metro area. The report may only be used and relied on by the project partners as set out in section 1.1 of this report.

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The Cost Estimate has been prepared for the purpose of making a relative assessment of options and must not be used for any other purpose.

The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD/Beca does not represent, warrant or guarantee that the project can or will be undertaken at a cost which is the same or less than the Cost Estimate.

Executive summary – Economic Case

1.1 Introduction

This report sets out the Economic Case for the Waikato Southern Metro Area Wastewater Detailed Business Case (Southern Metro DBC).

The purpose of the Economic Case is to evaluate options available to address the problems identified in the Strategic Case. The assessment of these options uses several criteria including the project objectives which have been identified in the Strategic Case and other critical success factors. The Economic Case aims to identify a Preferred Option that delivers best public value including wider social and environmental effects.

This report provides an overview of the preferred option, the approach to the development and assessment of options and the refinement and details of the preferred option.

1.2 Project objectives

This project seeks to identify long-term wastewater treatment solutions for the Waikato-Hamilton Waipā Metro Area. This report covers the area from the southern part of Hamilton City, through to Cambridge, Te Awamutu and Kihikihi (known as the Southern Metro Area). It evaluates sub-regional solutions that operate across territorial boundaries to deliver higher quality outcomes, community benefits and overall efficiencies compared to solutions constrained by territorial boundaries.

This project aims to contribute toward the overarching project vision:

Tooku awa koiora me oona pikonga he kura tangihia o te maataamuri

"The river of life, each curve more beautiful than the last"

... a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come[1].

Project objectives were developed and agreed with the project partners and are based on giving effect to Te Ture Whaimana, the Best for River definition and other key drivers. Project objectives are:

1. Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect kai from the river and connected waterways, thereby contributing to the restoration and protection of the health and wellbeing of the river.
2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and around water bodies is enhanced through the reduction of wastewater treatment and discharge impacts before 2050.
3. Wastewater treatment solutions contribute to restoring and enhancing cultural connectivity/relationships with the river so that before 2050 Marae, Hapū and Iwi access to the river and other sites of significance for cultural and customary practice within the metro spatial area[2] are no longer impeded by wastewater treatment solutions.

[1] Te Ture Whaimana o te Awa o Waikato

[2] Hamilton-Waikato-Metropolitan-Spatial-Plan-Final-Low-Res.pdf (futureproof.org.nz)

4. Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from wastewater treatment systems before 2050.
5. The wastewater solution provides sufficient capacity to ensure sustainable growth in the metro spatial area in accordance with growth projections assumptions for the next 100 years.

1.3 Growth

Growth assumptions have been developed in conjunction with the three councils, Waikato-Tainui and with reference to relevant strategic planning documents. The growth assumptions have informed development of the preferred option. Growth assumptions have been used to size the system components for the long list, short list and preferred options and include:

- Existing development (residential and non-residential)
- Infill development
- Planned commercial industrial development (e.g. Ngaaruawaahia, Taupiri, Te Kowhai, Hopuhopu, Horotiu, Te Rapa North, Rotokauri, Ruakura, Airport, Cambridge/Hautapu)
- Planned residential greenfield development (e.g. Taupiri, Hopuhopu, Ngaaruawaahia, Te Kowhai, Rotokauri, Peacocke, Temple View, R2, HT1, WA, Cambridge and Te Awamutu growth cells)
- Additional infill development as noted in the Metro Spatial Plan[2]
- 'Wet industry' allowances at Horotiu, Te Rapa, Ruakura, Airport and Cambridge. While these allowances have been included in the current DBC, the most appropriate locations for wet industrial activity in the Waikato Metro Area should be properly considered and discussed by Future Proof
- The ultimate design horizon also includes 35,000 Population Equivalent (PE) for the area between the Southern Links designation and the current Hamilton City Boundary, and an additional 30,000 PE in the vicinity of Ruakura

1.4 Longlist development and assessment

This project builds on previous wastewater servicing investigations for the metro spatial area, which includes urban areas from Ngaaruawaahia in the north, Hamilton, Cambridge, Te Awamutu to the south and smaller catchments in between. Some of the most relevant investigations are summarised in Table [3] of the Strategic Case.

The most recent and relevant previous feasibility study[3] was a pre-cursor to this DBC and identified a long list of six metro wastewater treatment solutions. The outcome of this study recommended the following options for further development:

- Convey all communities to a northern and southern centralised facility (new site)
- Convey all communities to a northern and southern centralised facility (Cambridge site)
- Five wastewater facilities to cater for the whole Metro Spatial Area including a new southern facility
- Upgrades of existing facilities and new decentralised facilities at Whatawhata, the airport and Ohaupo.

[3] Future Proof Partners, 2020. Hamilton Metro Wastewater Treatment Feasibility Study. Retrieved 25 Feb 2021, from https://www.futureproof.org.nz/assets/FutureProof/H2A/Waters/Final-Metro-Area-Wastewater-Treatment-Feasibility-Study_with-Appendices.pdf

Eight longlist options were developed for the Southern Metro Area Wastewater DBC based on the options above plus the inclusion of Fonterra for each option, as detailed in Section 3.2. These options were developed to meet the outcomes detailed in the Wastewater Treatment Assumptions Memorandum[4].

The longlist Multi-Criteria Analysis (MCA) assessment results identified Option 2A (involving a new southern facility on a new site) and Option 3A (building a sub-regional plant on the Cambridge site) as the highest overall scoring options (detailed in the Longlist Report, Appendix A). Both options also included upgrades of the Pukete and Te Awamutu WWTPs.

Option 2A

Option 2A was the highest performing option based on the MCA assessment and was progressed to the shortlist stage.

It was considered the benefits associated with building a new plant on a new site would outweigh the risks involved in consenting and approving a new site.

A new site would offer the opportunity to masterplan a treatment facility to achieve the greatest long-term operational efficiency and flexibility to adapt to load, technology and resource recovery opportunities. A new site would be able to adapt more quickly and easily to growth changes.

A central location was also considered to reduce the length of large diameter rising main pipework and would allow for greater development opportunities when compared against Option 3A.

Additionally, a new location south of Hamilton is closer to the airport industrial area. This area has significant industrial growth potential which would provide greater opportunities for industrial water reuse.

Option 3A

Option 3A (a sub-regional plant on the Cambridge site) was the second highest scoring option based on the MCA assessment.

This option was not progressed to the shortlist stage for a number of reasons including long conveyance lengths, logistical challenges with constructing on an existing site whilst keeping the plant operational and compliant during construction, geotechnical risks with the site, limited ability for resource recovery and re-use limited space availability and potential for reverse sensitivity based on surrounding residential land use.

A modified Option 4A was proposed as the Enhanced BAU option. For comparative purposes, an Enhanced BAU option was also carried through to the shortlisting stage. Option 4A was considered to be a more appropriate than Option 1A.

The recommendation for the shortlist was:

- **Option 1 - Do Nothing** (for comparative purposes only)
- **Option 2A - Three Plant Option** – Involves upgrades and expansion of the Pukete WWTP to service the Northern Metro Area (including Taupiri, Ngaaruawaahia, Te Kowhai, Horotiu and majority of

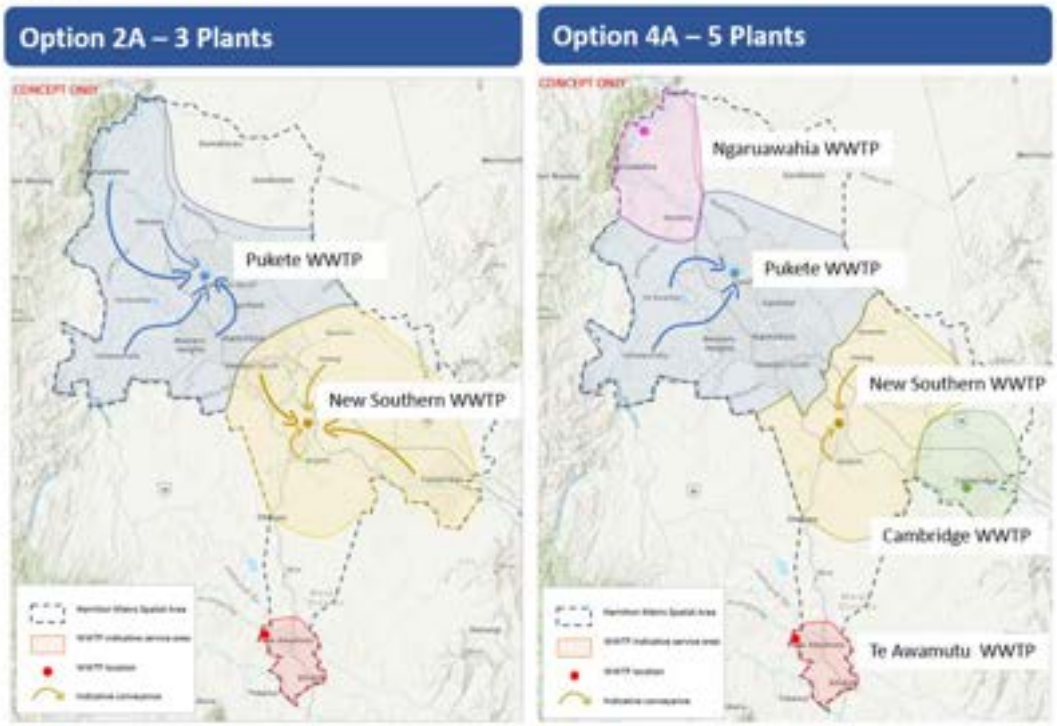
[4] Wastewater Treatment Assumptions for Waikato Metro Wastewater DBC, August 2020, included in Appendix C, Preferred Option Technical Report, September 2021.

Hamilton); a new southern plant to service the Southern Metro Area (including Hamilton South; airport area and environs, Cambridge) and the Te Awamutu WWTP.

- **Option 4A - Five Plant Option** – Involves treatment plant upgrades at Ngaaruawaahia, Pukete, Cambridge and Te Awamutu and a new southern plant to service the airport area and environs.

The service areas of the short-listed options are in ***Figure EC - ES 1:*** below and are diagrammatic.

Figure EC - ES 1: Diagrammatic Overview of Short-listed Waikato Metro Area Wastewater Servicing Options



The shortlisted options assessment (detailed in the Shortlist Options Report, Appendix B) noted **Option 2A** as the emerging preferred option. Option 2A was the highest scoring option from the raw MCA assessment and the MCA sensitivity assessments.

Option 4A was recommended for shortlisting over Option 1A as it involves a smaller number of med-large plants which aligned closer to the better achieve project objectives and is more pragmatic and efficient than having many smaller plants. Option 4A scored better than Option 1A for affordability, given Option 1A has limited potential for additional funding sources.

1.5 Shortlist development and assessment

From October 2020 - February 2021 all three shortlist options were subjected to detailed assessments against MCA criteria. The results informed the selection of a preferred option.

A preliminary shortlist option assessment occurred during October- November 2020, followed by re-assessment in February 2021 based on more detailed information.

The key outcomes of the re-assessment and cost estimate comparisons were:

- Option 4A and Option 2A achieved similar outcomes in relation to the investment objectives and Best for River outcomes
- Option 4A and Option 2A were assessed as having a similar ability to be successfully consented and implemented
- Option 4A had a capital cost estimate[5] of $652 million compared with Option 2A ($716 million [6]). These included capital costs for wastewater plant investments for the Northern and Southern Metro areas to accommodate projected growth out to 2071. Conveyance networks to new treatment plants as well as consenting, procurement, land purchase, make good and council construction overheads were also included.

A Net Present Value (NPV) assessment was undertaken during the shortlist assessment phase. This identified that Option 4A had an NPV estimate of -$1,096 million compared with Option 2A (-$1,212 million). Assumptions included capital cost inflation of 3%, operating cost inflation of 2%, costs modelled to 2071 and 5% discount rate).

Option 4A is assessed as more affordable than Option 2A as it gives project partners the potential to defer some capital costs in the first and second decades (2031 and 2041) as well as stage delivery of wastewater servicing for the airport area and environs and Hamilton South.

Development of the shortlisted options included more detailed consideration and refinement of the capital and operational costs associated with servicing the Southern Metro Area[7]. The main capital cost components include:

- Southern Sub-Regional WWTP including staged WWTP development plus land acquisition, master planning and consents, outfall, conveyance from Mātangi (2041), conveyance from Hamilton South (post 2061)
- Cambridge WWTP redevelopment
- Mātangi WWTP minor improvements (up to 2041)
- Te Awamutu WWTP upgrade
- Tauwhare Pā WWTP upgrades.

The refined costs and subsequently updated NPV results are shown in

[5] Capital Cost estimates for WWTP and Conveyance are estimated by Beca and are P50 AACE Class 5 cost estimate; expected accuracy of -30% to +50%. In addition, other costs including procurement, consenting, council resources, land acquisition have also been included and are provided by others.

[6] [7] Total dollars out to 2061 and unadjusted for inflation

Table EC-ES 1 below (and provided in the Financial Case). The costs have been discounted using a 5% real discount rate (i.e. no inflation has been applied to costs). The key difference here is changing from a Real to a Nominal discounting methodology to align with Treasury's approach. This change in calculation has resulted in a minor differential change between the two shortlisted options but does not change the rationale for the decision to confirm Option 4A as the preferred option.

Table EC-ES 1 Shortlist Options Net Present Value – Southern Metro Area Elements Only

	Capital Costs	Renewal capital costs	Operating costs	Total
Option 2A	($375.5 m)	($9.1 m)	($326.5 m	($711.1 m)
Option 4A	($341.5 m)	($10.3 m)	($314.4 m)	($666.2 m)

1.6 Preferred option

The preferred option for the Southern Metro Area is a refinement of Option 4A. This was selected through assessments of the two short-listed options (Option 2A and 4A), risk and opportunity considerations and additional investigations.

The two short-listed options for the Northern Metro Area (i.e. conveying all flows to an upgraded Pukete WWTP or upgrading both Ngaaruawaahia and Pukete WWTPs) will be evaluated and a preferred option identified as part of the Northern Metro DBC.

The preferred option for the Southern Metro Area consists of:

- The adoption of minimum treatment performance standards across all plants (refer to Section 5.3) over time.
- A new Southern Sub-Regional WWTP to service the airport area and environs, Mātangi/ Tamahere commercial area and southern Hamilton. Development of the plant will be staged to meet demand. Land discharge is proposed for Stage 1 with a move toward a discharge to water in Stage 2 and beyond as flows increase.

  The Southern Sub-Regional WWTP will be staged to meet the changing growth needs across Hamilton and the sub-region. The recommended site footprint for the Southern Sub-Regional WWTP provides for sufficient space to expand the plant to service a larger part of Hamilton in the future if required.
- Retaining and upgrading the Tauwhare Pā WWTP and land discharge to service local growth with the potential to be reticulated to the new Southern Sub-Regional WWTP or HCC network in the future if appropriate.
- A new WWTP at Cambridge with discharge to the Waikato River to meet the long-term needs of Cambridge.
- Retaining and upgrading the Te Awamutu WWTP to achieve improved treatment standards and cater for growth. Continued discharge via rock channel to the Mangapiko Stream is assumed.
- Improvements to the existing Mātangi WWTP until the wastewater is conveyed to the new Southern Sub-Regional WWTP in around 2040.
- Tamahere commercial hub to continue to utilise on-site wastewater treatment and discharge systems until 2040 when Mātangi is diverted to the Southern Sub-Regional WWTP.
- Ohaupo continuing with private on-site wastewater systems as there are no known environmental concerns with existing systems and only low-density, lifestyle-type development is expected.

An overview of the key features of the preferred option (i.e., indicative treatment plant locations and areas served) is shown in *Error! Reference source not found.*. Specific details of the areas and population equivalents served by each plant are included in ***Table EC-ES 2.***

Figure EC - ES 2: Preferred Option Overview – Key features and overview of staging of Southern Sub-Regional WWTP

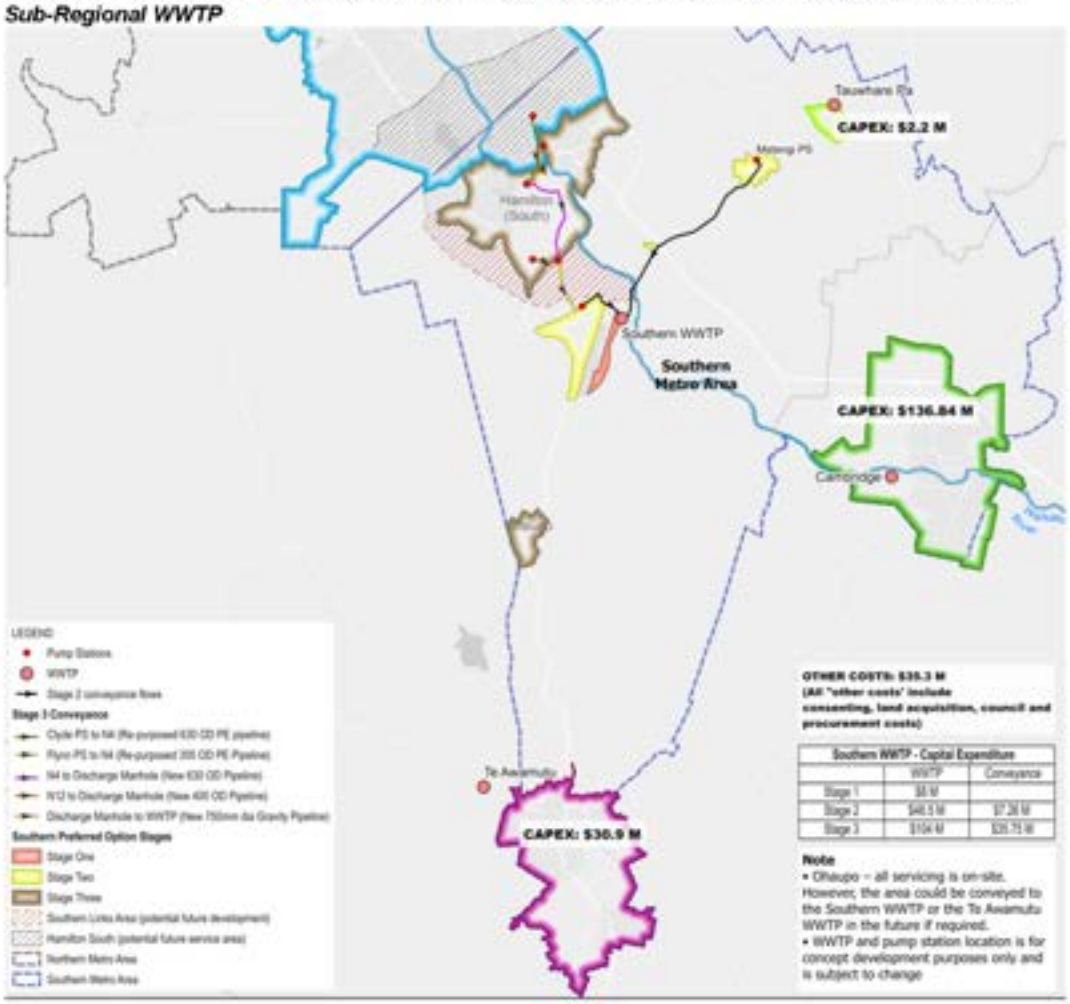


Table EC-ES 2: Summary of Preferred Option WWTPs, Service Areas and Population Equivalents Served over time

WWTP	Locations served	Population equivalent serviced by capacity available at the following dates					Notes
		2031	2041	2051	2061	Ultimate	
Mātangi WWTP	Mātangi Village	150	Transfer to Southern Sub-Regional WWTP				
Tauwhare Pa WWTP	Tauwhare Pā	619	619	619	619	889	2031 projection includes for additional 500 PE at Tauwhare Pā from current estimates. Ultimate includes allowance for Tauwhare Village (270 PE)
New Southern Sub-Regional WWTP	Airport area & environs	4,000	6,000	17,852	17,852	17,852	Assumptions are based on ~85 ha of developed dry industrial land being serviced at 2031; ~140 ha of dry industrial land being serviced at 2041. Assumptions includes for flows from wet industrial land use from 2051*
	Mātangi/Tamahere	Existing standalone facility	464	464	464	1,035	Includes servicing Tamahere commercial area (does not include Tamahere residential area)
	Hamilton South: Hillcrest, Riverlea, Glenview, Peacocke	Serviced through Pukete WWTP			59,626	75,366	DBC assumes diversion to new WWTP at 2061. Additional PE in 'ultimate' horizon is based on infill in these areas from 2020 Metro Spatial Plan
	Southern Links Area	Not Serviced				35,000	Ultimate forecast includes allowance for Southern Links
	Sub-Total	**4,000**	**6,464**	**18,316**	**77,942**	**129,253**	The Stage 3 WWTP can operate from 40,000 Population equivalent demand level
Cambridge WWTP	Cambridge	32,940	37,801	42,892	45,031	57,649	Assumptions includes flows associated with wet industrial activity to be generated from a small portion of land in Cambridge
Te Awamutu WWTP	Te Awamutu	27,989	30,905	34,982	36,001	42,011	
No WWTP	Ohaupo	Not serviced					All servicing is on-site. However, the area could be conveyed to Southern Sub-Regional WWTP or Te Awamutu in future if required

* Wet industrial flow assumptions based on 50 ha (~20% of airport industrial land) producing an addition 2 litres per second per hectare of wastewater flow.

Actual demand and timing of servicing for each area will likely vary from the assumptions used in the DBC. The triggers used to inform staging and implementation of the new plant will need refinement to reflect updates to the Hamilton and Metro Growth Strategies currently under review, and through more detailed assessment of network capacity constraints.

For example, the actual demand from the airport area and environs may be significantly lower than those used for the DBC which have assumed some wet industrial activity post 2051. The timing and extent of Hamilton (and other areas such as Southern Links) diverted to the new plant will likely vary from the assumptions used in the DBC. The diversion may occur much earlier than 2061 and the extent may vary based on growth, network and Pukete WWTP constraints.

It is recommended that demand assumptions are revisited and confirmed as part of implementing the new Southern Sub-Regional WWTP in the immediate to short term.

1.6.1 Preferred Option Treatment Plant Performance Standards

The minimum treated wastewater quality standards adopted are very high. They are based on current best practice and delivering Best for River outcomes which include having a swimmable river that is safe for gathering kai. The minimum performance standards for all treatment plants are shown in ***Table EC-ES 3*** and ***Table EC-ES 4*** below.

Table EC-ES 3: Minimum water quality standards for discharges to water

Parameter	Minimum Performance Standards for Discharges to Water
Total Nitrogen	Less than 4.0 milligrams per litre (as annual means)
Total Phosphorus	Less than 1.0 milligrams per litre (as annual means)
Escherichia coli (E.Coli)	Less than 14 cfu per 100 millilitres (as a 95th percentile)
	Noting that the future consents for any water based discharges will likely include specific daily limits on nutrient mass loadings (in units of kg/d rather than concentration limits in mg/l) for both summer and winter flow conditions .

Table EC-ES 4: Minimum water quality standards for discharges to ground

Parameter	Minimum Performance Standards For Discharges To Ground
Total Nitrogen	Less than 20 milligrams per litre (as annual means)
Total Phosphorus	No specific limit
Escherichia coli (E.Coli)	Less than 500 cfu per 100 millilitres (as a median)
	Noting that actual parameters will depend on nitrogen and phosphorus loads able to be sustinably discharged to land irrigation systems, and appropritae microbial parameter limits will be dependant on the method and location of discharge to ground.

The treated wastewater quality standards would be introduced by 2031 or when the existing discharge resource consent for each WWTP plant expires. Achieving these targets may need to be staged within resource consents to provide sufficient time to upgrade and transition existing plants (i.e., Pukete WWTP) to meet these minimum standards.

During any resource consent process the form of the water quality standards will be further refined and may include ranges to take into account normal expected system variation and other location-specific

factors. These refinements will not degrade the basis and/or adopt a lower water quality standard than that of the adopted standards for this DBC.

For the purpose of completing the DBC, assumptions have been made regarding discharge methods to be employed at each plant. Appropriate discharge methods will need to be considered and evaluated in detail as part of each Project to support resource consenting of any discharge activities.

To give effect to Te Ture Whaimana, alongside these quantitative minimum performance standards, further methods will be required to protect the mauri of the water and land from adverse effects. These requirements will need to be determined as part of implementing the Projects.

Appropriate management of solids from treatment processes is an important consideration in any treatment strategy. In line with the agreed treatment performance standards for the Southern Metro Area, solids management complexity, extent of solids destruction and energy potential realisation will increase in steps with population equivalent served.

Proposed provisions for atmospheric emissions are reasonably general but all would require best practice to be implemented.

In all process plant development, life cycle emissions will be given due consideration. It is anticipated that all three councils will consider The Climate Change Response (Zero Carbon) Amendment Act 2019 aspirations and optimisation of life cycle emissions generally. These will be drivers for initiatives, particularly in the larger plants, and for processes that drive the plants towards energy neutrality and emissions minimisation.

More detailed information is contained in the Wastewater Treatment Assumptions Memorandum[8] included in the Preferred Options Report (Appendix C).

1.6.2 Preferred Option – Conceptualised Treatment Processes

The conceptualised treatment processes adopted for this DBC for the purpose of staging and cost estimating are outlined in ***Table EC-ES 5***.

[8] Wastewater Treatment Assumptions for Waikato Metro Wastewater DBC, August 2020, included in Appendix C, Preferred Option Technical Report, September 2021.

Table EC-ES 5: Treatment Concept Development

Site	Population Equivalent (rounded)	Flow range (m³/d) (rounded)	Liquid Processes	Solids Processes	Discharge
Mātangi WWTP	150	30	Local and communal septic tanks and recirculating sand filter (until 2040). UV if there is a risk of bypass flow	Periodic clean out of septic tanks	Sub-surface drip irrigation to land (until 2040)
Tauwhare Pā WWTP	275	55	Package secondary treatment with land disposal	Periodic clean out of septic tanks	Sub-surface drip irrigation to land
Southern sub-regional WWTP Stage 1	2,000-5,000	400 – 1,000	SBR	Transfer thickened sludge to Pukete or Cambridge WWTP	Sub-surface drip irrigation to land
Southern sub-regional WWTP Stage 2	5,000-18,000[9]	1,000-3,600	Secondary BNR reactor Membrane separation UV	Screw press dewatering	Discharge to water, wetland restoration and/or reuse. Stage 1 land discharge could continue for part of flow
Southern sub-regional WWTP Stage 3	78,000[10]	– 15,500+[11]	Primary sedimentation Secondary BNR reactor Membrane separation UV Disinfection Centrate Treatment	Digester[12] centrifuge dewatering	Discharge to water, restoration, or reuse. Stage 1 land discharge could continue for part of flow
Cambridge WWTP	25,000-45,000	5,000-9,000	Primary sedimentation Secondary BNR reactor Membrane separation UV Disinfection	Digester centrifuge dewatering	Discharge to water, restoration or reuse.

[9] WWTP at this stage can operate up to 40,000 Population equivalent demand level, however, DBC demand projections for Southern Sub-Regional WWTP prior to Hamilton South being connected reach a maximum of 18,000 PE.

[10] WWTP at this stage can operate from 40,000 Population equivalent demand level, however DBC assumes that all of the Hamilton South area (Hillcrest, Glenview, Peacocke) will be diverted at the same time in 2061.

[11] This WWTP can be upgraded further by adding additional process units such as reactors and membrane systems as needed to service additional growth post 2061.

[12] The solids stream management ultimately chosen for this population and beyond is likely to be heavily influenced by that ultimately selected for Pukete WWTP.

			Centrate Treatment Installation of primary sedimentation and digesters could be delayed with extra reactor capacity required		
Te Awamutu WWTP	20,000-36,000	4,000-7,200	Reactor Clarifiers UV	Filter Press (existing)	Discharge to water via rock filter

1.6.3 Wastewater Discharges

A range of discharge options have been identified and are included in Section 3.2.3 of the Shortlist Options Report (Appendix B). For the purpose of this DBC, assumptions have been made regarding discharge methods to be employed at each plant. Appropriate discharge methods will need to be considered and evaluated in detail as part of each Project to support resource consenting of any discharge activities.

1.6.4 Southern Wastewater Treatment Plant: Staging and Key Considerations

Staged development of the Southern Sub-Regional WWTP is a key element of the preferred option. The proposed capacity of Stage 1 is based on the extent of land currently developed or consented in and around the Airport. It is proposed to be operational in Year 5 (2026) to:

- Avoid investment in short-term servicing solutions that do not achieve the agreed investment objectives, including many packaged treatment plants, or storage and tankering options that do not provide long-term sustainable solutions[13].
- Provide certainty for land use planning and development.
- Provide for wastewater reticulation and conveyance systems in and around the Airport that support land development and are compatible with the medium to long-term wastewater servicing solution for the Waikato Metro Area.
- A new site and WWTP offers the opportunity to masterplan an operationally efficient treatment facility future proofed to provide for growth and future demands. A buffer area around the WWTP will be required to mitigate potential visual, odour and noise issues.

Stage 2 upgrades will be triggered by growth. The upgrades are currently based on servicing further land developed around the airport area and environs and surrounding communities (including Mātangi), plus the need for improved treatment and alternative discharge methods. Stage 2 provides for an interim upgrade to provide for wet industrial activity at around 2051. This stage could equally service demand from other areas such as Hamilton South and the broader environs. But for the purpose of this DBC, it is assumed demand will arise from wet industrial activity.

Stage 3 represents a step change in capacity and treatment processes to service Hamilton South. Timing of Hamilton South diversion is based on an assessment of build-out capacity of the Pukete WWTP site. (Refer Section 4.1.1 for details).

However, the timing of the diversion may be required earlier than assumed, due to conveyance network constraints and/or growth occurring at a greater rate than assumed.

Further upgrades will be required as flows increase, for example, if Southern Links areas develop.

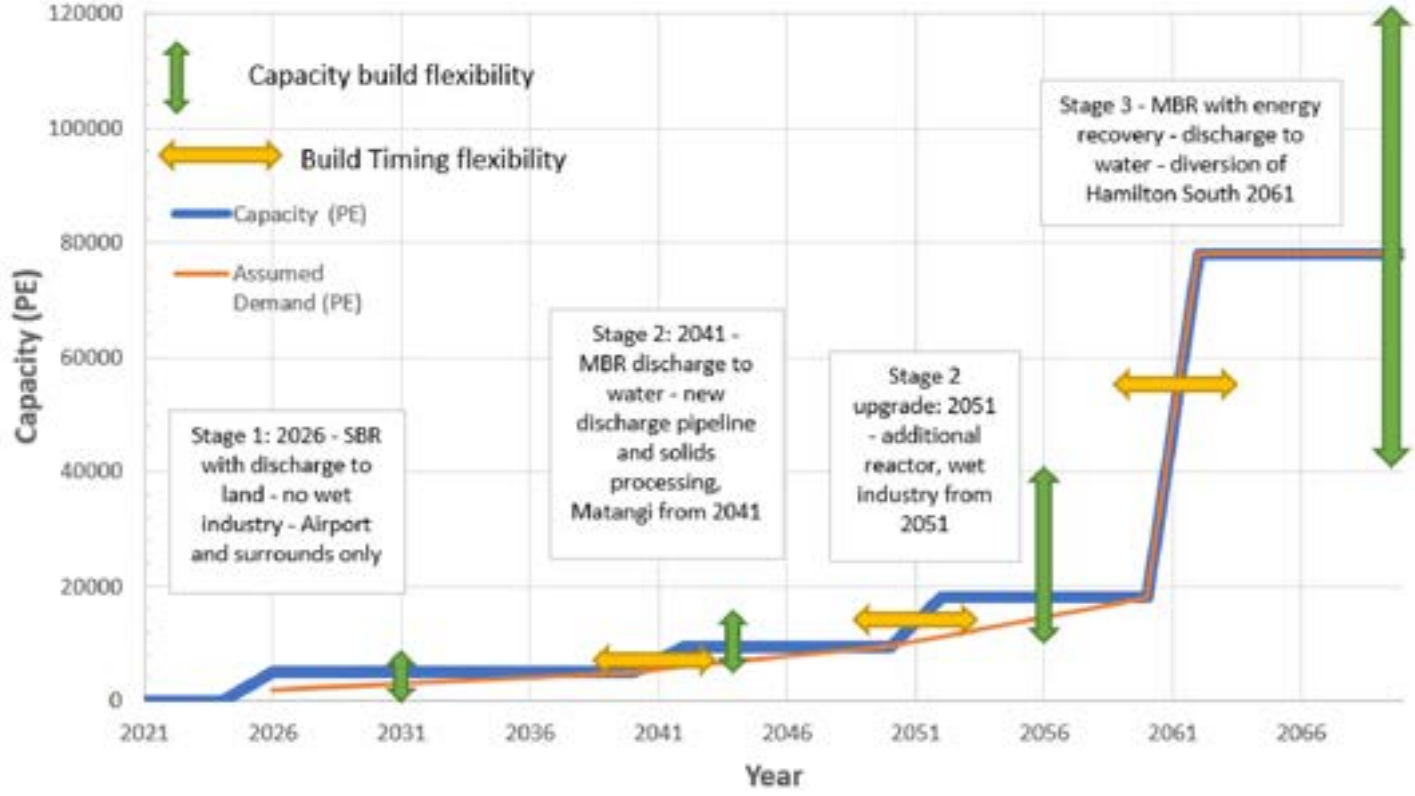
A summary of Southern Sub-Regional WWTP staging is provided in ***Table EC-ES 5*** above, ***Table EC-ES 6*** and illustrated in *Figure EC - ES 3*: below. Servicing catchments and conveyance is also detailed further below in and ***Figure EC -*** ES 5: .

[13] A proliferation of private package treatment plants does not align with the project investment objectives, is expected to deliver poorer treatment standards and performance overtime; and likely increase the capital and operating costs in the long term as package plants would not contribute toward the broader servicing needs of the Metro Area.

Table EC-ES 6: Southern Sub-Regional Treatment Concept Staging (note that these are further refined in the Financial Case)

Year	Date	Stage	Description	Assumed Areas Served	Total Stage Built Capacity	Capital Cost Estimate	Starting Demand
1 - 3	2022-2024	Stage 1	Pre-Implementation: Land acquisition, designation, consenting, master planning	Land and designation assumed to serve all stages and provide sufficient space for further expansion beyond Stage 3		$20 m	
3-5	2024-2026	Stage 1	WWTP: SBR with discharge to land including procurement and Council overheads and land discharge extension	Airport precinct (no allowance for wet industry)	1,000 m³/day (5000 PE)	$9.9 m	400 m³/day (2,000 PE)
19 - 21	2040-2042	Stage 2	WWTP & Discharge: MBR with discharge to Waikato River. Includes conveyance from Mātangi to plant, outfall pipeline and structure to river, operator building, sludge dewatering facility.	Airport area and environs (excluding wet industry) and Mātangi/ Tamahere Commercial areas	1,900 m³/day (9500 PE)	$39.6 m assumes all Stage 1 plant can be reused	1,200 m³/day (6,000 PE)
29-31	2050-2052	Stage 2	WWTP Upgrade: Additional reactors and membrane equipment	Airport area and environs, wet industry and Mātangi/ Tamahere Commercial areas	3,600 m³/day (18,000 PE)	$16.5 m	3,600 m³/day (18,000 PE)
39-41	2060-2062	Stage 3	WWTP: MBR with Energy Recovery (Primary Sedimentation and Digestion) with discharge to Waikato River. Includes conveyance from Southern Hamilton, major increase in treatment capacity.	Airport area and environs (with wet industry), Mātangi/ Tamahere Commercial, Southern Hamilton	15,600 m³/day (78,000 PE)	$150.15 m (assumes 60% Stage 2 plant can be reused)	15,600 m³/day

Figure EC - ES 3: Southern Sub-Regional WWTP Staging and Capacity (Population Equivalents)



1.6.5 Conveyance

The Preferred Option includes conveyance infrastructure to connect current and future reticulation networks to the Southern Sub-Regional treatment facility. The terminal pumping systems (pump stations and rising mains) from the service areas to WWTP are included.

The costs associated with local or trunk network upgrades or diversions to convey wastewater to the terminal conveyance systems are not included in the financial assessments of the preferred option.

Costs of network upgrades needed to service growth within each city/community have not been included either as, in most cases, investment in upgrading the existing conveyance networks would be required regardless of the wastewater treatment solution.

As the assumed Stage 1 service area (located at the Airport) is near the assumed location of the Southern Sub-Regional WWTP, no strategic conveyance costs have been included for Stage 1. The cost of local reticulation and trunk conveyance infrastructure needed to service the Stage 1 area would sit with developers, not councils.

The assumed Stage 2 service area is shown in ***Figure EC - ES 4***. The Stage 2 conveyance includes the terminal conveyance system from Mātangi to the Southern Sub-regional WWTP. A new pump station at Mātangi discharging into a 9.7 km 200 OD PE pressure main to the new Southern Sub-Regional WWTP (**Error! Reference source not found.**0) is also included.

Figure EC - ES 4: Stage 1 & 2 Service Areas and Stage 2 Conveyance details

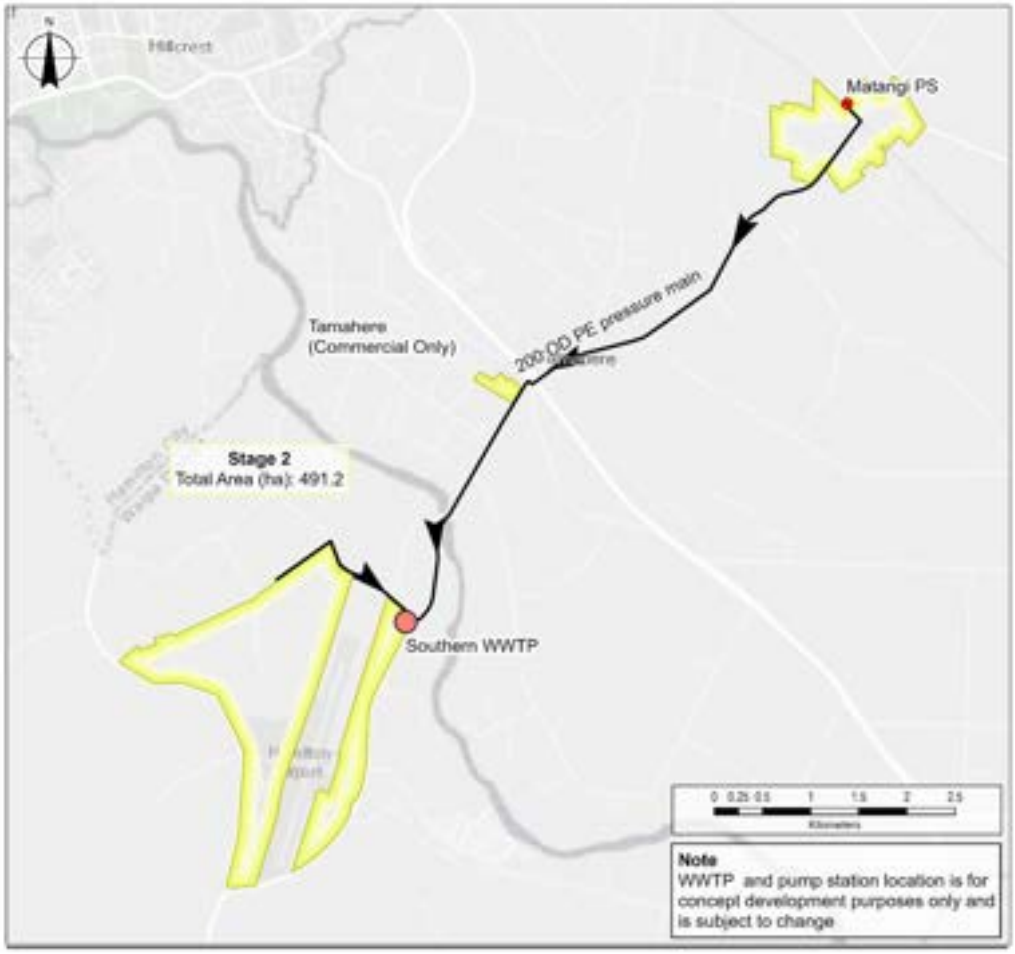
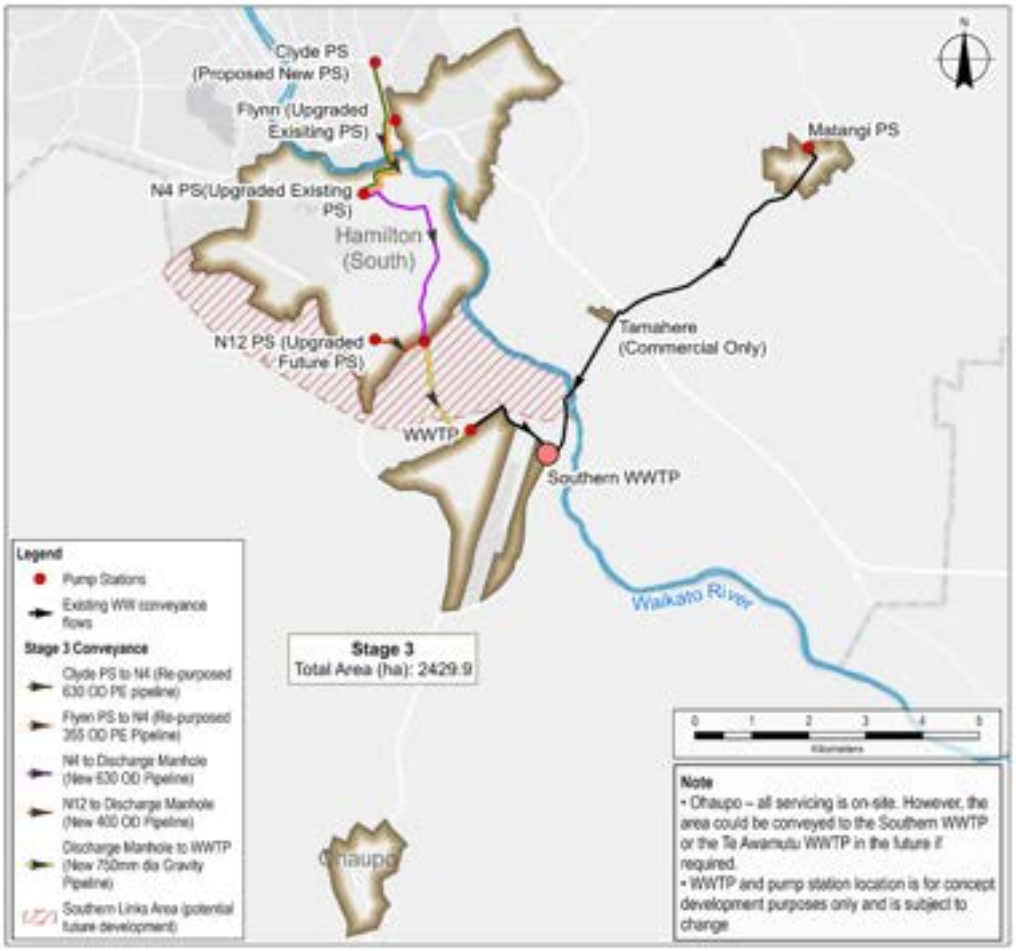


Figure EC - ES 5: Stage 1, 2 and 3 Service Areas and Stage 3 Conveyance details



The assumed Stage 3 service area is shown in Figure EC - ES 5: ***Stage 1, 2 and 3 Service Areas and Stage 3 Conveyance detailsFigure EC - ES 5:*** **.** The Stage 3 conveyance system includes a new pump station at Clyde Street and an upgraded Flynn pump station utilising the Peacocke rising mains in reverse. Both pump stations would pump to the N4 pump station in the Peacocke growth cell. The N4 and N12 pump stations would divert flow through (new or repurposed) pressure mains to the Southern Sub-Regional WWTP. Several local and trunk pump station upgrades and diversions will be necessary to divert the full extent of Stage 3 Hamilton South Area, however these have not been included in this DBC.

For this purpose of this DBC diversion of Hamilton South is assumed to occur in 2061. Several factors will influence the actual timing of the Hamilton South diversion, including the cost of upgrading the Hamilton strategic wastewater network and Pukete plant, versus the cost of conveyance and upgrades to the Southern Sub-Regional WWTP, and the rate and scale of growth in and around Hamilton.

Some initial conveyance concepts for the Southern Links area have also been developed which link in with the conveyance concept for the Peacocke area. The costs of conveyance and plant upgrades to service

other parts of Hamilton not outlined above and/or Southern Links area are not included in the financial assessments of the preferred option.

The cost of local reticulation and trunk conveyance infrastructure (such as that needed to service the Airport Industrial Precinct or service development in brownfields areas) have not been included in this DBC. These costs are assumed to sit with developers or the relevant Council.

The cost of network upgrades needed to service growth within each city/community have not been included in this DBC as, in most cases, investment in upgrading the existing conveyance networks would be required regardless of the wastewater treatment solution.

1.6.6 Cambridge WWTP

The new Cambridge WWTP can also be staged. Additional screens, reactors, primary sedimentation tanks and digestors can be added over time in response to residential and industrial growth. Primary sedimentation and digestion processes could be added post-2050 when flows are higher. However, this would require more reactor capacity and result in less energy recovery.

Treatment plant development would need to provide both horizontal and vertical spaces for the process units to be added subsequent to the initial phase of development. Initial process configuration would need to allow vertical and horizontal spaces for the future introduction of primary sedimentation tanks.

1.6.7 Nutrient summary

The following information is summarised from the technical note Wastewater Baseline and Future Nutrient Loads for Waikato Southern Metro Wastewater DBC (Appendix D).

Calculation and comparison of future predicted nutrient (Total Nitrogen (TN) and Total Phosphorus (TP)) mass loads against the baseline nutrient loads from the existing treated wastewater discharges for the Southern Metro Area, has been undertaken. This is to analyse whether the proposed level of wastewater treatment, and associated discharges, will meet the various policy and statutory requirements around improving the health and wellbeing of the river. Calculations in particular aim to ascertain whether the proposed future discharges (which will likely see an increase in volume discharged) will deliver a reduction in the total nutrient loads discharged compared to the baseline nutrient loads.

The predicted mass loads from the proposed new Southern Sub-Regional WWTP and the upgraded Cambridge WWTP were considered individually and in combination with each other, and in combination with other Metro WWTP discharges.

When considered alone, the new Southern Sub-Regional WWTP will exceed the TN and TP mass load baseline. This is because it is a new WWTP and discharges into a largely greenfield environment. Wastewater generated by the few existing industrial sites in the vicinity is either discharged to land or trucked offsite (mostly to Cambridge WWTP). Any growth and the associated wastewater discharge would be considered against a very low existing baseline.

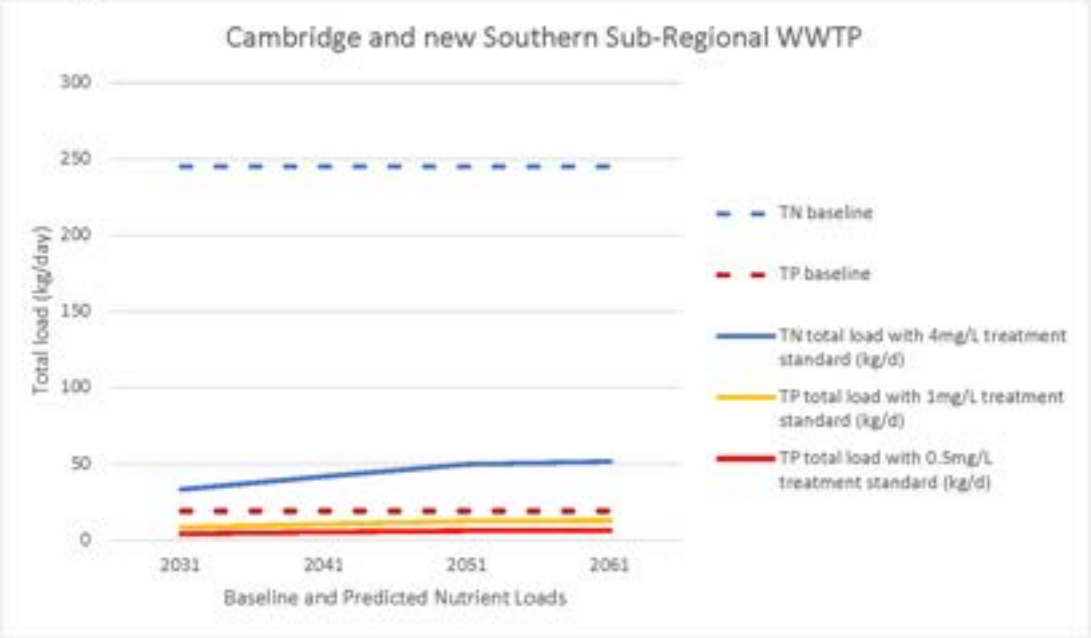
The existing baseline for TN is 1 kg/day and <1 kg/day for TP, and this is associated with the current discharge to land from the Mātangi WWTP (noting these flows will be re-directed to the new Southern Sub-Regional WWTP once operational).

Taking a combined view of future mass loads is considered reasonable, given that wastewater generated by a few of the existing airport industrial sites is already trucked offsite to the Cambridge WWTP. If there was no Southern Sub-Regional WWTP, the additional flow and load to be served by the plant would likely be conveyed to either Pukete or Cambridge to be treated and discharged.

As shown in ***Figure EC - ES 6*** when the Cambridge WWTP and new Southern Sub-Regional WWTP are looked at together, future nutrient loads are substantially less than existing. This is likely to be consistent with

policy and statutory requirements around improving the health and wellbeing and water quality of the Waikato River.

Figure EC - ES 6: Baseline and Predicted Nutrient Loads for the Cambridge WWTP and Southern Sub-Regional WWTP combined



In addition to employing high treatment standards, investment in restoration may also be required Best for River outcomes. This could be achieved in a number of ways, including by planting erosion prone land and undertaking riparian planting. This would need to be worked through with partners and stakeholders including Tangata Whenua.

If the Cambridge WWTP and the proposed new Southern Sub-Regional WWTP were not considered together for consenting purposes, offsetting would likely be required due to the very low nutrient mass load baselines.

1.6.8 Risks

The following are the key risks (refer to Management Case – Section 1.5 for additional detail including mitigations) for this project:

- **The recommended DBC projects cannot be funded**. This could lead to project being delayed, not proceeding or lower standards being adopted as a result of financial constraints; capital cost increases; and/or, poor integration, coordination and planning.
- **Costs to implement are significantly higher than estimates**. This could further impact on affordability and lead to the project being delayed, not proceeding or lower standards being adopted as a result of increased market (resources and materials) costs due to demand, supply chain issues or poor risk allocation in construction contracts.
- **The recommended projects do not meet partner expectations.** This may impact ability to implement the projects; adversely impact relationships and result in a failure to deliver 'best for river' outcomes.

- **Resource consents and designations for the recommended option cannot be secured** or the costs to deliver a consentable solution and to secure designations are prohibitive.
- **Three Waters reform impacts the ability or commitment to implement the projects:** While the DBC has been prepared on the basis of 'business as usual' (BAU) water services delivery, three waters reforms could result in the projects being deferred, delayed or not occurring in the timeframes required. This situation could arise as a result of the transition phase, delays in decision making, changes in key 'actors' involved in delivery, and changing investment priorities. A delay in implementing Stage 1 of the Southern Sub-Regional WWTP will result in a proliferation of on-site private solutions, undermining the long-term investment in the Southern Sub-Regional WWTP. Conversely, reforms may provide a stronger financial position to support project implementation than BAU.
- **Inability for councils to move to an integrated delivery programme**. Would result in uncoordinated delivery of the overall programme; misalignment of objectives and 'Best for River' principles.

Technical risks

The technical risks relating to the Preferred Option include:

- Delay in Stage 1 delivery for Southern Sub-Regional WWTP impacting on project viability in the medium term and resulting in in inefficient infrastructure investment. Southern Sub-Regional WWTP site and conveyance corridors not protected resulting in increased costs and project delays
- Changes in rate of growth or wastewater composition compared to assumptions resulting in lack of or excess servicing capacity. The impacts could include limits on growth or financial burden of under-utilised assets
- Limited options for biosolids reuse/disposal resulting in increased operating cost, lost opportunities for resource recovery and/or Increased greenhouse gas emissions
- Increased costs associated with Greenhouse gas emissions as a result of legislative change (introduction of carbon taxes/levies); Liquid and solids discharge concerns trump concerns around greenhouse gas emissions Reluctance to invest in energy recovery technology of energy, chemicals and biosolids disposal

1.6.9 Recommended investigation and design

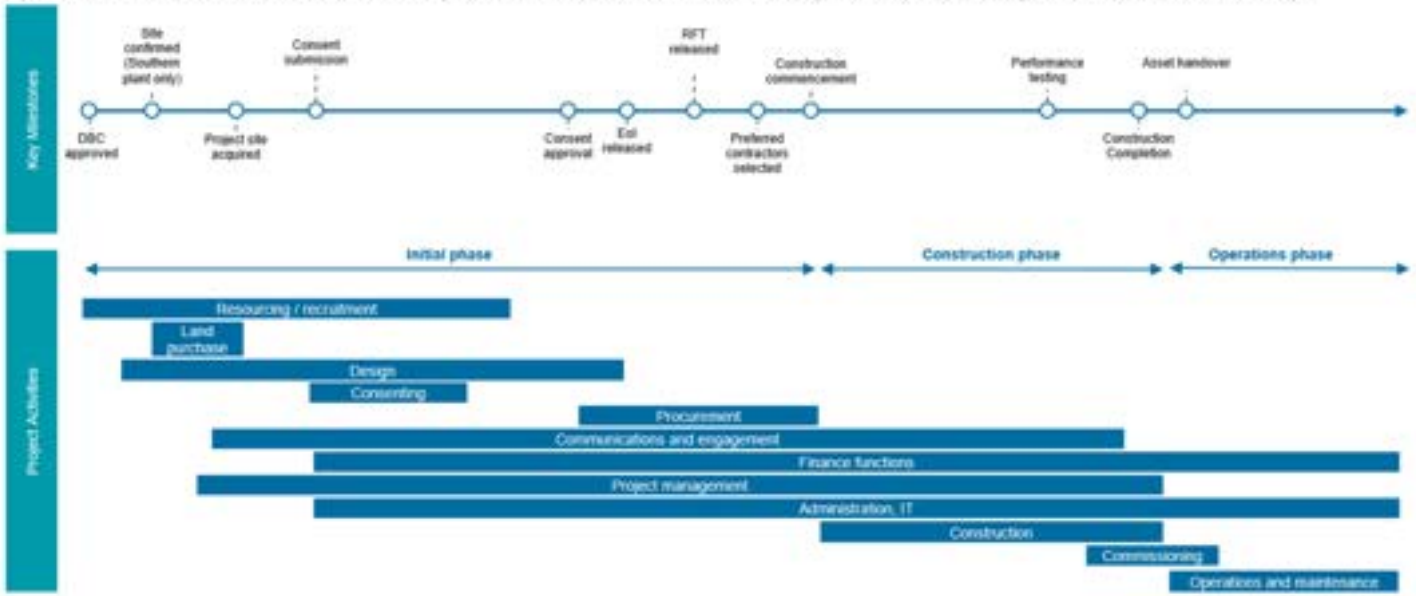
To implement the preferred option, further investigation and design is recommended as follows:

- Confirming location and securing tenure for the Southern Sub-Regional WWTP site and discharge locations.
- Geotechnical investigations for the Southern Sub-Regional WWTP
- Master Planning, designations and consenting for the Cambridge and Southern Sub-Regional WWTPs s and discharges
- Preliminary design of the wastewater treatment and discharge facilities
- Review of redundancy requirements for major process units (e.g. screens and reactors)
- Investigation of biosolids reuse and disposal options
- Further investigation of sustainability and capital/operational carbon footprint
- Further refinement of capital, operational and present value analysis

A detailed breakdown of proposed project activities to deliver the Southern Sub-Regional WWTP and discharge is shown in Figure EC **- ES 7** and provided in the Management Case (Section 1.2.4).

Project activities to deliver the Cambridge WWTP and discharge are being developed separately by Waipā DC as part of the Cambridge WWTP Project and are not repeated in this DBC.

Figure EC - ES 7: Proposed Southern Sub-Regional Wastewater Treatment Plant Project Activities (Management Case – Section 1.2.4)



1.6.10 Cost estimates

Cost estimates representing capital and operating requirements to 2061 were prepared by BECA to establish the order of magnitude capital and operational costs for the preferred option. They are P50 cost estimates and include a 20-30% risk allowance on the capital costs. P95 estimates have also been prepared and are included in Appendix B of the Preferred Option Report (Appendix C). An allowance of 10% for procurement and Council overhead costs has been added to the capital cost estimates for inclusion in the economic and financial cases. Refer to section 8 of the appended Preferred Option Report for a detailed breakdown of the costs).

The cost estimates are deemed to be Class 5 estimates as per the AACE[14] Cost Estimate Classification System and have an expected accuracy range of -30% / +50%. The estimates are developed as part of the DBC to provide early estimates for inclusion in budgeting and funding applications for implementation funding. They will need to be refined once a detailed design is developed.

The capital and operational costs for the Southern Sub-Regional WWTP are shown in Table EC-ES 7, Table EC-ES 8 and Table EC-ES 9. Costs for the other WWTPs are shown in

[14] Association for the Advancement of Cost Engineering – Practice No. 18R-97

Table EC-ES 10. The costs are also outlined in the Financial Case, which provides additional information regarding cashflows and specific timing for expenditure.

The Financial Case provides analysis of the financial implications for the delivery of the preferred option including capital, operational, land purchase and procurement and construction overheads based on Council estimates.

Table EC-ES 7: Stage 1 Southern Sub-Regional WWTP Capital Cost Estimate Breakdown (2026)

Item	Cost (2020 values)
Land Acquisition *Assumes adequate land for Stage 1, 2 and 3 WWTP development*	$12 m
Master planning and consents *This includes consenting for land and water discharge for Stage 1 and 2 and includes master planning, designation and consents for the treatment and discharge facilities.*	$8 m
2026 Wastewater Treatment Plant & Discharge System	
Design, ground improvements and initial civil work	*$1 m*
Land disposal system: part – irrigation (sub-surface drip irrigation on approximately 10 ha)	*$1 m*
SBR reactors, screens, mechanical and electrical equipment	*$6 m*
2026 WWTP & Discharge (Capital Costs) Sub–Total:	$8 m
2026 WWTP Procurement & Council Overheads *Allowance of 10% of capital costs for procurement and Council overhead costs (as per the Financial Case*	$0.8 m
Other Stage 1 Costs – *extend the irrigation equipment and system (assumes use of land acquired in Stage 1)*	$1.1 m
Total – Capital Expenditure	**$29.9 m**
Annual Operational Costs	**$0.544 m**

Table EC-ES 8: Stage 2 Capital Cost Estimate Breakdown (2041 and 2051)

Item	Cost (2020 values)
2041 Wastewater Treatment Plant & Discharge System	
Outfall: 1 km pipeline plus discharge structure (assumed gravity flow)	*$4.5 m*
Treatment Plant including screens, membranes, UV system, mechanical and electrical equipment, and pipework	*$19.5 m*
Civil works and buildings	*$6 m*

2041 WWTP & Discharge (Capital Costs) Sub–Total:	$30 m
2041 Procurement & Council Overheads *Allowance of 10% for procurement and Council overhead costs (as per the Financial Case)*	$3 m
2041 Mātangi Conveyance Costs *includes allowance of 10% for procurement and Council overhead costs (as per the Financial Case)*	$7.26 m
2051 WWTP (Capital Costs) Sub-Total *Additional reactors, membranes, screens and aeration system (2051) – includes allowance of 10% for procurement and Council overhead costs (as per the Financial Case)*	$16.5 m
Total – Stage 2 Capital Expenditure	**$56.76 m**
Annual Operational Costs WWTP	$0.672 m - $2.05 m
Annual Operational Costs Matangi Conveyance	$0.102 m

Note: Consent approvals and cost assumed to be covered under stage 1

The Stage 2 plant costings assume that all Stage 1 plant can be reused.

While the key tankage at the WWTP will already be in place, additional costs will include:

- Provision of trunk infrastructure (including pipes and channels) on site for large future flows
- Grit removal and second stage screening
- Upgraded aeration system
- Upgraded UV system
- Dewatering facility
- Reconfiguration work
- Membrane trains and associated plant and plant room
- Operator facilities.

Stage 2 also assumes that a treated water discharge to the Waikato River will be required and includes a new outfall pipeline to the river and a new outfall structure. The outfall cost estimates are based a 1 km long gravity discharge pipeline from the WWTP to the river. This length is assumed as the WWTP site and discharge location are yet to be determined.

Approximately 40% of the initial Stage 2 cost is associated with the outfall and dewatering facility.

Table EC-ES 9: Stage 3 Capital Cost Estimate Breakdown (2061)

Item	Cost (2020 values)
2061 Wastewater Treatment Plant & Discharge Systems	
Structural and civil works	***$48 m***
Mechanical and electrical equipment	***$48 m***

Upgrade capacity outfall pipeline and structure	*$8 m*
2061 WWTP & Discharge (Capital Costs) Sub–Total	$104 m
2061 Procurement & Council Overheads *Allowance of 10% for procurement and Council overhead costs (as per the Financial Case)*	$10.4 m
2061 Hamilton South Conveyance Costs *Conveyance for Hamilton South includes allowance of 10% for procurement and Council overhead costs (as per the Financial Case) – does not include servicing the area between the Southern Links designation and existing Hamilton City boundary*	$35.75 m
Total – Stage 3 Capital Expenditure	**$150.15 m**
Annual WWTP Operational Costs	$7.44 m
Annual Matangi Conveyance Operational Costs	$0.102 m
Annual Hamilton South Conveyance Operational Costs	$0.8 m

Note: Consenting costs relating to Stage 3 have not been included for the purposes of financial modelling. The consent approval process required at that time (c2055-2060) is unknown. Approval for a significant increase in discharge volume will be required.

Cost estimates to upgrade other wastewater treatment facilities in the Southern Metro Area are included in

Table EC-ES 10. The assumptions and staging applied to each of these facilities are detailed in the Preferred Option Technical Report and Section 5.9.

Table EC-ES 10: Preferred Option Cost Summary (un-escalated and excluding Southern Sub-Regional WWTP)

WWTP name	WWTP Capital Cost ($ m) up to 2061 – includes allowance of 10% for procurement and Council overhead costs (as per the Financial Case)	Operational Cost @ 2061 ($/year)
Cambridge	$ 136.84 m	$2.8 m
Matangi	$ 0.55 m (short term improvements)	Matangi is assumed to be serviced by the Southern Sub-Regional WWTP from Stage 2 (2041)
Te Awamutu	$30.9 m	$4.0 m
Tauwhare Pa	$ 2.2 m	$0.04 m

Estimates for Cambridge are based on achieving the treatment quality standards agreed through this DBC project.

Estimates for Te Awamutu are based on the funding included in the Waipa District Council 2021–2031 Long Term Plan (LTP) and provisional estimates of the costs of further upgrades. These estimates do not reflect the level of investment likely to be required and is unlikely to achieve the treatment standards agreed through this DBC. The costs associated with achieving the agreed standards will need to be evaluated as part of future Te Awamutu WWTP consenting and upgrade projects.

Over time the total operational costs increase as flows increase. Large plants with PSTs and digesters (i.e. Cambridge WWTP) have significantly lower relative operating costs due to energy recovery and reduced biosolids volumes for disposal. The technology associated with the addition of primary sedimentation (PST), digestion and energy recovery increase the capital cost of a treatment plant development or plant upgrade.

However, a choice to delay the installation of PSTs and digesters at the Cambridge plant would increase operational costs. Any decision on delaying energy recovery facilities should take into account the whole-of-life cost implications.

1.6.11 Implementation Plan

The implementation plan is summarised in Figure EC-ES 1 below. Triggers have been identified to move between development stages. The Southern Sub-Regional WWTP development stages are triggered by local (Airport area and environs), Mātangi or Hamilton demand. Mātangi conveyance and Cambridge and Te Awamutu WWTP upgrades are triggered by growth and new resource consent requirements. Developer agreements will trigger the need to upgrade at Tauwhare Pā WWTP. Servicing of Ohaupo would be triggered by environmental issues with current on-site wastewater systems or significant increased demand due to higher density development.

Key implementation steps to implement a new Southern Sub-Regional WWTP involve:

Stage 1 – Pre-implementation

- Develop an understanding of the existing and short-term flows that will need to be managed before Stage 1 is operational. Coordination with the airport and other developers to develop a servicing concept and input into master plans for developments.
- Entering into funding agreements for pre-implementation activities and land acquisition.
- Securing land for the plant, buffers and Stage 1 land discharge. The total site area will be large enough to cater for future plant expansion.
- Master planning of the site to support staged plant development.

- Designating and consenting the treatment plant and discharge activities (Stages 1 and 2)
- Entering into funding agreements for Stage 1 of the plant.

Stage 1

- Commencing Stage 1 of the treatment plant development. SBR treatment technology with land disposal is proposed for the first stage. This technology provides enormous flexibility in terms of flows and load and will provide effluent quality suitable for application into or onto land. The first stage would cater for between 400 m³/day and up to 1,000 m³/day (but with some flexibility). Soils will need to be suitable for low-rate irrigation year round.

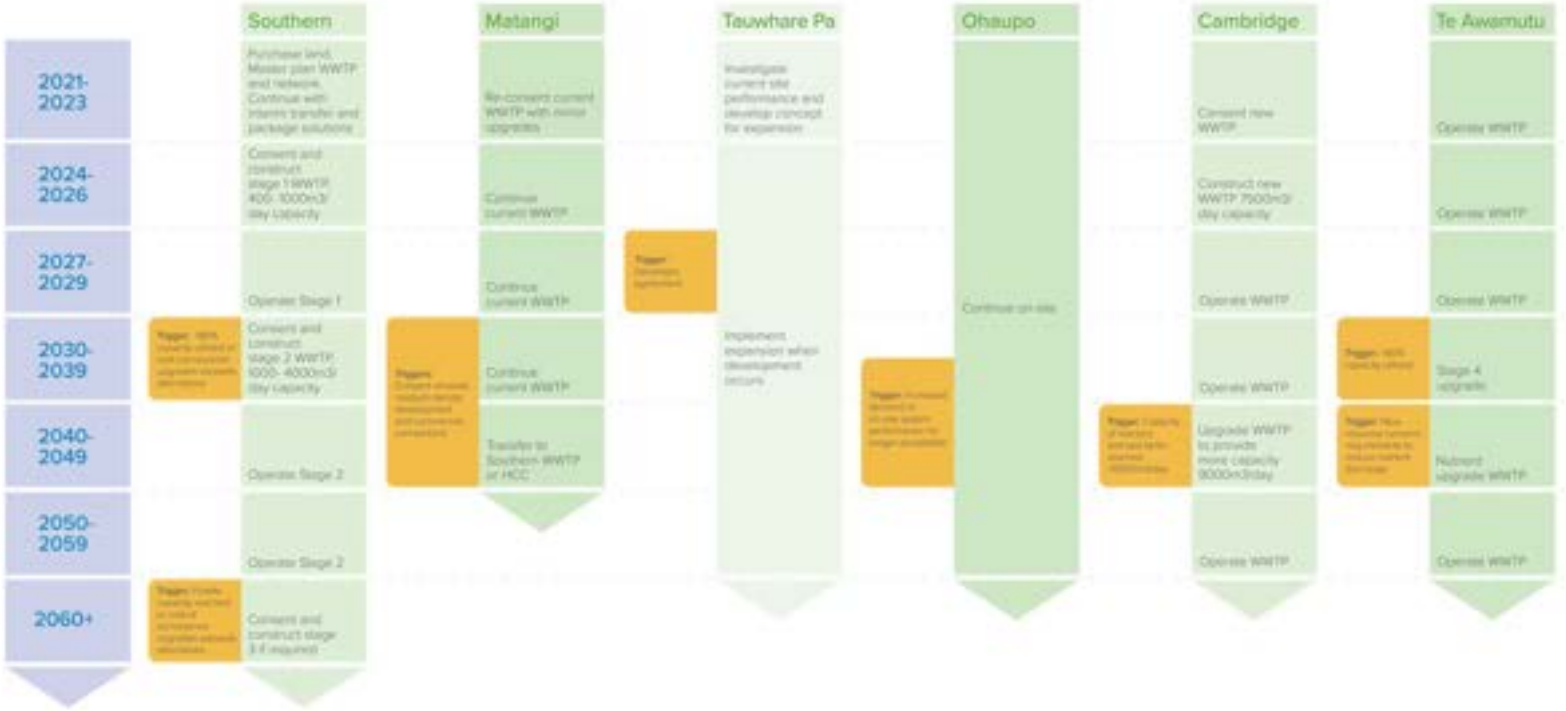
Stage 2

- When the demand to the Stage 1 plant nears 1,000 m³/day the plant would be upgraded to an MBR system and likely require a discharge to water. There is the potential for all or part of the Stage 1 land disposal system to continue to be used in parallel. The MBR system could be configured using the Stage 1 SBR reactor tanks, much like the conversion of the Pukekohe WWTP from SBR to MBR configuration. This system will be upgraded to meet demand given local demand is expected to be 3,600 m³/day by 2061. If servicing of parts of the Southern links or Peacocke catchments was desired, the Stage 2 plant could potentially be upgraded to 8,000 m³/day capacity. The MBR technology would also open up opportunities for re-use of treated wastewater by selected industries.

Stage 3

The Stage 3 Treatment Plant upgrade provides additional capacity to service Hamilton South and allows for enhanced energy and resource recovery. Further system upgrades would be undertaken to meet demand.

Figure EC-ES 1: Preferred option implementation plan



1. Introduction

1.1 Purpose

This report sets out the Economic Case for the Waikato Southern Metro Area Wastewater Detailed Business Case (Southern Metro DBC).

The purpose of the Economic Case is to evaluate options available to address the problems identified in the Strategic Case. The assessment of these options uses several criteria including the project objectives which have been identified in the Strategic Case and other critical success factors. The Economic Case aims to identify a Preferred Option that delivers best public value including wider social and environmental effects.

This report provides an overview of the preferred option, the approach to the development and assessment of options and the refinement and details of the preferred option.

In the Waikato, there are few fully compliant municipal wastewater treatment plants (WWTPs) and the majority of municipal wastewater discharge consents will expire in the next 10 years. Many Waikato communities require urgent investment in their three waters infrastructure to address existing and future performance requirements and needs.

Territorial authorities are under increasing pressure to provide new and enhanced infrastructure that progress toward achieving Te Ture Whaimana and the objectives set out in the National Policy Statement (NPS) for Freshwater Management; deliver on community expectations for environmental quality; respond to growth pressures and unlock the economic potential of their communities.

Territorial authorities have budgeted for significant investment in their three waters services in their 2018-2028 long term plans (LTPs). However, this level of investment is unlikely to satisfy regulatory obligations (particularly following the establishment of Taumata Arowai), or adequately respond to current and future growth pressures and long-term environmental expectations.

The Waikato Sub-Regional Three Waters Strategic Case was approved in December 2019, which provided a compelling case for change in the way that water, wastewater, and stormwater (three waters) services are planned, managed and delivered in the Lower Waikato and Waipā river catchments. A Waikato Sub-Regional Three Waters Programme Business Case (PBC) is being developed and expected to be completed in 2023. The PBC will incorporate the work undertaken to complete this DBC as well as the work currently being undertaken for the Northern DBC in relation to Wastewater. The PBC will incorporate this information with water supply and stormwater to recommend a sub-regional three waters investment programme.

1.2 Project objectives and outcomes

This project seeks to identify long-term wastewater treatment solutions for the Waikato-Hamilton Waipā Metro Area. This report covers the area from the southern part of Hamilton City, through to Cambridge, Te Awamutu and Kihikihi (known as the Southern Metro Area). It evaluates sub-regional solutions that operate across territorial boundaries to deliver higher quality outcomes, community benefits and overall efficiencies compared to solutions constrained by territorial boundaries.

This project vision is derived from Te Ture Whaimana o te awa o Waikato:

Tooku awa koiora me oona pikonga he kura tangihia o te maataamuri

"The river of life, each curve more beautiful than the last"

... a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come[15].

1.2.1 Te Ture Whaimana objectives

The project aims to give effect to Te Ture Whaimana and the Best for River definition by directly contributing to the objectives from Te Ture Whaimana:

a) The restoration and protection of the health and wellbeing of the Waikato River.

b) The restoration and protection of the relationship of Waikato-Tainui with the Waikato River, including their economic, social, cultural, and spiritual relationships.

c) The restoration and protection of the relationship of Waikato River iwi according to their tikanga and kawa, with the Waikato River, including their economic, social, cultural, and spiritual relationships.

d) The restoration and protection of the relationship of the Waikato region's communities with the Waikato River including their economic, social, cultural, and spiritual relationships.

e) The integrated, holistic, and coordinated approach to management of the natural, physical, cultural and historic resources of the Waikato River.

f) The adoption of a precautionary approach towards decisions that may result in significant adverse effects on the Waikato River, and in particular those effects that threaten serious or irreversible damage to the Waikato River.

g) The recognition and avoidance of adverse cumulative effects, and potential cumulative effects, of activities undertaken both on the Waikato River and within its catchments on the health and wellbeing of the Waikato River.

h) The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities.

i) The protection and enhancement of significant sites, fisheries, flora, and fauna.

j) The recognition that the strategic importance of the Waikato River to New Zealand's social, cultural, environmental, and economic wellbeing requires the restoration and protection of the health and wellbeing of the Waikato River.

k) The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length.

l) The promotion of improved access to the Waikato River to better enable sporting, recreational, and cultural opportunities.

m) The application to the above of both maatauranga Maaori and latest available scientific methods.

1.2.2 Metro DBC project objectives

For the purpose of this project, SMART project objectives have been developed with the purpose of giving effect to the Te Ture Whaimana, based around the following five themes:

- Water Quality
- Ecology
- Cultural outcomes

[15] Te Ture Whaimana o te Awa o Waikato

- Sustainable technology
- Sustainable growth

The final agreed objectives are, as follows:

1. Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect kai from the river and connected waterways thereby contributing to the restoration and protection of the health and wellbeing of the river.
2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and around water bodies is enhanced through the reduction of wastewater treatment and discharge impacts before 2050.
3. Wastewater treatment solutions contribute to restoring and enhancing cultural connectivity /relationships with the river so that before 2050 Marae, Hapu and Iwi access to the river and other sites of significance for cultural and customary practice within the metro spatial area are no longer impeded by wastewater treatment solutions.
4. Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from wastewater treatment systems before 2050.
5. The wastewater solution provides sufficient capacity to ensure sustainable growth in the metro spatial area in accordance with growth projections assumptions for the next 100 years.

Note, some minor wording changes to the investment objectives and key performance indicators were agreed with stakeholders between the longlist and shortlist assessments as part of this DBC. The updates are reflected in the MCA criteria in Table EC - 2 below.

1.2.3 Growth

Growth assumptions have been developed in conjunction with the councils and with reference to relevant strategic planning documents. The growth assumptions have informed development of the preferred option. The growth assumptions, as agreed with the Metro Wastewater Project Partners, used to size the system components for the long list, short list and preferred options include:

- Existing development (residential and non-residential)
- Infill development
- Planned commercial industrial development (e.g. Ngaaruawaahia, Taupiri, Te Kowhai, Hopuhopu, Horotiu, Te Rapa North, Rotokauri, Ruakura, Airport, Cambridge / Hautapu)
- Planned residential greenfield development (e.g. Taupiri, Hopuhopu, Ngaaruawaahia, Te Kowhai, Rotokauri, Peacocke, Temple View, R2, HT1, WA, Cambridge and Te Awamutu growth cells)
- Additional infill development as noted in the Metro Spatial Plan[16]
- 'Wet industry' allowances at Horotiu, Te Rapa, Ruakura, Airport and Cambridge. While these allowances have been included in the current DBC work, the most appropriate strategic locations for wet industrial activity in the Waikato Metro Area needs to be properly considered and discussed by Future Proof

  The ultimate design horizon also includes 35,000 Population Equivalent (PE) for the area between the Southern Links designation and the current Hamilton City Boundary, and an additional 30,000 PE in the vicinity of Ruakura.

[16] Hamilton-Waikato Metro Spatial Plan – Future Proof

1.3 Option Development and Assessment Methodology

Development of this DBC is characterised by collaboration including key decision points driven by partners and key stakeholders' input (Refer [Figure EC - 1: Process and key milestones to identify the preferred wastewater option]). The previous feasibility study[17] identified six metro wastewater treatment solutions and recommended four for future investigation as part of this DBC.

Throughout the option development and assessment process, input and feedback was primarily received at key workshops held with the stakeholders shown in Table EC - 1 below.

Table EC - 1: Key Stakeholder Workshop Participants – Metro Wastewater DBC Short List Options Phase

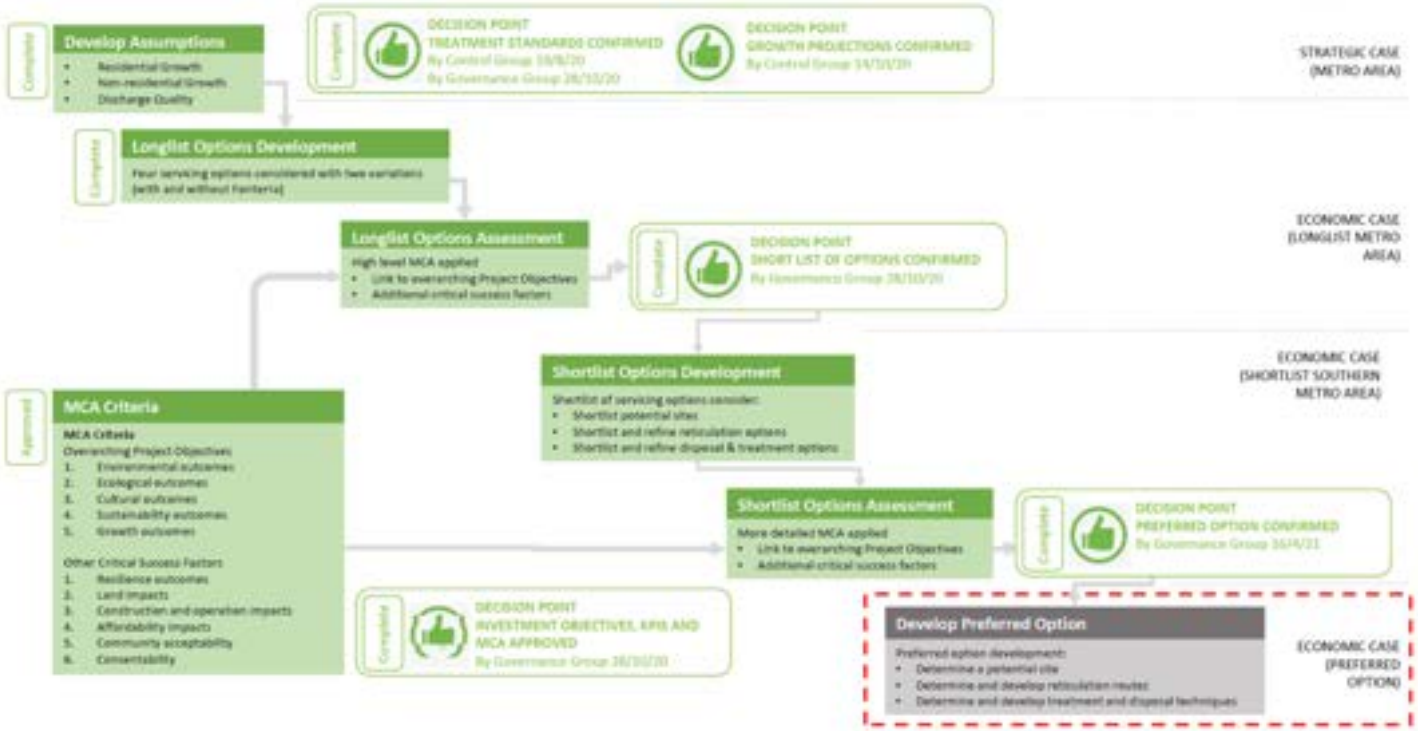
Key Stakeholders	
Hamilton City Council	Waikato Tainui
Waikato District Council	Te Haa o te Whenua o Kirikiriroa – Ngati Tamainupo
Waipa District Council	Te Haa o te Whenua o Kirikiriroa – Ngati Wairere
Waikato Regional Council	Te Haa o te Whenua o Kirikiriroa – Ngati Koroki Kahukura
Te Hauora o Ngati Haua	Te Haa o te Whenua o Kirikiriroa – Ngati Haua
Maniapoto	Te Haa o te Whenua o Kirikiriroa – Ngati Mahanga
Nehenehenui Regional Management Committee	Watercare (Waikato)

Targeted discussions were also held with key stakeholders throughout the DBC development. Milestone recommendations and decisions were made formally by the Project Control and Governance Groups.

The economic case builds on the Strategic Case and involves assessing longlist and shortlist options to develop a preferred option. Figure EC - 1 outlines this overarching methodology, with completed steps to date shown in green.

[17] Future Proof Partners, 2020. Hamilton Metro Wastewater Treatment Feasibility Study. Retrieved 25 Feb 2021, from https://www.futureproof.org.nz/assets/FutureProof/H2A/Waters/Final-Metro-Area-Wastewater-Treatment-Feasibility-Study_with-Appendices.pdf

Figure EC - 1: Process and key milestones to identify the preferred wastewater option



2. MCA assessment

2.1 Multi criteria analysis (MCA) framework

The servicing options were assessed using an MCA and scoring system. The assessment criteria were developed based on agreed investment objectives and KPIs established through the Strategic Case phase (described in Section 1.2.2 – Metro DBC Project Objectives). Critical success factors were also used as additional criteria for the options assessments. The criteria used for the assessment are outlined below.

Criteria

The following assessment criteria (refer to Table EC - 2) was developed based on the project objectives and KPIs described in the Strategic Case.

Additional critical success factors were developed at the shortlist stage to assess other distinguishing features of the options. These criteria were agreed with partners and stakeholders. The critical success factors consider implementation matters associated with the options. These included:

- Constructability
- Operability
- Consentability
- Resilience

Costs were also developed at the shortlist stage; however, they are not scored as part of the MCA assessment.

Table EC - 2: MCA criteria descriptions

MCA	KPI Equivalent	Criteria measure / considerations
OBJECTIVE CRITERIA		
Water Quality 1. By 2050 municipal wastewater treatment plant discharges, as part of cumulative discharges to the river, are no longer impacting the ability of people to swim and collect kai from the river	KPI 1.4: Proportion of plants which are compliant against discharge quality consent conditions	**Water Quality (TN, TP, Nitrates, Ammonia)** To what extent and timeframe does the option reduce the level of Nitrogen, Phosphorus, Nitrates and Ammonia in the quality of the discharge?
	KPI 1.2 Concentration of Total Nitrogen contaminants impacting the river and connected waterways from WWTPs	
	KPI 1.3: Concentration of Total Phosphorous contaminants impacting the river and connected waterways from WWTPs	
	KPI 1.1: Public health risks caused by the concentration of E.coli within the WWTP discharges	**Water Quality (E.coli)** To what extent and timeframe does the option reduce the E.coli levels of the discharge to the river?
		Public Health To what extent does the option reduce the risk to public health?
Ecology 2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and	KPI 2.1: Amount of algal biomass in the Waikato River as measured by chlorophyll a concentrations attributable to treated wastewater discharges	**River / Aquatic Ecosystems** To what extent and timeframe does the option impact or improve river ecosystems and hydrology

MCA	KPI Equivalent	Criteria measure / considerations
around water bodies is enhanced through the reduction of wastewater treatment and eco-system re-entry impacts by 2050	KPI 2.2: Health and abundance of mahinga kai species	
	KPI 2.3: Number and variety of terrestrial species at specific locations within the metro area	**Terrestrial Ecosystems** To what extent and timeframe does the option provide the ability to improve vegetation coverage around riverbed and terrestrial ecosystems? This will only be applicable if potential riparian areas and other restoration opportunities are included as part of the options. This may have to remain very high level for now.
	KPI 2.4: Area coverage of native riparian vegetation surrounding water bodies and within the catchment area	
Cultural Outcomes 3. Wastewater treatment solutions restore and enhance cultural connectivity / relationships with the river so that by 2050 marae and iwi access to the river and other sites of significance within the Metro spatial area is no longer impeded by wastewater treatment solutions	KPI 3.1: Maatauranga Maaori Cultural Health Index	What potential is there for land discharge vs water discharge? (How much does the option reduce the discharge to the river?) This assumes that land discharges are preferred but further assessment is required from Iwi
		To what extent does this option enhance and restore cultural connectivity with the river? (Cultural assessment to be determined.)
	KPI 3.2: Number and quality of access points to the river for cultural and recreational activities	**Access to River** To what extent and by when does the option increase the opportunity to improve the number of access points to the river and/or other waterways, lakes and wetlands? Measure by considering the potential to rehabilitate existing sites/riparian activities of options/location of site
Sustainable technology 4. Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from wastewater treatment systems by 2050	KPI 4.1: Water reuse, water allocations and accounting	**Water Reuse** To what extent and timeframe does the option allow for water reuse?
	KPI 4.2: Carbon footprint / Energy requirements of plant and plant systems (i.e. pumps)	**Energy / Carbon Reduction** To what extent and timeframe does the option consider energy and carbon neutral technologies? To what extent do options reduce relative operational carbon associated with conveyance system? What is the biosolid reuse potential?
	KPI 4.3 Proportion of biosolids that are able to be safely reused for beneficial purposes	
Sustainable growth 5. The wastewater solution provides sufficient capacity to ensure sustainable growth in the metro spatial area in accordance with growth projections assumptions for the next 100 years	KPI 5.1 Flexibility and adaptability of solution to be staged / developed over time to meet the needs of the community.	**Flexibility** To what extent does the option provide flexibility to adapt to growth and land use changes?
	KPI 5.2: Proportion of Industrial areas which are serviced by municipal plants sustainably	**Sustainable Growth** To what extent does this option provide additional growth opportunities which align with planned future growth of the Waikato Metro area?
	KPI: 5.3 Proportion of residents in the metro area serviced by municipal treatment plants sustainably	
CRITICAL SUCCESS FACTORS		

MCA	KPI Equivalent	Criteria measure / considerations
Constructability	Treatment	**Construction Impacts** What are the relative constructability benefits, issues and risks (available space, access, existing utilities, watercourse, rail crossings, reinstatement requirements, geotechnical impacts, utility impacts, road and traffic impacts)?
	Reticulation	
Maintenance and operations	Treatment	**Operational Impacts** What is the relative ease or difficulty of operation and maintenance (includes access, odour treatment, resource availability, monitoring, etc)?
	Reticulation	
Consentability opportunities and risks	Construction	**Consentability – Land use and designation** What are the risks of delays during the consenting process? Are there any consenting fatal flaws?
	Operation	**Consentability – Discharge** To what extent does the option improve the consistency of consents applied to discharges to the river? To what extent does the option reduce the risk of breeching consenting requirements?
Resilience	Operation	**Resilience** To what extent will the option provide resilience against climate change impacts and natural hazards?
Funding Potential	Funding availability	What ability do partners have to fund the option within funding allocations in LTPs and forward expenditures?
COSTS		
Capital costs		High level estimates only
Operating Costs		High level estimates only
Whole of life costs		High level estimates only

Each objective criterion was weighted equally in the MCA assessment. Criteria sensitivity assessments were completed as part of the long-list options assessment (Refer to Long-list options assessment for details). The sensitivity assessments did not alter the outcomes of the evenly weighted MCA assessment. It was agreed that weightings were difficult to apply in a meaningful way as each criterion are likely to have different levels of importance at different time horizons. For example, the ability the meet higher growth in the longer term may not materialise for 30 years. Therefore the options were assessed on the balance of outcomes from the options assessments as a whole rather than through weighted MCA scores.

Scoring

The servicing options were scored in accordance with the scoring definitions outlined in Table EC - 3: Scoring definitions for both the longlist and shortlist assessments.

Table EC - 3: Scoring definitions

3	Significant positive impact compared with other options
2	Moderate positive impact compared with other options
1	Minor positive impact compared with other options
0	Very limited to no positive or negative impact (neutral)

Minor negative impact compared with other options

Moderate negative impact compared with other options

Significant negative impact compared with other options

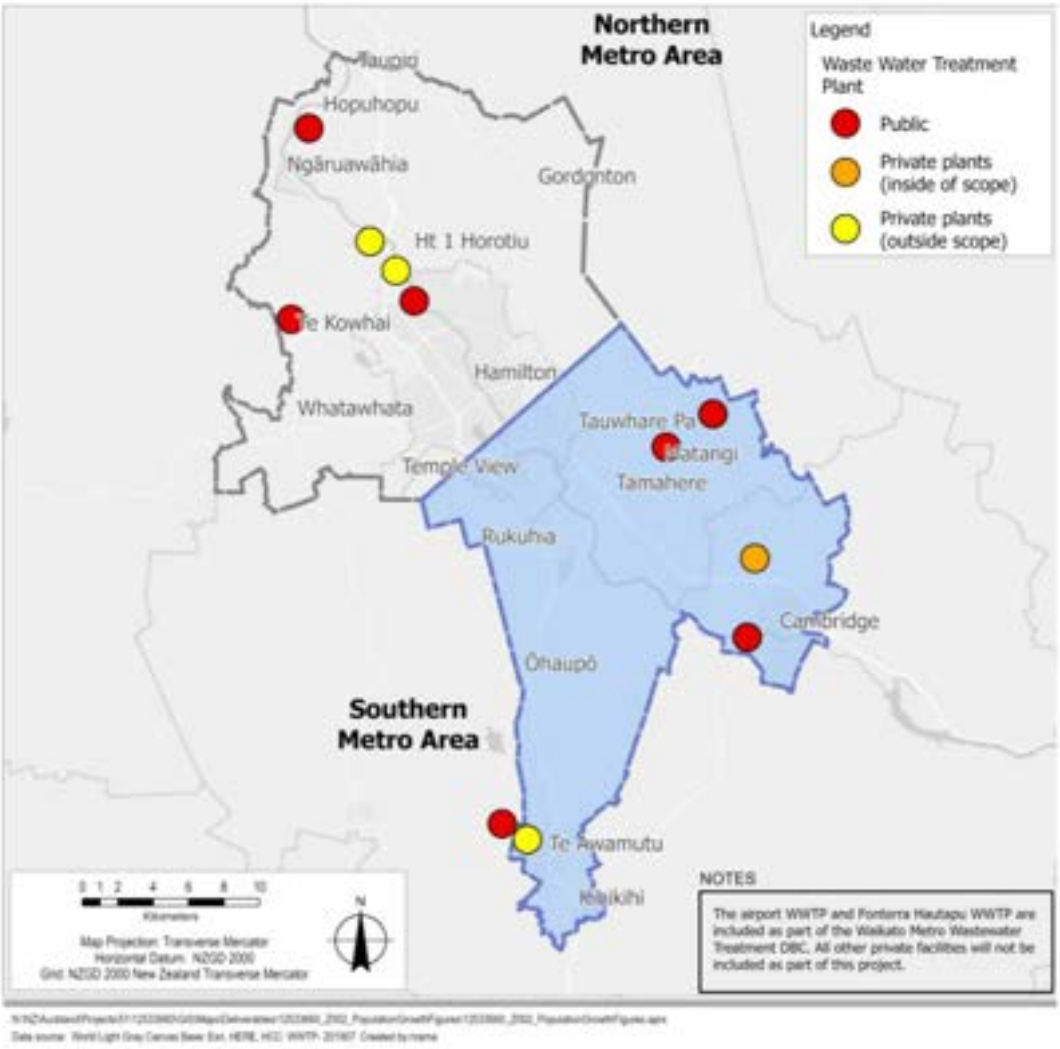
Fatally flawed

3. Longlist options

3.1 Introduction

The purpose of the longlist (and the shortlist) options process is to identify suitable wastewater servicing options for the Waikato Metro Area (shown in Figure EC - 2:) taking a boundaryless, 'Best for River' approach. This longlist options assessment is a comparative assessment to determine whether centralised wastewater servicing solutions for the Southern Metro Area should be considered further and in more detail at the shortlist stage.

Figure EC - 2: **Wastewater treatment plants within the Waikato Metro Area (study area)**



3.2 Longlist option development

This project builds on previous wastewater servicing investigations with the most relevant investigations summarised in Table [3] of the Strategic Case.

The most recent and relevant previous feasibility study[18] was a pre-cursor to this DBC which identified a long list of six metro wastewater treatment solutions. The outcome of this study recommended the following options for further development:

- Convey all communities two facilities - a northern and southern centralised facility (new site)
- Convey all communities two facilities - a northern and southern centralised facility (Cambridge site)
- Five wastewater facilities to cater for the whole Waikato Metro Area including a new southern facility
- Upgrades of BAU including new facilities at Whatawhata, the airport and Ohaupo

The options outlined above were used to inform and develop more detailed options for the long list of options. A total of eight longlist options were developed for DBC based on the options above plus the inclusion of Fonterra for each option, as detailed in Section 3.2. These options were developed to meet the performance levels and outcomes detailed in the Wastewater Treatment Assumptions Memorandum[19] and outlined further in Section 5.3 of this report.

The longlist options are described in Table EC - 4: and in full in Appendix A: Long List Options Report. It should be noted that treatment and conveyance are considered within the options outlined below and in Section 5 of this report.

Table EC - 4: High level option descriptions[20]:

Option	Description
Do Nothing	Operate all facilities as they are currently constructed with no additional capacity or treatment improvements.
Option 1A	Do Minimum – All the existing plants will be upgraded to produce high quality flows (as outlined within the Water Quality Assumptions Memorandum). A new facility will be built to service the industrial growth around the airport and another new facility will be built to service growth in Ohaupo. The existing Cambridge plant will also be upgraded. Fonterra Hautapu would be serviced by a new stand-alone plant. (Subsequent to this assessment process Fonterra has confirmed will construct a new stand-alone WWTP at Hautapu)
Option 1B	Option 1B includes all interventions outlined in Option 1A. However, this option assumed Fonterra flows would be serviced by the proposed new Cambridge facility.
Option 2A	All northern communities will be serviced by a northern plant located at Pukete and southern communities will be serviced by a new southern centralised facility to be built on a new location (to be determined). The new southern facility will service growth at the airport area

[18] Future Proof Partners, 2020. Hamilton Metro Wastewater Treatment Feasibility Study. Retrieved 25 Feb 2021, from https://www.futureproof.org.nz/assets/FutureProof/H2A/Waters/Final-Metro-Area-Wastewater-Treatment-Feasibility-Study_with-Appendices.pdf

[19] Wastewater Treatment Assumptions for Waikato Metro Wastewater DBC, August 2020, included in Appendix C, Preferred Option Technical Report, September 2021.

[20] *Following the outcomes of the long-list assessment completed for this DBC, Fonterra re-commenced their investigations and resource consent application process to pursue a standalone solution for the Hautapu plant. In early 2022 Fonterra secured long term discharge consents for a standalone solution.*

Option	Description
	and environs, Cambridge, Mātangi, Tamahere Hub, Ohaupo and a portion of south Hamilton. Te Awamutu and Tauwhare Pā will continue to operate as standalone plants but will undergo upgrades. Pukete will service flows from Te Kowhai and Ngaaruawaahia. Fonterra Hautapu would be serviced by a new stand-alone plant.
Option 2B	Option 2B includes all interventions outlined in Option 2A. However, this option variation assumed Fonterra flows would be serviced by the proposed new Cambridge facility.
Option 3A	All northern communities will be serviced by a northern plant located at Pukete and southern communities will be serviced by a new southern centralised facility to be built at the Cambridge site. The new southern facility will service growth at the airport area and environs, Cambridge, Mātangi, Tamahere Hub, Ohaupo and a portion of south Hamilton. Te Awamutu and Tauwhare Pā will continue to operate as standalone plants but will undergo upgrades. Pukete will service flows from Te Kowhai and Ngaaruawaahia. Fonterra Hautapu would be serviced by a new stand-alone plant.
Option 3B	Option 3B includes all interventions outlined in Option 3A. However, this option variation assumed Fonterra flows would be serviced by the proposed new Cambridge facility.
Option 4A	A new southern facility will be built near the airport to service flows from the airport area and environs, Mātangi, Tamahere Hub and Ohaupo. Pukete will service flows from Te Kowhai and all of Hamilton. This option will also include upgrades to the existing plants at Ngaaruawaahia, Te Awamutu, and Tauwhare Pā and a new plant at Cambridge. Fonterra Hautapu would be serviced by a new stand-alone plant.
Option 4B	Option 4B includes all interventions outlined in Option 4A. However, this option variation assumed Fonterra flows would be serviced by the proposed new Cambridge facility.

Each of the longlist options were then assessed using a project specific MCA framework. This framework measured longlist option performance against the project investment objectives and critical success factors confirmed in the previous strategic case phase of this project.

3.3 Longlist options MCA assessment summary

A summary of the longlist option MCA results is in Table EC - 5.

Initial assessments were undertaken individually by project team members. The project team members include civil and wastewater engineers, environment scientists, planners and economists. Moderation workshops were then held with the project team members to agree on the initial assessments and to document the rationale behind the scoring. The initial assessments were then workshopped with project partners and stakeholders for review and feedback before being finalised.

Results show both Option 2A and Option 3A as the highest overall scoring options. The rationale for the scoring is detailed in the Long List Options Assessment report (Appendix A: Long List Options Report).

Table EC - 5: Longlist Option MCA summary

OBJECTIVE CRITERIA	Do Nothing	Option 1A (Do Minimum)	Option 1B	Option 2A	Option 2B	Option 3A	Option 3B	Option 4A	Option 4B
Water Quality - TN and TP	-3	3	2	3	2	3	2	3	2
Water Quality - E. coli	-2	2	2	2	2	2	2	2	2
Water Quality - Public health	-1	1	1	1	1	1	1	1	1
Aquatic Ecology	-2	1	1	1	1	1	1	1	1
Terrestrial Ecology	0	1	1	1	1	1	1	1	1
Discharge location	Not scored at this time								
River vs land discharge	Not scored at this time								
Cultural Connectivity	Not scored at this time								
Access to river	0	1	1	2	2	2	2	1	1
Water reuse potential	0	1	0	3	2	2	1	1	0
Carbon neutral potential	0	-1	0	1	2	1	2	-1	0
Flexible and adaptable	-3	1	0	3	2	2	1	1	0
Meeting growth	-3	2	2	3	3	3	3	2	2
CRITICAL SUCCESS FACTORS									
Constructability (treatment)	0	-2	-3	-1	-2	-2	-3	-2	-3
Constructability (reticulation)	0	0	-1	-2	-3	-2	-3	-1	-2
Operability (treatment)	0	0	-2	1	0	1	0	0	-2
Operability (reticulation)	0	0	0	-2	-2	-3	-3	-1	-1
Land impacts	Not scored at this time								
Community acceptability	Not scored at this time								
Consentability opportunities and risks	-4	-3	-3	-1	-2	0	-1	-2	-3
Resilience	-2	1	0	0	-1	0	-1	1	0
Funding Potential	0	-2	-1	1	2	1	2	0	1
	3	2	2	-2	-2	-2	-2	0	0
COSTS									
Capital costs ($m)		$481	>$481	$588	>$588	$612	>$612	$494	>$494
Operational costs ($m)		$30.2	>$30.2	$30.8	>$30.8	$30.7	>$30.7	$30.6	>$30.6

A number of MCA sensitivity assessments were completed to support the long-list assessment process. The sensitivity assessments applied different weightings to the criteria. The approach and outcomes of the sensitivity assessments are documented in the long list report (Appendix B). The Do-Nothing option was deemed to have a fatal flaw in relation to the ability to consent the option due to water quality issues and

performance of WWTP against current and future standards. The Do-Nothing option was retained as a comparator.

Option 1A performed lower than Option 2A and Option 3A for the objectives but had comparatively better scores for a number of the critical success factors. The relative merits of Option 1A compared to Option 4A are discussed below.

Option 2A was the highest performing option and shortlisted under the MCA scoring process. The benefits associated with building a new plant on a new site were considered to outweigh the risks involved in consenting and approving a new site. A new site offers the opportunity to masterplan a treatment facility to achieve the greatest long-term operational efficiency and provide flexibility to adapt to changes in demand over time, technology advances and resource recovery opportunities. A central location between Cambridge and Hamilton South reduces the length of large diameter conveyance pipework and allows for greater development opportunities when compared against Option 3A.

Additionally, a new location south of Hamilton is closer to the airport industrial area. This area has significant industrial growth potential, providing greater opportunities for industrial water reuse.

Option 3A (building a sub-regional plant on the Cambridge site) was the second highest scoring option. This option utilises the site of the existing Cambridge WWTP which is already consented for this type of land use and as an existing discharge location, however was not identified for the shortlist because of the following issues:

- Requires long conveyancing/pumping lengths from Peacocke and south Hamilton
- Constructing on an existing site that includes expansive, low intensity process units, whilst trying to keep the existing plant operational is logistically difficult. It will require additional time and strict planning during construction
- Limited space on the existing Cambridge site will make it very difficult to masterplan the site efficiently and respond to changes and growth
- Whilst located within an industrial precinct, significant residential development is occurring around the precinct. Reverse sensitivity may become an increasing challenge into the future.
- There are geotechnical risks on the existing site, particularly the potential for lateral spread during construction and consequential impact on the river.
- If geotechnical, master planning and other space constraints around operational logistics dictate a move to partial siting on adjacent land (e.g., the quarry site), designation work will be required to provide for the expanded site.
- There is limited ability to reuse any of the existing assets at the Cambridge site.

Both Option 1A and Option 4A performed lower than Option 2A and Option 3A for the objectives but had comparatively better scores for a number of critical success factors. A modified Option 4A was recommended for short listing and refinement.

For comparative purposes, it was agreed that further development of an option that contained aspects of the current servicing arrangements be carried through to the shortlisting stage. Option 4A was considered more appropriate than Option 1A for the following reasons:

- For the Northern Metro Area (from North Hamilton region to Taupiri), the servicing of Te Kowhai through the Pukete WWTP is considered more practicable than building a new plant at Te Kowhai for whole-of-life cost and efficiency reasons. A new plant for Te Kowhai would very likely require a new site. It would also place a high rating burden on a small community to invest in a high-quality plant (to meet appropriate water quality standards). It is recommended that the Northern Metro Area pursue Option 4A

over Option 1A. Conveying Te Kowhai to Horotiu and then onto Ngaaruawaahia is a considerably longer distance than conveying directly to Pukete WWTP.

- For the Southern Metro Area (from south Hamilton to Te Awamutu), it is proposed that a new plant (south of Hamilton) is master planned to allow for the inclusion of Mātangi, Tauwhare, and Ohaupo. However, conveyance from these communities should only be considered when flows are large enough to avoid excessive retention times. Within the short to medium term, both Mātangi and Ohaupo will continue to operate as per BAU with Mātangi investing in short to medium term improvements in its standalone plant. The connection of Ohaupo is not expected to be needed until at least 2050. Developer interest within these areas may trigger the inclusion of the communities to a more centralised plant sooner. At this stage it has been assumed that these communities would connect to a centralised plant in 2050
- This approach also allows for the potential to stage centralisation in the future and is flexible enough to adapt to changes and development opportunities as they occur.

Fonterra options:

The MCA shows that the benefits of servicing Fonterra through a municipal system *do not* outweigh the risks. The key risk of including Fonterra options into any municipal service relates to the risks of liability and additional consequences of an operational failure. It would also likely increase the footprint of a new plant.

These risks are most significant when considering the inclusion of Fonterra with a standalone Cambridge plant. Servicing Fonterra through a sub-regional facility is likely to have lower operational risk than if serviced through a Cambridge standalone facility.

It was acknowledged during the long list options assessment that inclusion of Fonterra flows could potentially improve the ability to use advanced biosolids recovery technology. This would have the potential to partially offset the operational costs for the plant (and support moves toward achieving energy neutrality).

However, it is considered unlikely these benefits will offset the costs and risks associated with the options including Fonterra. It was agreed with all parties (including Fonterra) that the servicing solutions and short list options would not include Fonterra.

Following the outcomes of the long-list assessment Fonterra re-commenced their investigations and resource consent application process for pursue a standalone solution to meet their needs. In early 2022 Fonterra secured long term discharge consents for a standalone solution.

3.3.1 Long List Assessment Outcome Summary

The recommended shortlist options following the long-list options assessment are provided in more detail in the next section and summarised below as being:

- **Do Nothing** (for comparative purposes).
- **Option 2A - Three Plant Option** – Involves upgrades and expansion of the Pukete WWTP to service the Northern Metro Area (including Taupiri, Ngaaruawaahia, Te Kowhai, Horotiu and majority of Hamilton); a new southern plant to service the Southern Metro Area (including Hamilton South, airport area and environs, Cambridge) and the Te Awamutu WWTP.
- **Option 4A - Five Plant Option** – Involves treatment plant upgrades at Ngaaruawaahia, Pukete, Cambridge and Te Awamutu and a new southern plant to service the airport area and environs.

Option 2A was recommended for the shortlist. It was the highest scoring option from the raw MCA assessment and the MCA sensitivity assessments. The benefits associated with building a new plant on a new site were considered to outweigh the risks involved in consenting and approving a new site.

Option 4A was recommended for shortlisting over 1A, as servicing the smaller communities collectively (e.g. Mātangi, Airport) or via existing municipal facilities (e.g. Te Kowhai) is considered more pragmatic and efficient than having many smaller plants. This option also has the potential to deliver more cost-effective and resilient solutions, offered the ability to stage investment and could enable a transition to include a larger a sub-regional WWTP in the future.

The sensitivity tests are detailed in the Long List report (Appendix A) and did not change the relative assessments or selection of the options for short listing.

4. Shortlist option development and assessment

4.1 Introduction

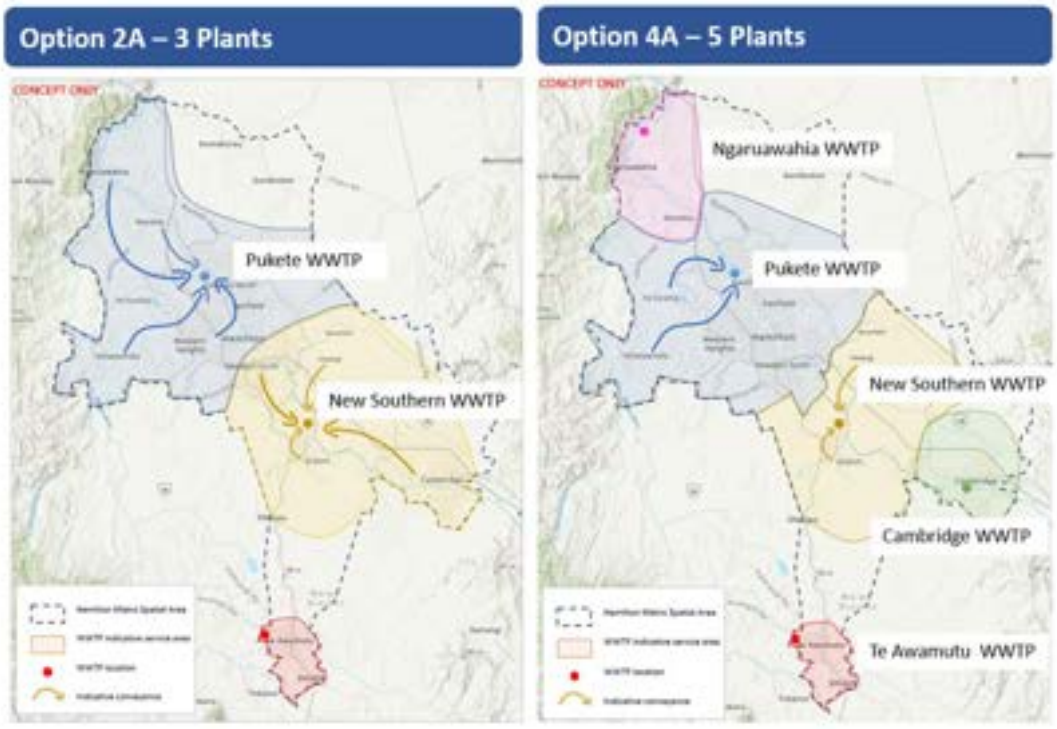
Between October 2020 and February 2021 all three shortlist options were subjected to detailed assessments against the MCA criteria, with results used to inform the selection of a preferred option.

A preliminary shortlist option assessment occurred in October- November 2020, followed by a more robust re-assessment in February 2021. This was based on more detailed information being available, including the capacity assessment of the Pukete WWTP outlined in section 4.1.1 below.

The shortlist assessments are summarised in Section 4.2 and are provided in full in the Shortlist Options Report included in Appendix B.

The service areas of the short-listed options are in **Error! Reference source not found.** below and are diagrammatic.

Figure EC - 3: Diagrammatic Overview of Short-listed Metro Area Wastewater Servicing Options



4.1.1 Pukete WWTP capacity assessment

An assessment of the Pukete wastewater treatment plant's build out capacity (space requirements) was undertaken by Beca in February 2021 and documented in the Pukete Buildout Capacity Review Memorandum[21].

This work has confirmed the Pukete site has sufficient space available to construct processes for predicted demand to at least 2061[22] (See

below). This assessment assumes:

- Conversion of treatment processes to MBR to achieve the necessary performance standards.
- Installation of additional treatment capacity to service growth.
- Expansion of the plant is limited to the existing footprint.

Achieving additional capacity and improved discharge standards at Pukete will require considerable investigation and investment. The requirements are being considered in more detail as part of the Northern Metro Wastewater DBC. Some existing assets at Pukete WWTP are reaching the end of their lives and require renewal. Treatment process changes will need to consider how both new assets and renewals could be staged and practically implemented.

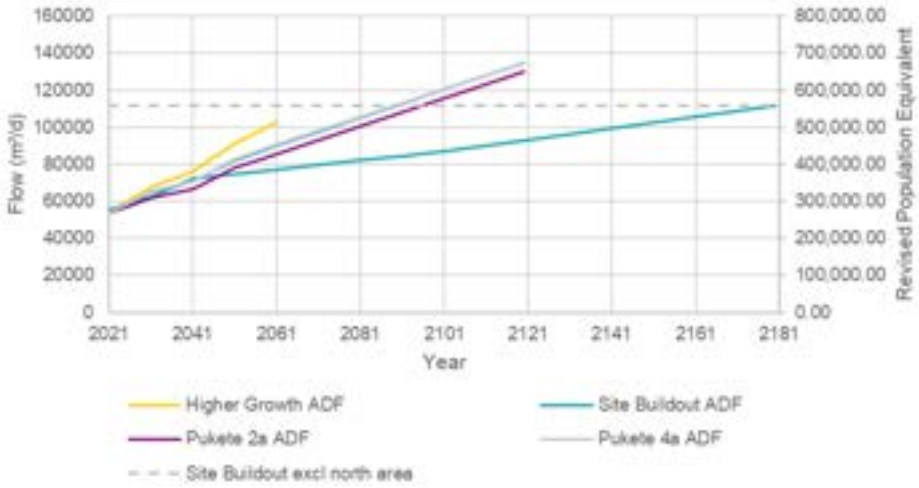
The capacity of Pukete WWTP and timing of upgrades has an influence on the ability to service the Hamilton urban area and therefore the requirements and timing of a Southern Sub-Regional WWTP to service the southern areas of Hamilton.

Alternative technologies will need to be considered for Pukete WWTP such as enhanced primary sedimentation, MABR, Anammox and advanced sludge processes to meet performance standards and resource recovery aspirations. The MBR process will require either additional network or onsite peak wet weather flow (PWWF) attenuation to reduce the amount of influent needing to be treated during peak periods.

[21] Included as Appendix C in the Short list Options Report (which is Appendix B of this report)

[22] This date assumes that the build out of the site is limited to the current plant footprint, and that growth may occur faster than the base population and growth assumptions used for this DBC. Note that the base assumptions do not specifically provide for the level of growth contemplated through recent policy reforms such as the NPS-UD or the RMA Housing Supply Amendment Bill. The implications of these reforms and accelerated growth could result in Pukete site capacity being built out and expended earlier than predicted and bring forward the need to divert flows to a new plant.

Figure EC - 4: Pukete WWTP Flow Projections



4.2 Shortlist option descriptions

The short list options are described below.

Option 1: Do Nothing - has been brought forward for comparative purposes. This option includes:

- Ngaaruawaahia WWTP continues to service:
  - Hopuhopu
  - Horotiu
  - Ngaaruawaahia
  - Taupiri
- Hamilton (Pukete Plant) continues to service:
  - Hamilton (north)
  - Hamilton (south)
  - Te Kowhai
- Hamilton airport industrial area– as current (ad-hoc on-site servicing)
- Mātangi – continue current local WWTP
- Ohaupo – continue on-site servicing
- Cambridge WWTP continues to operate
- Te Awamutu/Kihikihi (standalone plant) to be upgraded as planned

Option 2A: Three Plant Option – The treatment plant locations, and areas of service for each along with the key conveyance routes developed for this option are shown in Figure EC - 5:. This option consists of the following three main WWTPs as described below:

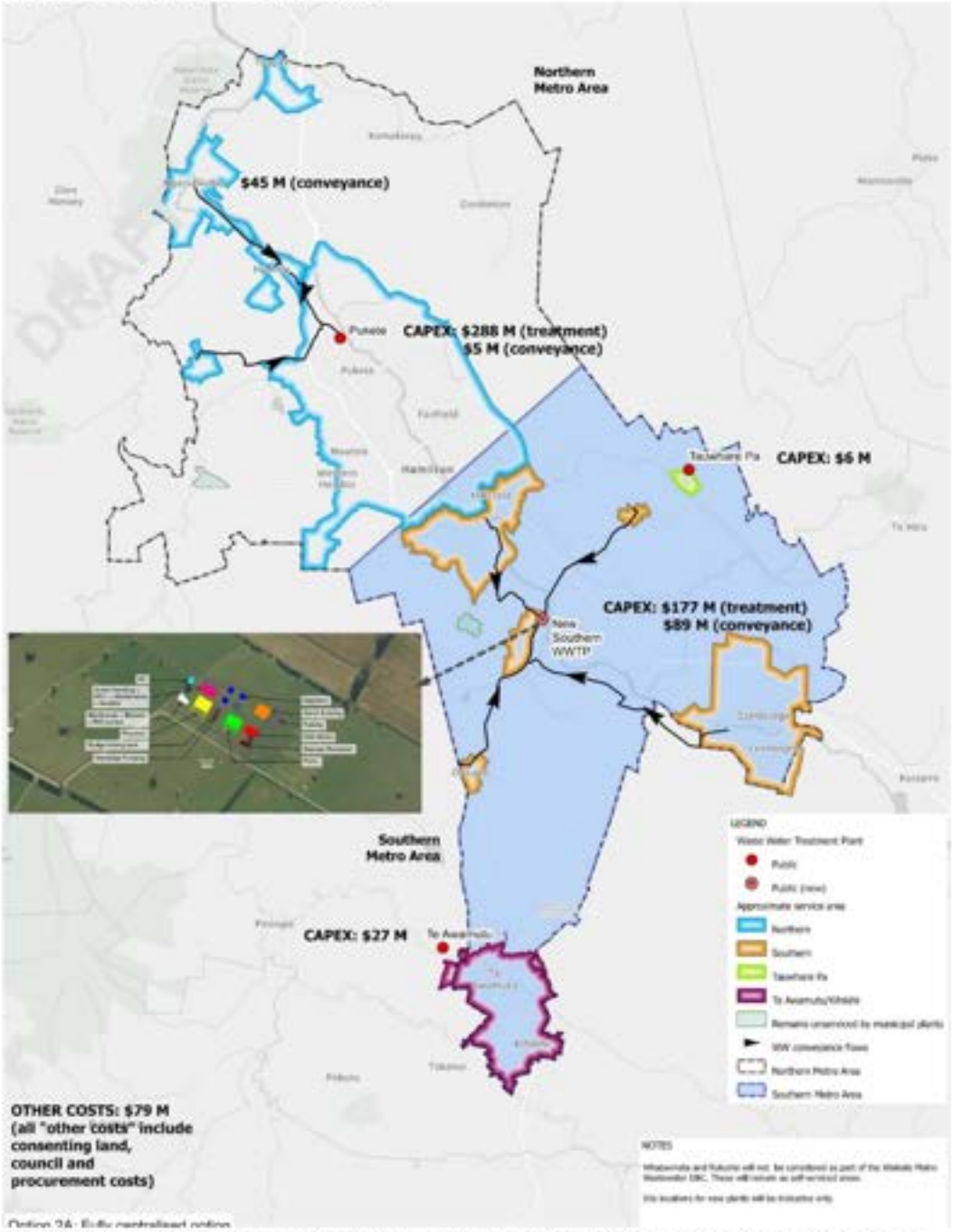
- Pukete WWTP as the centralised northern plant to service northern communities
  - Hamilton (North)

  - Hopuhopu
  - Horotiu
  - Taupiri
  - Te Kowhai.
- One centralised southern plant to service the southern communities (plant located south of Hamilton)
  - Cambridge
  - Hamilton Airport industrial area and environs
  - Hamilton (South)
  - Matangi
  - Ohaupo.
- Te Awamutu/Kihikihi (standalone plant) to be upgraded

For the purpose of the assessment, it is assumed Tauwhare Pā will continue as a small standalone plant.

The longlist assessment identified Option 2A as the most preferred technical solution under various weightings and sensitivity assessments (excluding a detailed cost assessment). This option provides the flexibility to masterplan an efficient facility on a new site, take advantage of water re-use and waste-to-energy opportunities due to its size and scale. Some benefits of this option are related to a centralised location between Hamilton and Cambridge. The reticulation alignment and cost may change depending on the location of the site. For the purposes of this assessment, it has been assumed the site is as shown in Figure EC - 5:.

Figure EC - 5: Option 2A – 3 Plant Option



OPTION 4A: Five Plan Option - This option is shown in Figure EC - 6 consists of the following five main plants:

- Ngaaruawaahia standalone plant to service:

- Hopuhopu
- Horotiu
- Ngaaruawaahia
- Taupiri.

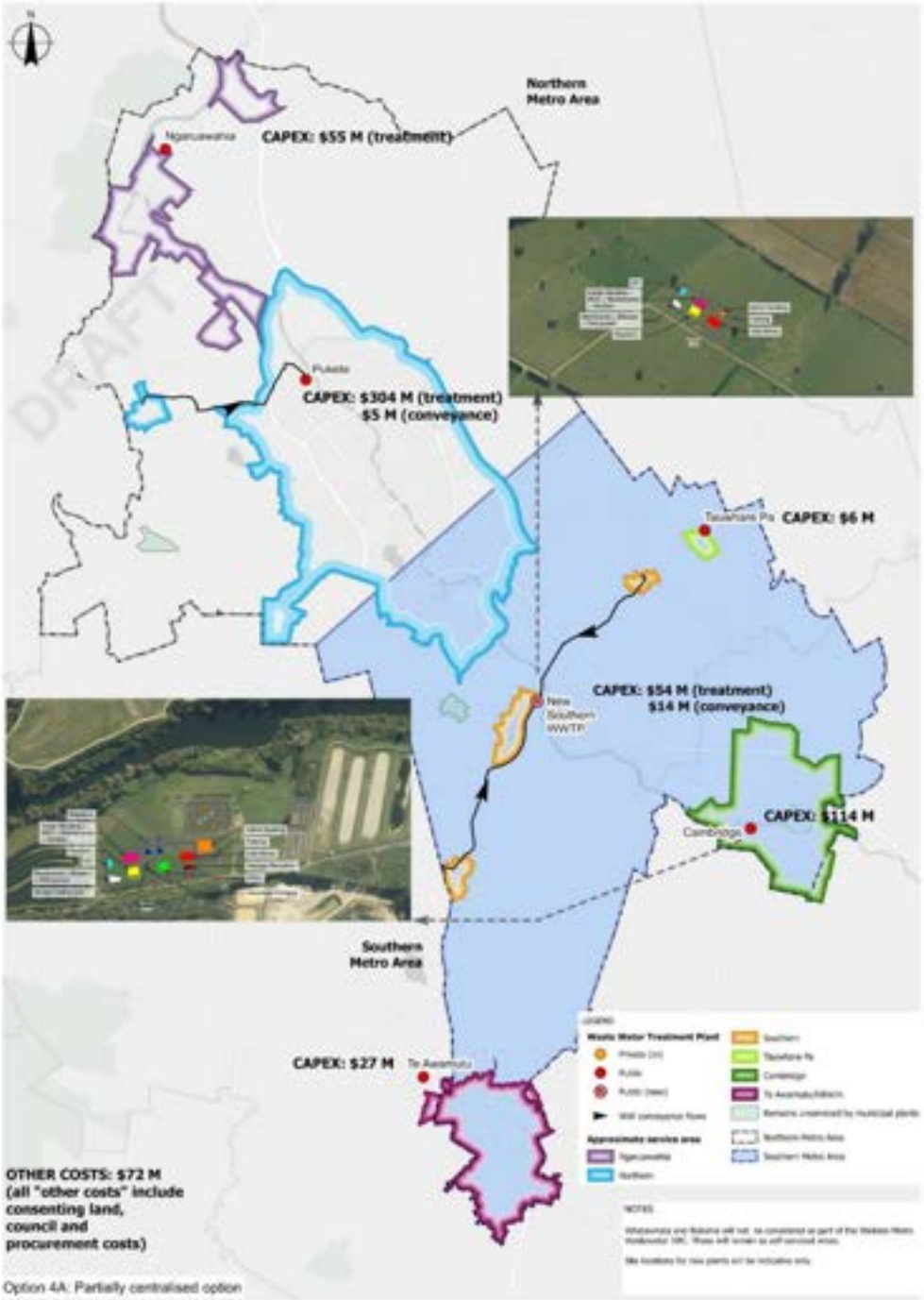
- Hamilton (Pukete Plant) to service:
  - Hamilton (north)
  - Hamilton (south)
  - Te Kowhai.
- Southern plant to service small southern communities (plant located south of Hamilton):
  - Hamilton Airport Business Zone
  - Mātangi
  - Ohaupo.
- New plant at Cambridge (standalone plant)
- Te Awamutu/Kihikihi (standalone plant) to be upgraded

As with Option 2A, for the purposes of the long-list assessment, it is assumed Tauwhare Pā will continue as a small standalone plant which will be upgraded.

This option consists of seven plants in total to service the Waikato Metro Area (refer to Figure EC - 6). A new southern plant to service the airport area will be master planned to cater for Mātangi, Tauwhare and Ohaupo. If selected as the preferred option, it can be refined over time to allow for growth. In the interim, the Mātangi plant is likely to require short to medium-term upgrades.

It is also expected that the connection of Te Kowhai to Pukete is more economical than building a new plant in Te Kowhai. This connection is likely to be required in the next 10 years. This option also assumes existing council boundaries.

Figure EC - 6: Option 4A – Five Plant Option



Common assumptions: Option 2A and Option 4A

Both shortlist options 2A and 4A assume the smaller communities of Mātangi and Ohaupo will be serviced by a new southern sub-regional WWTP, while the Tauwhare Pa WWTP will remain a stand-alone. The rationale informing these shortlist option servicing assumptions for Mātangi, Ohaupo and Tauwhare Pā is in Table EC - 6.

Table EC - 6: Option 2A and Option 4A – Smaller Settlement Servicing Assumptions

Settlement / catchment	Servicing solution	Rationale
Mātangi	Transfer to southern sub-regional WWTP	Limited land available for expansion of WWTP. Current compliance issues for WWTP. Opportunities for more dense development around Mātangi Village and to include Tamahere commercial hub on route to southern sub-regional WWTP.
Ohaupo (from 2051)	Transfer to southern sub-regional WWTP	Limited well-drained land available for on-site systems. Potential impacts of on-site systems on sensitive environments e.g., peat lakes. Opportunities for more dense development.
Tauwhare Pā a	Stand alone	Small flows would be difficult to transfer without septicity issues. Low level of certainty around growth. Land likely to be available/suitable for expansion of existing WWTP.

These smaller catchment shortlist option servicing assumptions were further tested and refined at the preferred option stage.

4.3 Shortlist Options Assessment

Between October 2020 and February 2021 all three shortlist options were subjected to detailed assessments against the MCA criteria, with the results used to inform the selection of a DBC preferred option. A preliminary shortlist option assessment occurred in October- November 2020, followed by a more robust re-assessment in February 2021 based on more detailed information being available. Assessments were undertaken by the project team including technical specialists with inputs from stakeholders and project partners.

Work on the Management, Commercial and Financial Cases of this DBC was carried out concurrently. This work informed some of the assessments such as the Net Present Value, constructability, operability and resilience assessments.

A summary of the shortlist option MCA assessment results are in Table EC - 7 and Table EC - 8. The tables show the 'scores' of each option against each investment objective and critical success factor criteria. Initial assessments were undertaken individually by project team members. The project team members include civil and wastewater engineers, environment scientists, planners and economists. Moderation workshops were then held with the project team members to agree on the initial assessments and to document the rationale behind the scoring. The initial assessments were then workshopped with project partners and stakeholders for review and feedback before being finalised.

Sensitivity tests of the MCA assessment were completed, as detailed in the Short List report (Appendix B) and did not identify any notable influence on the Preferred Option Selection. The MCA assessments provided a method to systematically evaluate the short-listed options against agreed objectives. Preferred option selection also considered financial implications, risks and opportunities associated with each of the options. The key points of difference between the short-listed options are described in the following section

(Section 4.4) as well as the Shortlist Report (Appendix B). The recommended preferred option was identified on the balance of outcomes from the options assessments as a whole rather than the highest total MCA score.

Table EC - 7: Shortlist Options MCA Investment Objective Summary of results

OBJECTIVE CRITERIA		Do Nothing/BAU	Option 2A	Option 4A
Water Quality	To what extent does the option reduce the level of Nitrogen, Phosphorus, Nitrates and Ammonia in the quality of the discharge?	-3	3	3
	To what extent does the option reduce the E.coli levels of the discharge to the river?	-2	2	2
	To what extent does the option reduce the risk to public health? Measure by assessing risks associated with contamination of groundwater and the location of the discharges. E.coli has been captured above	-1	1	1
Ecology	To what extent does the option impact or improve river ecosystems and hydrology	-2	1	1
	To what extent does the option provide the ability to improve vegetation coverage around riverbed and terrestrial ecosystems? - This will only be applicable if we are including potential riparian areas as part of the options? This may have to remain very high level for now	0	2	1
Cultural Connectivity / Relationship	What potential is there for land discharge vs water discharge (How much does the option reduce the discharge to the river?)			
	To what extent does this option enhance and restore cultural connectivity with the river?			
	To what extent does the option increase the opportunity to improve the number of access points to the river and/or other waterways, lakes and wetlands? - measure by considering the potential to rehabilitate existing sites/riparian activities of options/location of site	0	2	1
Sustainable Technology	To what extent does the option allow for water reuse?	0	3	1
	To what extent does the option consider energy and carbon neutral technologies? To what extent do options reduce relative operational carbon associated with conveyance system?	-1	1	1
Sustainable Growth	To what extent does the option provide flexibility to adapt to growth and land use changes?	-3	1	2
	To what extent does this option provide additional growth opportunities which align with the sustainable and planned future growth of the Waikato Metro area?	-3	1	2

Table EC - 8: Shortlist Options MCA Critical Success Factors (Consenting and Implementation) Summary of results

CRITICAL SUCCESS FACTORS CRITERIA		Do Nothing/BAU	Option 2A –	Option 4A
Constructability (treatment)	What are the relative constructability benefits, issues and risks (available space, access, existing utilities, watercourse, rail crossings, reinstatement requirements, Geotechnical impacts, utility impacts, road and traffic impacts)	-1	-1	-2
Constructability (conveyance)		0	-2	-1
Operability (treatment)	What is the relative ease or difficulty of operation and maintenance (includes access, odour treatment, resource availability, monitoring, etc.)?	0	2	0
Operability (conveyance)		0	-2	-1
Consentability risks – land use and designation	To what extent will the option require consents for a new site (that require land use consent)??	0	-2	-1
Consentability risks - Discharge	To what extent will the option have discharges that are likely to meet discharge parameters acceptable to the consent authority	-4	-1	-2
Resilience	To what extent will the option provide resilience against potential failures, climate change impacts, natural hazards and labour skill.	-2	0	1

It should also be noted that the Do-Nothing Option was fatally flawed as it is considered un-consentable but has been included for comparative purposes.

4.3.1 Shortlist Option Assessment – Investment Objective Differentiators

Some of the specific and key differentiators between Option 2A and Option 4A outlined below.

Ecology – Terrestrial Ecosystems

Whilst both options will consider riparian vegetation and rehabilitation of the natural ecosystems, Option 4A assumes individual councils will continue to act independently. This reduces the pool of resources and potentially the scale of these projects. Option 4A (score of 1) therefore has a lower score than Option 2A (score of 2).

Cultural Connectivity / Relationship - Access to the River

Option 2A (score of 2) provides the ability to provide improved access through pathways and dual-purpose pipelines and also allows for the opportunity to repurpose the current Cambridge WWTP site. Under Option 4A (score of 1) councils will operate more independently and it is assumed there will be less opportunity to develop access to the river.

Sustainable Technology – Water Reuse

Option 2A (score of 3) by its nature has a large, centralised facility which provides a far greater opportunity for water reuse than Option 4A (score of 1). Option 2A would potentially be able to reuse water at an industrial scale rather than for irrigation. This would be possible under Option 4A.

Flexibility

Option 2A (score of 1) requires greater levels of intervention to re-distribute wastewater from the southern suburbs of Hamilton to the proposed sub-regional plant in the near future. It is also more difficult to stage to meet current projected growth under high growth scenarios. Option 4A (score of 2) has the flexibility to adapt to changing demand. Stages can be delayed or accelerated to meet needs including accommodating wet industry in the medium-term if required.

Sustainable Growth

The funding level required to implement Option 2A (score of 1) would have made subsequent changes to meeting the demand changes across the sub-region more difficult. This is due to the large initial outlay from councils. The funding requirements of Option 4A (score of 2) are comparatively lower than Option 2A; thus access to funding to respond to land use changes will be comparatively easier.

4.3.2 Shortlist Options Net Present Value Assessment

During the long list assessment, a score was applied to each option under the 'funding potential' criteria. This assessment was replaced by the Net Present Value Assessment used in the decision-making process.

The Net Present Value (NPV) assessment identified that Option 4A had an NPV estimate of -$1,096 million compared with Option 2A (-$1,212 million). Assumptions included capital cost inflation of 3%, operating cost inflation of 2%, costs modelled to 2071 and 5% discount rate).

At the time of the Preferred Option decision Option 4A was considered more affordable. It gives project partners the potential to defer capital costs in the first and second decades (2031 and 2041) with a smaller WWTP near the airport or through a different servicing arrangement for this catchment.

Through closer examination of the Preferred Option, further refinements to the capital and operational costs have been undertaken and subsequently NPV calculations have been updated. These updated NPV results for the short list options are in Table EC - 9 below (and are also provided in the Financial Case).

The costs have been discounted using a 5% real discount rate (i.e. no inflation has been applied to costs). The key difference is changing from a Real to a Nominal discounting methodology to align with Treasury's approach. This change in calculation has resulted in a minor differential change between the two short listed options but does not change the rationale for the decision to confirm Option 4A as the preferred option.

Table EC - 9: Shortlist Options – Southern Metro Area Net Present Value

	P50 Capital Costs	Renewal capital costs	Operating costs	Total
Option 2A	($375.5 m)	($9.1 m)	($326.5 m	($711.1 m)
Option 4A	($341.5 m)	($10.3 m)	($314.4 m)	($666.2 m

4.3.3 Other key risk and opportunity considerations

In addition to the MCA assessment there were other key risk and opportunity considerations for the two short listed options. On review, these did not change the options assessment against the criteria. But they were key considerations of the Preferred Option decision-making process. They included:

- **Staging opportunities for the Airport Precinct** - Further analysis identified that the capital cost - 'developer share' for a new wet industry to locate to the Airport precinct in Option 4A would be significantly higher compared to other existing industrial areas in Hamilton. Retaining this area for light industry only, with a much smaller Stage 1 WWTP, would reduce the initial capital and operational cost associated with Option 4A.
- **The risk of lower than planned growth impacts -** If growth is lower than currently assumed[23], Option 4A could better cater for the level of servicing need and the additional capital expenditure required for Option 2A would not be required.
- **Opportunity Cost of Option 4A -** There would be some opportunity cost associated with the selection of Option 4A over Option 2A for refinement as the Preferred Option. This includes more restricted potential wet industry development.

[23]Note: Which includes the additional growth allowance above NIDEA low for HT1, R2, Southern Links and further infill development.

4.4 Preferred option selection

The key outcomes of the shortlist option MCA re-assessment and cost estimate comparisons were:

- Option 4A and Option 2A achieve similar outcomes in relation to the investment objectives and Best for River outcomes
- Option 4A and Option 2A were assessed as having a similar ability to be successfully consented and implemented
- Option 4A had a capital cost estimate[24] of $652 million compared with Option 2A ($716 million[25]). These included capital costs for wastewater plant investments for the Northern and Southern Metro Areas to accommodate projected growth out to 2061. Conveyance networks to new treatment plants as well as consenting, procurement, land purchase, make good and council construction overheads were also included.
- Option 4A was considered to be more adaptable to demand over time with the Southern Sub-Regional WWTP able to be staged overtime. Option 2A whilst able to respond to high levels of growth near the airport is not as flexible as Option 4A which (through refinement and future proofing) would be better able to respond to land use changes (type, space and location of growth) across the sub-region.

Option 4A, subject to significant refinements, was accepted as the Preferred Option of the DBC at the Governance Group meeting on 16th April 2021.

Further information regarding the selection of Option 4A and the refinements proposed to this option are in the Metro Wastewater DBC Preferred Option Memorandum which is an appendix to the Short List Report (Appendix B).

4.4.1 Refinement Opportunities for selected Preferred Option (Option 4A)

The key areas for refinement of Option 4A included:

- The service area (and subsequent infrastructure investment) for the Southern Sub-regional WWTP being modified to include Hamilton South.
- Assuming that wet industrial activities serviced by the Southern Sub-regional WWTP would be deferred until an adequate proportion of municipal wastewater was serviced by the plant.

Updated scoring of Option 4A was not undertaken. The project team was instructed to detail a refined option that met the same standards and outcomes of Option 4A. The refined option needed an improved ability to stage development to meet demand for capital expenditure to occur as the demand occurred.

Development of a refined Option 4A as the Preferred Option included:

- Building a standalone facility to service Cambridge
- Securing a site (c 15 – 20 ha) for a southern sub-regional plant in the vicinity of the airport to meet servicing needs for the Airport area and environs, Hamilton South and beyond as demand necessitates
- Staged development of a new Southern Sub-Regional WWTP to respond to demand including servicing of Hamilton South, and the Airport area and environs.

[24] Capital Cost estimates for WWTP and Conveyance are estimated by Beca and are P50 AACE Class 5 cost estimate; expected accuracy of -30% to +50%. In addition, other costs including procurement, consenting, council resources, land acquisition have also been included and are provided by others.

[25] Total dollars out to 2061 and unadjusted for inflation

- Developing servicing solutions in the vicinity of the Airport area and environs to meet its immediate and short-term needs
- Improved servicing for Mātangi, including consideration of alternative solutions:
    - upgrading the existing Mātangi WWTP and renewing the discharge consent
    - seeking a connection to the existing Hamilton wastewater network (with appropriate upgrades)
    - servicing via a centralised facility
- Improved servicing to meeting growth demand at Tauwhare Pā, including consideration of alternative solutions:
    - Expanding and upgrading the existing Tauwhare WWTP facility as required,
    - Conveying Tauwhare Pā to an upgraded Mātangi WWTP,
    - Connecting to the existing Hamilton system with Mātangi.
- Servicing Ohaupo in the future when need arises, with treatment capacity is in place via the southern facility or at Te Awamutu
- Review potential for servicing Tamahere by conveyance to other WWTPs.

Servicing the Northern Metro communities is being considered as part of Northern Metro Area DBC investigations.

5. Preferred option

5.1 Preferred Option Refinement

Refining the Preferred Option included additional specification and conceptual design of the Southern Sub-Regional WWTP. Specifically, the refinement investigated a staged approach for the Southern Sub-Regional WWTP. This would provide more flexibility to respond to demand and would allow for parts of south Hamilton and southern links to be serviced by this plant in the future. The refined preferred option was confirmed and approved by the Governance Group on the 16th of April 2021.

Sensitivity assessments have been used to further refine and conceptualise the preferred solution including the form, size and staging of conveyance and treatment process components

5.2 Overview of the preferred option

The preferred option for the Southern Metro Area is a refinement of Option 4A and was selected through assessments of the two short-listed options (Option 2A and 4A) risk and opportunity considerations and additional investigations. The two short-listed options for the Northern Metro Area (i.e. conveying all flows to an upgraded Pukete WWTP or upgrading both Ngaaruawaahia and Pukete WWTPs) will be evaluated and a preferred option identified as part of the Northern Metro DBC.

The Preferred Option does address the problems identified in the Strategic Case and the investment objectives as outlined above. The adoption of minimum treatment performance standards across all plants (refer to Section 5.3 below) over time along with other outcomes is critical to this and contributes toward achieving the Water Quality, Ecology and Cultural Connectivity investment objectives.

An overview of the key features of the preferred option (i.e. indicative treatment plant locations and areas served) is shown in Actual demand and timing of servicing from each area will likely vary from the assumptions used in the DBC. The triggers used to inform staging and implementation of the new plant will need to be refined to reflect updates to the Hamilton and Metro Growth Strategies currently under review, and through more detailed assessment of network capacity constraints.

For example, the actual demand from the airport area and environs may be significantly lower than that used for the DBC, which has assumed some wet industrial activity post 2051. The timing and extent of Hamilton (and other areas such as Southern Links Area) diverted to the new plant will likely vary from the assumptions used in the DBC. The diversion may occur much earlier than 2061 and the extent may vary based on growth, network and Pukete WWTP constraints.

It is recommended that demand assumptions are revisited and confirmed as part of implementing the new Southern Sub-Regional WWTP in the immediate- short term.

Figure EC - 7. Specific details of the areas and population are included in Table EC - 10:.

The preferred option for the Southern Metro Area consists of:

- The adoption of minimum treatment performance standards across all plants (refer to Section 5.3 below) over time
- A new Southern Sub-Regional WWTP to service the airport industrial precinct, Mātangi/ Tamahere commercial area and southern Hamilton. Development of the plant will be staged to meet demand. Land discharge is proposed for Stage 1 with a move toward a discharge to water in Stage 2 and beyond as flows increase.
- Retaining and upgrading the Tauwhare Pā WWTP and land discharge to service local growth with the potential to be reticulated to the new Southern Sub-Regional WWTP or HCC network in the future
- A new WWTP at Cambridge with discharge to the Waikato River to meet the long-term needs of Cambridge
- Retaining and upgrading the Te Awamutu WWTP to achieve improved treatment standards and cater for growth. Continued discharge via rock channel to the Mangapiko Stream is assumed
- Improvements to the existing Mātangi WWTP until the wastewater is conveyed to the new Southern Sub-Regional WWTP in around 2040
- Tamahere commercial hub to continue to utilise on-site wastewater treatment and discharge systems until 2040 when Mātangi is diverted to the Southern Sub-Regional WWTP
- Ohaupo continuing with private on-site wastewater systems given there are no known environmental concerns with existing systems and development is expected to continue to be low density

Actual demand and timing of servicing from each area will likely vary from the assumptions used in the DBC. The triggers used to inform staging and implementation of the new plant will need to be refined to reflect updates to the Hamilton and Metro Growth Strategies currently under review, and through more detailed assessment of network capacity constraints.

For example, the actual demand from the airport area and environs may be significantly lower than that used for the DBC, which has assumed some wet industrial activity post 2051. The timing and extent of Hamilton (and other areas such as Southern Links Area) diverted to the new plant will likely vary from the assumptions used in the DBC. The diversion may occur much earlier than 2061 and the extent may vary based on growth, network and Pukete WWTP constraints.

It is recommended that demand assumptions are revisited and confirmed as part of implementing the new Southern Sub-Regional WWTP in the immediate- short term.

Figure EC - 7: Preferred Option Overview – Key features and overview of staging of Southern Sub-Regional WWTP

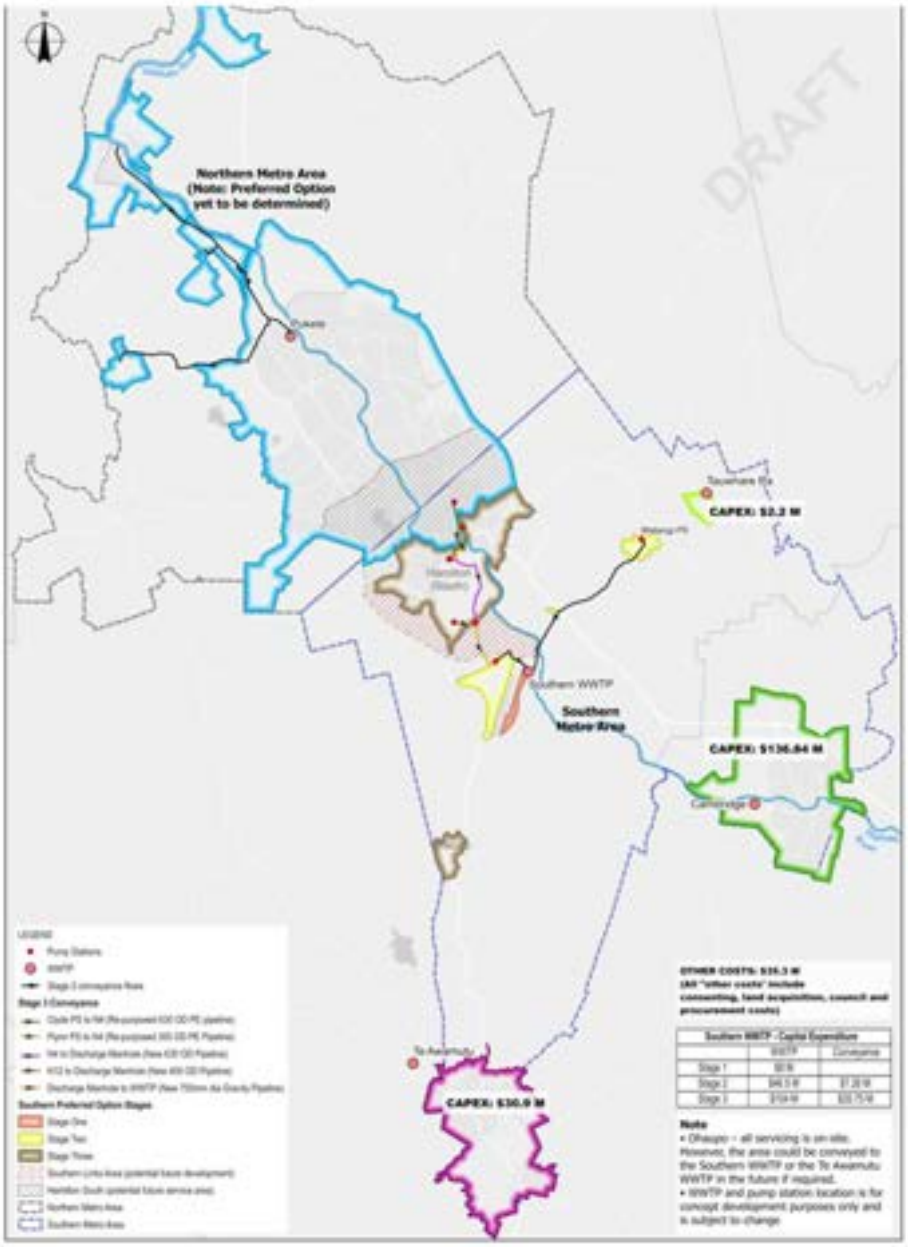


Table EC - 10: Summary of Preferred Option WWTPs, Service Areas and Population Equivalents Served over time

WWTP	Locations served	Population equivalent serviced by capacity available at the following dates					Notes
		2031	**2041**	**2051**	**2061**	**Ultimate**	
Mātangi WWTP	Mātangi Village	150	Transfer to Southern Sub-Regional WWTP				
Tauwhare Pā WWTP	Tauwhare Pā	619	619	619	619	889	2031 projection includes for additional 500 PE at Tauwhare Pā from current estimates. Ultimate includes allowance for Tauwhare Village (270 PE)
New Southern Sub-Regional WWTP	Airport & environs	4,000	6,000	17,852	17,852	17,852	Assumptions are based on ~85 ha of developed dry industrial land being serviced at 2031; ~140 ha of dry industrial land being serviced at 2041. Assumptions includes flows from wet industrial land use from 2051*
	Mātangi/Tamahere	Existing standalone facility	464	464	464	1,035	Includes servicing Tamahere commercial area (does not include Tamahere residential area)
	Hamilton South: Hillcrest, Riverlea, Glenview, Peacocke	Serviced through Pukete WWTP			59,626	75,366	DBC assumes diversion to new WWTP at 2061. Additional PE in "ultimate" horizon is based on infill in these areas from 2020 Metro Spatial Plan
	Southern Links Area	Not Serviced				35,000	Ultimate forecast includes allowance for Southern Links
	Sub-Total	**4,000**	**6,464**	**18,316**	**77,942**	**129,253**	The Stage 3 WWTP can operate from 40,000 Population equivalent demand level
Cambridge WWTP	Cambridge	32,940	37,801	42,892	45,031	57,649	Assumptions includes for flows from wet industrial land use for small area
Te Awamutu WWTP	Te Awamutu	27,989	30,905	34,962	36,001	42,011	
No WWTP	Ohaupo	Not serviced					All servicing is on-site. However, the area could be conveyed to Southern Sub-Regional WWTP or Te Awamutu in future if required

* Wet industrial flow assumptions based on 50 ha (~20% of airport industrial land) producing an addition 2 litres per second per hectare of wastewater flow.

5.3 Treatment Plant Performance Standards

The minimum treated wastewater quality standards adopted are very high. They are based on current best practice and delivering 'Best for River' outcomes which include having a river that is swimmable and safe to gather food from. Minimum performance standards for all treatment plants are in Table EC - 11 and Table EC - 12.

Table EC - 11: Minimum water quality standards for discharges to water

Parameter	Minimum Performance Standards for Discharges to Water
Total Nitrogen	Less than 4.0 milligrams per litre (as annual means)
Total Phosphorus	Less than 1.0 milligrams per litre (as annual means)
Escherichia coli (E.Coli)	Less than 14 cfu per 100 millilitres (as a 95th percentile)
	Noting that the future consents for any water based discharges will likely specify daily limits on nutrient mass loadings based on parameter concentrations and projected discharge volumes.

Table EC - 12: Minimum water quality standards for discharges to ground

Parameter	Minimum Performance Standards For Discharges To Ground
Total Nitrogen	Less than 20 milligrams per litre (as annual means)
Total Phosphorus	No specific limit
Escherichia coli (E.Coli)	Less than 500 cfu per 100 millilitres (as a median)
	Noting that actual parameters will depend on nitrogen and phosphorus loads able to be sustinably discharged to land irrigation systems, and appropriate microbial parameter limits will be dependant on the method and location of discharge to ground.

The treated wastewater quality standards would be introduced by 2031 or when the existing discharge resource consent for each wastewater treatment plant expires. Achieving these targets may need to be staged over time within resource consents to provide sufficient time to upgrade and transition existing plants (i.e., Pukete WWTP) to meet these minimum standards. During any resource consent process the form of the water quality standards will be further refined and may include ranges to take into account normal expected system variation and other location specific factors. These refinements will not degrade the basis and/or adopt a lower water quality standard than that of the adopted standards for this DBC.

For the purpose of completing the DBC, assumptions have been made regarding discharge methods to be employed at each plant. Appropriate discharge methods will need to be considered and evaluated in detail as part of each Project to support resource consenting of any discharge activities.

In order to give effect to Te Ture Whaimana, alongside these quantitative minimum performance standards, further methods will be required to protect the mauri of the water and land from adverse effects. These requirements will need to be determined as part of implementing the Projects.

Appropriate management of solids from treatment processes is an important consideration in any treatment strategy. In line with the agreed treatment performance standards for the Waikato Metro Area, solids management complexity, extent of solids destruction and energy potential realisation will increase in steps with population equivalent served.

Proposed provisions for atmospheric emissions are reasonably general but all would require best practice to be implemented.

In all process plant development, life cycle emissions will be given due consideration. It is anticipated that each council will consider The Climate Change Response (Zero Carbon) Amendment Act 2019 aspirations and optimisation of life cycle emissions generally. These will be drivers for initiatives, particularly in the larger plants, and for processes that drive the plants towards energy neutrality and emissions minimisation.

More detailed information is contained in the Wastewater Treatment Assumptions Memorandum[36] which is included in the Preferred Options Report (Appendix C).

5.4 Conceptualised Treatment Processes

The conceptualised treatment processes adopted for this DBC for the purpose of staging and cost estimating are outlined below in Table EC - 13.

[36] Wastewater Treatment Assumptions for Waikato Metro Wastewater DBC, August 2020, included in Appendix C, Preferred Option Technical Report, September 2021.

Table EC - 13: Treatment Concept Development

Site	Population Equivalent (rounded)	Flow range (m³/d) (rounded)	Liquid Processes	Solids Processes	Discharge
Mitangi WWTP	150	30	Local and communal septic tanks and recirculating sand filter (until 2040). UV if there is a risk of bypass flow	Periodic clean out of septic tanks	Sub-surface drip irrigation to land (until 2040)
Tauwhare P3 WWTP	275	55	Package secondary treatment with land disposal	Periodic clean out of septic tanks	Sub-surface drip irrigation to land
Southern sub-regional WWTP (Airport) Stage 1	2,000-5,000	400 – 1,000	SBR	Transfer thickened sludge to Pukete or Cambridge WWTP	Sub-surface drip irrigation to land
Southern sub-regional WWTP (Airport) Stage 2	5,000-18,000[27]	1,000-3,600	Secondary BNR reactor Membrane separation UV	Screw press dewatering	Discharge to water, wetland restoration and/or reuse. Stage 1 land discharge could continue for part of flow
Southern sub-regional WWTP (Airport) Stage 3	78,000[28]	– 15,500+[29]	Primary Sedimentation Secondary BNR reactor Membrane separation UV disinfection Centrate treatment	Digester[30] centrifuge dewatering	Discharge to water, restoration, or reuse. Stage 1 land discharge could continue for part of flow
Cambridge WWTP	25,000-45,000	5,000-9,000	Primary Sedimentation Secondary BNR Reactor Membrane separation	Digester Centrifuge Dewatering	Discharge to water, restoration or reuse.

[27] WWTP at this stage can operate up to 40,000 Population equivalent demand level, however, DBC demand projections for Southern Sub-Regional WWTP prior to Hamilton South being connected reach a maximum of 18,000 PE.

[28] WWTP at this stage can operate from 40,000 Population equivalent demand level, however DBC assumes that all of the Hamilton South area (Hillcrest, Glenview, Peacocke) will be diverted at the same time in 2061.

[29] This WWTP can be upgraded further by adding additional process units such as reactors and membrane systems as needed to service additional growth post 2061.

[30] The solids stream management ultimately chosen for this population and beyond is likely to be heavily influenced by that ultimately selected for Pukete WWTP.

			UV Disinfection Centrate Treatment Installation of primary sedimentation and digesters could be delayed with extra reactor capacity required		
Te Awamutu WWTP	20,000-36,000	4,000-7,200	Reactor Clarifiers UV	Filter Press (existing)	Discharge to water via rock filter

5.5 Water Discharges

A range of discharge options have been identified as part of the options development and evaluation and is included in Section 3.2.3 of the Shortlist Options Report (Appendix C). For the purpose of this DBC, assumptions have been made regarding discharge methods to be employed at each plant. Appropriate discharge methods will need to be considered and evaluated in detail as part of each Project to support resource consenting of any discharge activities.

5.6 Southern Wastewater Treatment Plant: Staging and Key Considerations

Staged development of the Southern Sub-Regional WWTP is a key element of the Preferred Option. The staging and related demand trigger points have been identified using sensitivity analysis which takes into consideration urban growth across the Southern Metro Area catchment, including demand for wet industry. The timing of the proposed staging can be adjusted to meet these demand changes and is outlined in the Preferred Option Report (Appendix C). The proposed capacity of Stage 1 is based on the extent of land currently developed or consented in and around the airport and is proposed to be operational in Year 5 (2026) to:

- Avoid investment in short-term servicing solutions that do not achieve the agreed investment objectives, including many package treatment plants, or storage and tankering options that do not provide long-term sustainable solutions
- Provide certainty for land use planning and development
- Provide for wastewater reticulation and conveyance systems in and around the Airport that support land development and are compatible with the medium to long-term wastewater servicing solution for the Waikato Metro Area.

Stage 2 upgrades will be triggered by growth and are currently based on servicing future development areas around the Airport precinct and surrounding communities (including Mātangi), and the need for improved treatment and alternative discharge methods. Stage 2 provides for an interim upgrade to provide for wet industrial activity at around 2051.

Stage 3 represents a step-change in capacity and treatment processes to service Hamilton South. Timing of the Hamilton South diversion included in this DBC is based on an assessment of build-out capacity of the Pukete WWTP site. (Refer Section CC for details). However, the timing of the diversion may be required earlier than assumed, due to conveyance network constraints and/or growth occurring at a greater rate than assumed.

Further upgrades will be required as flows increase, for example, if Southern Links areas develop.

A summary of Southern Sub-Regional WWTP staging is provided in Table EC - 13 above, Table EC - 14 and illustrated in Figure EC - 8 below. Servicing catchments and conveyance is detailed further below in Figure EC - 12 and Figure EC - 13.

Table EC - 14: Southern Treatment Concept Staging (note that these are further refined in the Financial Case)

Year	Date	Stage	Description	Assumed Areas Served	Total Stage Built Capacity	Capital Cost Estimate	Starting Demand
1 - 3	2022-2024	Stage 1	Pre-Implementation: Land acquisition, designation, consenting, master planning	Land and designation assumed to serve all stages		$20 m	
3-5	2024-2026	Stage 1	WWTP: SBR with discharge to land including procurement and Council overheads and land discharge extension	Airport precinct (no allowance for wet industry)	1,000 m³/day (5000 PE)	$9.9 m	400 m³/day (2,000 PE)
19 - 21	2040-2042	Stage 2	WWTP & Discharge: MBR with discharge to Waikato River. Includes conveyance from Matangi to plant, outfall pipeline and structure to river, operator building, sludge dewatering facility.	Airport precinct growth (excluding wet industry) and Mātangi/ Tamahere Commercial areas	1,900 m³/day (9500 PE)	$39.6 m assumes all Stage 1 plant can be reused	1,200 m³/day (6,000 PE)
29-31	2050-2052	Stage 2	WWTP Upgrade: Additional reactors and membrane equipment	Airport precinct growth, wet industry and Mātangi/ Tamahere Commercial areas	3,600 m³/day (18,000 PE)	$16.5 m	3,600 m³/day (18,000 PE)
39-41	2060-2062	Stage 3	WWTP: MBR with Energy Recovery (Primary Sedimentation and Digestion) with discharge to Waikato River. Includes conveyance from Southern Hamilton, major increase in treatment capacity.	Airport precinct (with wet industry), Mātangi/ Tamahere Commercial, Southern Hamilton	15,600 m³/day (78,000 PE)	$150.15 m (assumes 60% Stage 2 plant can be reused)	15,600 m³/day

Figure EC - 8: Southern Sub-Regional WWTP Assumed Staging and Capacity (Population Equivalents)

Stage 1 – SBR with discharge to land

Servicing areas

This stage services the airport precinct only and does not have an allowance for wet industry. The areas assumed to be serviced by the Stage 1 Southern Sub-Regional WWTP are shown in Figure CC. Cost of conveyance to the plant is assumed to sit with the developer and is not included in the DBC.

Assumed starting date and plant flow

The plant would be operational in 2026 with 400 m³/day (2,000 PE) operating flows assumed for start-up. Flows less than 400 m³/day could be accommodated, although treatment efficiency would be reduced. Stage 1 can service up to 1,000 m³/day (5000 PE) without further upgrades or expansion.

Assumed configuration

A two tank Sequenced Batch Reactor (SBR) in IDEA configuration, configured for biological nitrogen removal followed by ultra violet (UV) disinfection is proposed for Stage 1. IDEA is a hybrid of SBR and Modified Ludzack Ettinger (MLE) technology. All three are commonly used technologies in New Zealand and are shown in **Error! Reference source not found.** below.

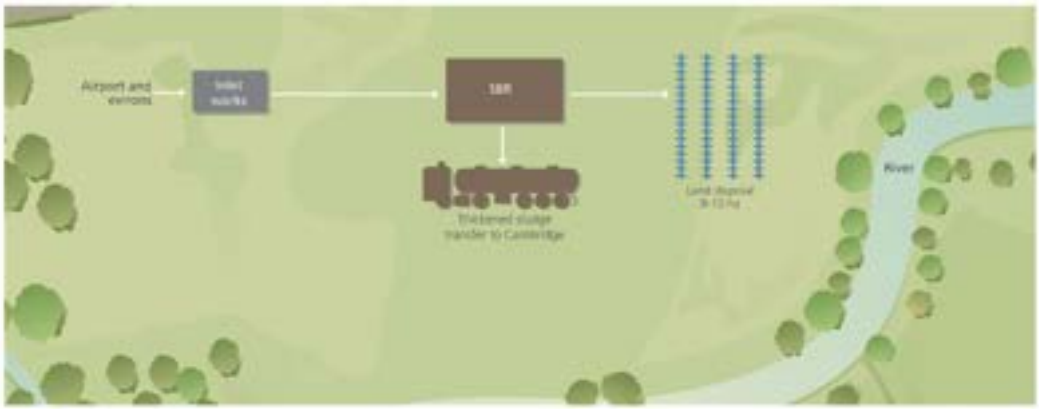
The IDEA plant can cater for a wide range of flows and loads, providing the flexibility needed.

Reactor sizing and zone sizing will be configured with future reconfiguration (to MBR technology) in mind so the reactors can be re-used in future stages.

The decant tank would be sized and shaped for future reconfiguration as a membrane and or flow equalisation tank when the MBR conversion happens.

Discharge to land via sub-surface drip irrigation is proposed for Stage 1. The DBC assumes that 8 -10 ha would be required for sub-surface drip irrigation, and that the irrigation fields would be located on the WWTP site. However, further area may be needed depending on soil conditions and flows. For example, first installing the discharge to land system for up to 500 m³/day then, when necessary, adding incremental blocks of 250 or 500 m³/d capacity. No additional land acquisition beyond that assumed for the WWTP has been included.

Figure EC - 9: Stage 1 Southern Sub-Regional WWTP Configuration



Interim upgrades or additional requirements

No upgrades should be required for this WWTP unless some of the UV modules are omitted to start with.

Theoretical trigger and estimated date to start next stage

Commencement of Stage 2 will be triggered once flows exceed 1,000 m³/day (5000 PE). Based on projections this is assumed to be around 2041. Implementation of Stage 2 will probably require two years. The connection of Mātangi and the Tamahere commercial area is assumed to occur when Stage 2 is commissioned.

Timing of the wet industry growth for the airport industrial precinct has been assumed to occur post 2051.

The current proposed staging provides flexibility as there is no planned wet industry. If wet industry was planned and agreed, the timing of Stage 2 could be progressed earlier to meet servicing requirements. Including wet industry will need to take into account the variability of flows and loads that will occur.

All or part of the land disposal system developed for Stage 1 could potentially be retained for Stage 2.

Stage 2 – MBR with discharge to Waikato River

Servicing areas

Stage 2 services the Airport precinct and Mātangi/ Tamahere commercial areas. The areas assumed to be serviced by the Stage 2 Southern Sub-Regional WWTP, and the conveyance system concept details are shown in **Error! Reference source not found.**. No provision is included for wet industrial activity at the Airport precinct until 2051.

Assumed starting date and plant flow

This stage would be operational in approximately 2041. Starting flows of 1,200 m³/day (6,000 PE) are assumed, however the initial Stage 2 build capacity is 1,900 m³/day. The plant could be down rated by delaying the installation of individual membrane cassettes to match the actual flow growth profile.

Assumed configuration

For Stage 2, it is proposed the original Stage 1 IDEA plant is reconfigured into a Membrane Bioreactor (MBR) treatment plant based on either the 4 or 5 stage Bardenpho activated sludge process (**Error! Reference source not found.**). Stage 2 assumes a discharge to water and therefore requires a higher standard of treatment than Stage 1.

The MBR provides solids separation using membranes (rather than gravity settlement) and in so doing, also essentially removes all bacteria (not viruses) from the effluent.

The membrane configured plant has a significantly higher biomass carrying capacity than a conventional gravity separation plant and so the treatment capacity of a given reactor size is greater as an MBR than as an SBR/IDEA (i.e. a reactor sized for a maximum of 1,000 m³/day ADF, could cater for over 2,000 m³/day in MBR configuration). The number of air diffusers consequently has to be increased to support the increased biomass. The Pukekohe WWTP has recently been reconfigured from an SBR to an MBR treatment plant.

One objective of the transformation from IDEA to MBR is to reuse most, if not all, of the existing infrastructure.

The existing reactors would be provided with additional aeration diffusers with one tank at a time retrofitted. The Stage 1 Decant tank would be configured into the membrane tank and scouring diffusers added. It is possible a portion of this tank could also be configured as the new influent flow equalisation tank.

This new set-up would provide a redundant reactor for a period of time. This would also allow for more rapid diversion south of flows from parts of the southern suburbs of Hamilton City if appropriate.

Figure EC - 10: Stage 2 Southern Sub-Regional WWTP Configuration

Interim upgrades or additional requirements

The staging plan provides for an interim upgrade in 2051 for additional reactor and associated membrane equipment. This upgrade will expand capacity to 3,600 m³/day and allow for servicing of wet industrial activity or additional growth. At 3,600 m³/d, a three-reactor plant would have limited spare capacity but could tolerate limited duration shut-down of one treatment train for maintenance.

Theoretical trigger and estimated date to start next stage

The next stage would be triggered by unexpected growth around the airport or growth in wet industry beyond the capacity of the plant. It may also be triggered if it becomes necessary to divert Hamilton South catchments from Pukete WWTP to the Southern Sub-Regional WWTP. For the purposes of this staging plan we have assumed these triggers would occur in 2061.

Stage 3 – MBR with Energy Recovery (Primary Sedimentation and Digestion) with discharge to Waikato River

Servicing areas

This stage services the Airport precinct (with wet industry), Mātangi/ Tamahere commercial areas and Southern Hamilton (Hillcrest, Riverlea, Glenview and Peacocke catchments). The areas of Southern Hamilton assumed to be diverted to the Southern Sub-Regional WWTP, and the conveyance system concept details, are shown in **Error! Reference source not found.**.

Southern Links area is allowed for at the ultimate stage PE forecasts, but timing is uncertain and has been assumed to be after 2061.

Assumed starting date and plant flow

For the purposes of this DBC it has been assumed that this stage will become operational in approximately 2061. The precise operational start date and flow will most likely depend on the timing and requirements for servicing the Hamilton South catchments.

Nominally, the starting flows for a Stage 3 type have been assumed to be 8,000 m³/d. However, this is very much dependent upon the needs for servicing Hamilton South catchments. A step change to 15,000 m³/day servicing 78,000 PE (464 P/E for Waikato DC, 17,852 P/E for Waipa DC and 59,626 P/E for Hamilton CC) has been assumed based on the available growth projections and the change of Hamilton South catchment flows occurring around 2061.

Assumed configuration

The solution is expected to be a continuation of the MBR configured treatment plant of stage 2 as shown in **Error! Reference source not found.** below with additional:

- Reactor and membrane trains
- Screens and UV modules
- Primary sedimentation and anaerobic co-digestion of primary sludge and waste activated sludge.

Figure EC - 11: Stage 3 Southern Sub-Regional WWTP Configuration

A key risk involves the provision of private infrastructure by the developers in the airport precinct. The level of investment required to deliver, operated and maintain onsite wastewater solutions is significant and will only meet the immediate needs of the individual landowner or developer. There are practical limits to the flows that can be processed through an onsite wastewater solution, and so there is a risk of a proliferation of these types of systems to respond to growth over time. This will increase operating, maintenance and compliance costs and complexity and could result in poorer system performance over time.

Investment in further private infrastructure misses the opportunity to invest in key strategic infrastructure required for the broader Metro Area.

Staged implementation of the Southern Sub-Regional WWTP allows for servicing in the short-term and also provides greater surety and confidence for commercial businesses to develop near the airport in decades to come. It also provides the ability to respond to Hamilton's needs going forward and land use changes in the local area.

A new site or WWTP offers the opportunity to masterplan a treatment facility to achieve the greatest operational efficiency while being able to adapt quickly and easily to growth changes and future demands. A buffer area around the WWTP will be required to mitigate potential visual, odour and noise issues.

5.7 Conveyance

The Preferred Option conveyance consists of the new conveyance infrastructure to connect to current and future reticulation networks to the treatment facilities.

The conveyance infrastructure included in the DBC estimates are the terminal pumping systems (pump stations and rising mains) from the service areas to the southern treatment plant. The costs associated with local or trunk network upgrades or diversions to convey wastewater to the terminal conveyance systems are not included in the financial assessments of the preferred option. Costs of network upgrades needed to service growth within each city/community have not been included either as, in most cases, investment in

upgrading the existing conveyance networks would be required regardless of the wastewater treatment solution.

As the assumed Stage 1 service area (located at the Airport) is near the assumed location of the Southern Sub-Regional WWTP, no strategic conveyance costs have been included for Stage 1. The cost of local reticulation and trunk conveyance infrastructure needed to service the Stage 1 area would sit with developers, not councils.

The assumed Stage 2 service area is shown in Figure 20. The Stage 2 conveyance system estimates include the terminal conveyance system from Mātangi to the Southern Sub-regional WWTP. A new pump station at Mātangi discharging into a 9.7 km 200OD PE pressure main to the new Southern Sub-Regional WWTP (Figure EC - 10) is included.

For the purpose of this DBC, conveyance from Mātangi to the Southern Sub-Regional WWTP is assumed to occur in 2041. However actual connection timing will be triggered by demand. When flows at Mātangi are 3-4 times existing flows there are less likely to be septicity issues in the pipeline. This could be through additional residential or commercial development in the village or by connecting up more of the surrounding area. Tamahere hub could also connect into this pipeline. The cost of the Tamahere hub pumpstation has not been included in the financial assessments of the preferred option.

Figure EC - 12: Assumed Stage 1 and 2 Service Areas and Stage 2 Conveyance details

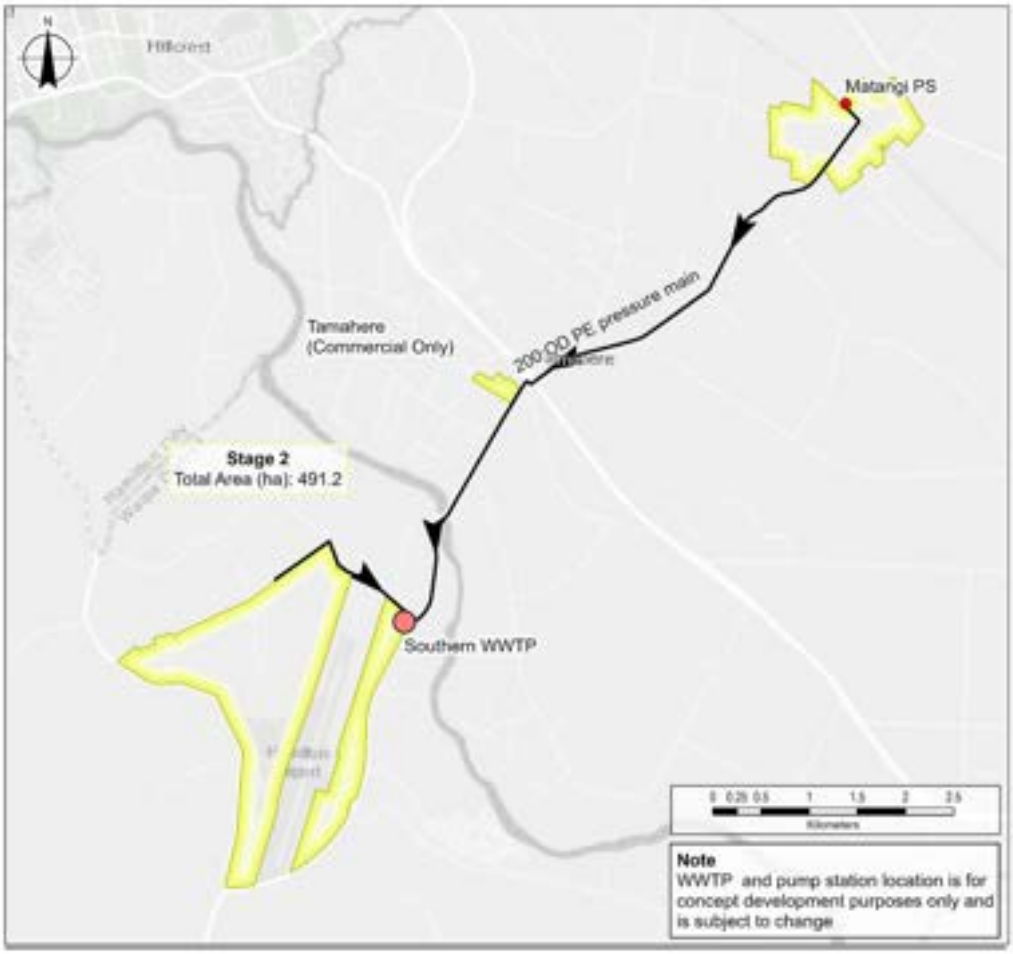
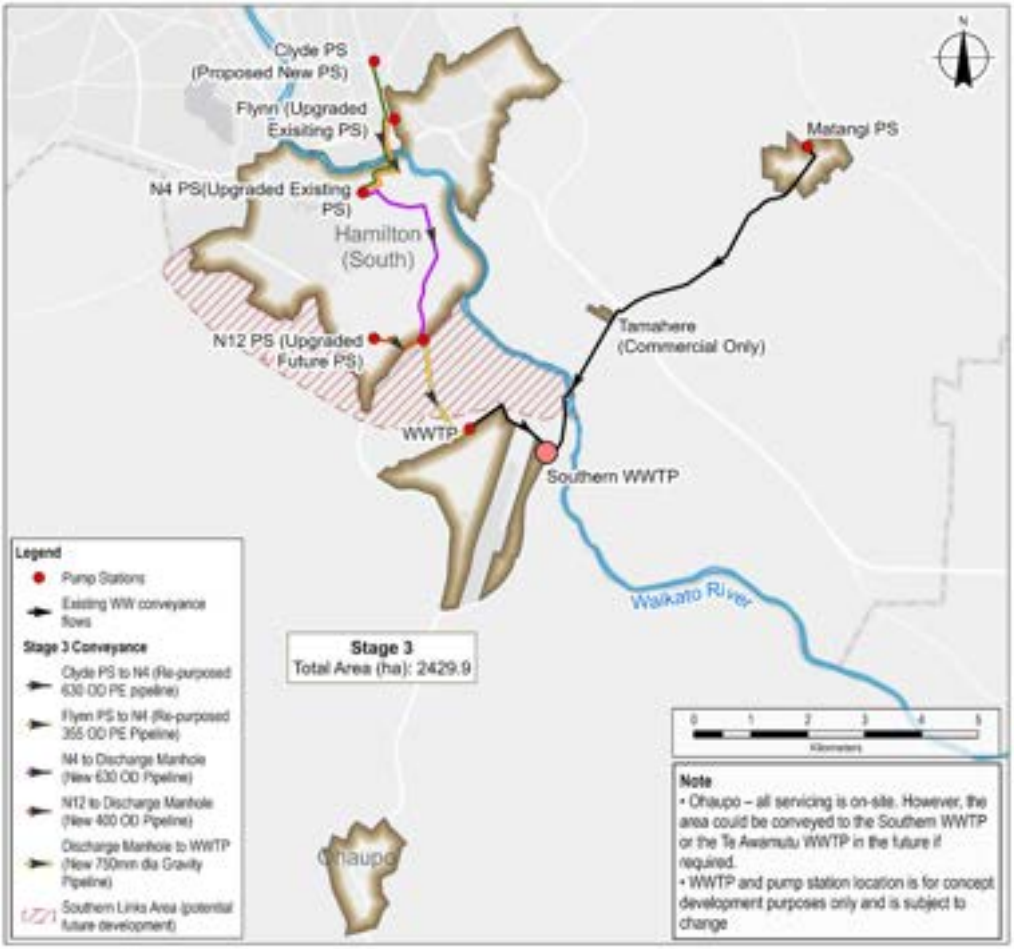


Figure EC - 13: Assumed Stage 1, 2 and 3 Service Areas and Stage 3 Conveyance details



The assumed Stage 3 service area and conveyance system elements included in the DBC are shown in Figure 21 and further outlined in the Preferred Option Report (Appendix C). The Stage 3 conveyance system includes a new pump station at Clyde Street and an upgraded Flynn pump station utilising the Peacocke rising mains in reverse. Both pump stations would pump to the N4 pump station in the Peacocke growth cell. The N4 and N12 pump stations will divert flow through (new or repurposed) pressure mains to the Southern Sub-Regional WWTP. The estimates include for re-purposing the N4 and N12 pump stations as their construction is either underway or funded as part of delivering the Peacocke growth cell. Several local and trunk pump station upgrades and diversions will be necessary to divert the full extent of Stage 3 Hamilton South Area, however these costs have not been included in this DBC.

For this purpose of this DBC diversion of Hamilton South is assumed to occur in 2061. A number of factors will influence the actual timing of the Hamilton South diversion, including the cost of upgrading the Hamilton strategic wastewater network and Pukete plant, versus the cost of conveyance and upgrades to the Southern Sub-Regional WWTP, and the rate and scale of growth in and around Hamilton South.

The Southern Sub-Regional WWTP has been developed to be able to be expanded to meet changing needs and growth across Hamilton and the sub-region. The recommended site footprint for the Southern Sub-Regional WWTP provides for sufficient space to expand the plant to service a larger part of Hamilton in the future if deemed more efficient.

Some initial conveyance concepts for the Southern Links area have also been developed which link in with the conveyance concept for the Peacocke area. The costs of conveyance and plant upgrades to service other parts of Hamilton not outlined above and/or Southern Links area through the Southern Sub-Regional WWTP are not included in the financial assessments of the preferred option.

5.8 Nutrient summary

The following information is summarised from the technical note Wastewater Baseline and Future Nutrient Loads for Waikato Metro Wastewater DBC (Appendix D).

Calculation and comparison of future predicted nutrient (Total Nitrogen (TN) and Total Phosphorus (TP)) mass loads against the baseline nutrient loads from the existing treated wastewater discharges for the southern metro areas has been undertaken. This is to analyse whether the proposed level of wastewater treatment and associated discharges will meet the various policy and statutory requirements, such as Te Ture Whaimana around improving the health and wellbeing of the river. In particular, analysis indicates whether the proposed future discharges (which will likely see an increase in volume discharged) will deliver a reduction in the total nutrient loads discharged to the Waikato River compared to the baseline nutrient loads.

The predicted mass loads from the proposed new Southern Sub-Regional WWTP and the upgraded Cambridge WWTP were considered individually and in combination with each other, and in combination with other Metro WWTP discharges.

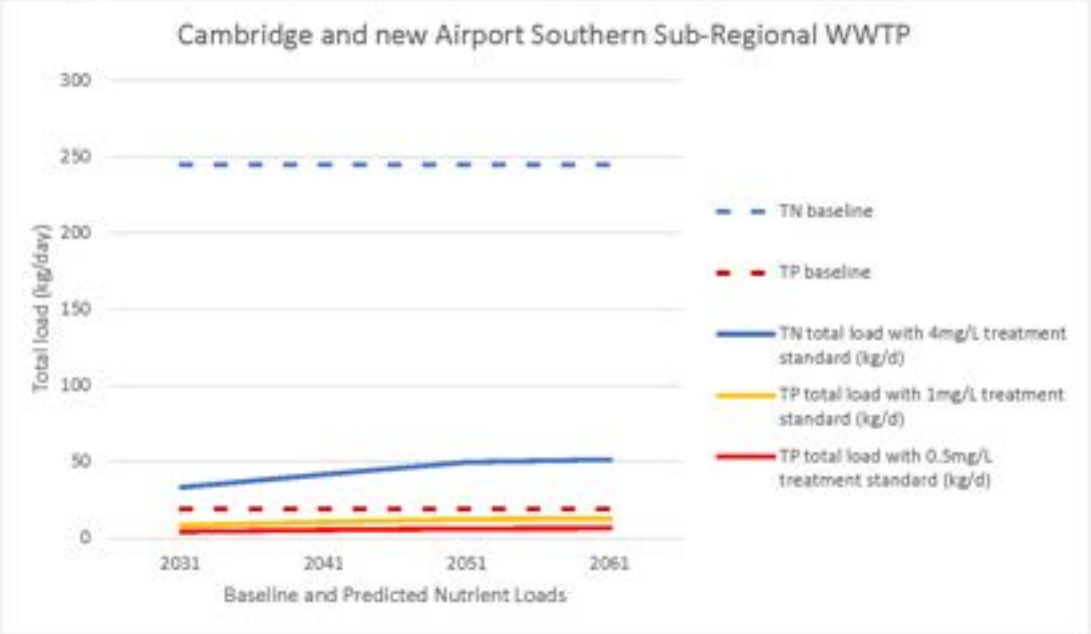
When considered alone the new Southern Sub-Regional WWTP will exceed the TN and TP mass load baseline. This is because it is a new WWTP and discharges into a largely greenfield environment. Wastewater generated by the few existing industrial sites in the vicinity is either discharged to land or trucked offsite (mostly to Cambridge WWTP). Any growth and the associated wastewater discharge would be considered against a very low existing baseline. The existing baseline for TN is 1 kg/day and <1 kg/day for TP, and this is associated with the current discharge to land from the Mātangi WWTP (these flows will be re-directed to the new Southern Sub-Regional WWTP once it is operational).

Taking a combined view of future mass loads is considered reasonable, given that wastewater generated by a few of the existing airport industrial sites is already trucked offsite to the Cambridge WWTP. If there was

no Southern Sub-Regional WWTP, the additional flow and load to be served by the plant would likely be conveyed to either Pukete or Cambridge to be treated and discharged.

As shown in Figure EC - 14, when the Cambridge WWTP and new Southern Sub-Regional WWTP are considered together, future nutrient loads are substantially less than existing. This is likely to be consistent with policy and statutory requirements around improving water quality and Best for River principles.

Figure EC - 14: Baseline and predicted nutrient loads for the Cambridge WWTP and Airport Southern Sub-Regional WWTP combined



In addition to employing high treatment standards, investment in restoration may also be required to deliver Best for River outcomes. This could be achieved in a number of ways, including by planting erosion prone land and undertaking riparian planting.

If the Cambridge WWTP and the new Southern Sub-Regional WWTP are not considered together for consenting purposes, then offsetting would likely be required when consenting the discharges from new Southern Sub-Regional WWTP due to the very low nutrient mass load baselines.

5.9 Other Wastewater Treatment Plant Upgrades

Through the development of this DBC it was confirmed that the Cambridge and Te Awamutu WWTPs will be upgraded by Waipa District Council to meet the long term needs of those communities.

Planning and design for the Cambridge WWTP upgrade and preparation of the resource consent application for long term discharge consents are underway. This DBC has evaluated the capital and operating costs to achieve the agreed minimum treatment performance standards at an updated Cambridge WWTP.

The estimates included in this DBC for Te Awamutu WWTP are based on the funding included in the Waipa District Council 2021 – 2031 LTP and provisional estimates and do not reflect the level of investment likely to be required to achieve the treatment standards agreed through this DBC. This approach was taken because the long-term discharge consent for Te Awamutu is relatively new and is unlikely to be reviewed in the near future. However, the costs associated with achieving the agreed standards will need to be evaluated as part of future Te Awamutu WWTP consenting and upgrade projects.

This DBC also assumes that Tauwhare Pa WWTP is to be expanded and continue to be a discharge to land approach. An alternative to service Tauwhare Pa via the new Southern Sub-Regional WWTP or connection to the Hamilton network was also considered at a high level. The need for alternative solutions or system upgrades will be triggered by demand.

Further information is provided below and in the Preferred Option Report (Appendix C).

Cambridge WWTP

The new Cambridge WWTP can be staged as outlined in Table EC - 15 below and concept development has been progressed in parallel to this process. Additional screens, reactors, primary sedimentation tanks and digestors are added over time in response to residential and industrial growth. Primary sedimentation and digestion processes could be added post 2050 when flows are higher, but this would require more reactor capacity and result in less energy recovery.

Treatment plant development would need to provide both horizontal and vertical spaces for the process units to be added, subsequent to the initial phase of development. Initial process configuration would need to allow vertical and horizontal spaces for the future introduction of primary sedimentation tanks.

Table EC - 15: Option 4A Cambridge WWTP Base Staging

Asset	Size[31]	2031	2041	2051	2061
Flow	m³/d	6,824	7,678	8,578	9,006
Screens	200L/s	2	2	2	3
PSTs	80m²	3	4	4	4
Reactors	1000m³	3	3	3	4
Membrane Trains	100L/s	4	4	4	5

[31] Process unit sizes are indicative and will likely change. Designers will refine these and numbers may alter depending upon selected resilience and redundancy policies.

Asset	Size[1]	2031	2041	2051	2061
Digesters	1100m³	2	2	3	3
Dewatering	10m³/hr	2	2	2	2
Biosolids @ 26%DS	m³/d	5.6	5.8	6	6.1

Te Awamutu WWTP

The Te Awamutu WWTP currently provides a reasonable treated wastewater quality with load-based TN and TP requirements. Capacity upgrades to cater for growth are planned for around 2030 . A further upgrade is expected to be required around the consent expiry date of 2044 to meet the very high treated wastewater standards adopted by this DBC for discharge to water.

Tauwhare Pā WWTP

Duplication of the current treatment plant and land discharge system at Tauwhare Pā could service expected growth at this location. This is expected to meet the treatment standards adopted for discharge to land in this DBC.

5.10 Risks

The key risks (refer to Management Case – Section 1.5 for additional detail including detailed mitigations) for this project include:

- The recommended DBC projects cannot be funded leading to the project being delayed, not proceeding or lower standards being adopted, as a result of competing priorities, financial constraints, capital cost increases and/or, poor integration, coordination and planning
- Costs to implement recommended DBC projects are significantly higher than estimates. This could further impact on affordability and lead to the project being delayed, not proceeding or lower standards being adopted as a result of increased market (resources and materials) costs due to demand, supply chain issues or poor risk allocation in construction contracts.
- The recommended DBC projects do not meet the partner expectations which may impact ability to implement the recommendations, consentability and adversely impact relationships as a result of poor engagement partner views not reflected in decision making and project not delivering on 'best for river' outcomes
- Resource consents and designations for the recommended option cannot be secured, or the costs to deliver a consentable solution are prohibitive as a result of the need for a new discharge to the Waikato River, other WWTPs consent renewal timeframes do not align, or legislative change of the Vision and Strategy
- While the DBC has been prepared on the basis of 'business as usual' water services delivery, three waters reforms could result in the projects being deferred, delayed or not occurring in the timeframes required. This delay will result in a proliferation of on-site private solutions, undermining the long-term investment in the Southern Sub-Regional WWTP. Conversely, reforms may provide a stronger financial position to support project implementation than BAU.

- Inability for councils to move to an integrated delivery programme results in uncoordinated delivery of the overall programme, misalignment of objectives and 'Best for River' principles.

Technical risks

The technical risks relating to the Preferred Option are outlined in Table EC - 16 below.

Table EC - 16: Technical Risk Summary

Risk Area	Description	Cause	Consequences	Mitigation measures
Meeting initial demand	Delay in Stage 1 delivery for Southern Sub-Regional WWTP	Planning, approvals (including consents) and design stages are delayed	Private developer investment in decentralised solutions. This may impact on project viability in the medium term and will result in inefficient infrastructure investment.	• Early engagement with potential land owners for WWTP site, project planning and funding confirmation
WWTP Site and Conveyance corridor protection	WWTP site and Conveyance corridors not protected for future servicing requirements	Delayed decision making and project implementation of WWTP. Future transfer of wastewater from Mātangi and Hamilton South to a Southern Sub-Regional WWTP will also require protection of the conveyance routes.	Increased project costs and potential delays to project delivery	• Early purchase of WWTP site • Allowances for utilities corridors should be considered when designations, sub-divisions and new infrastructure (roads and bridges) are implemented. • Space in berms alongside existing roads should be protected
Wet industry demand	Wet industry demand occurs before current assumed servicing from 2051	Wet industry demand occurs prior to planned time (assumed from 2051). Flows and plant design up until 2051 are insufficient to accommodate large amounts of wet industry. Wet industry has high demands and far more variable flows than the domestic flows the plant will be servicing up until this time.	If wet industry did not locate to this area, or more wet industry arrived than allowed for, process capacity could be delayed or bought forward to match requirements. A very high proportion of trade waste flows and loads to the Southern Sub-Regional WWTP could impact on treatment performance.	• Early diversion of largely domestic flows from Hamilton South or Southern Links could mitigate this risk. • Careful consideration in design processes and the setting of trade waste discharge consent conditions.
Change in rate of growth	Lack of or excess WWTP/network capacity	Change in rate of growth compared to assumptions	Limits growth (need to accelerate future stages) or financial burden of under-utilised assets	• Regular reviews of actual growth and development plan submissions. • Flexibility in process unit sizing at WWTPs. • Generous sizing and master planning of pipelines/sites
Change in wastewater composition	Lack of or excess WWTP capacity	Change in wastewater composition compared to assumptions	Limits growth (need to accelerate future stages) or financial burden of underutilized assets	• Regular reviews of actual characterization of wastes (flow & load)

Risk Area	Description	Cause	Consequences	Mitigation measures
				• Flexibility in process unit sizing. • Generous sizing and master planning of sites
Biosolids	Limited options for biosolids reuse/disposal	No coordinated approach to biosolids reuse/disposal. Research around emerging contaminants such as hormonal compounds, pharmaceuticals and micro-plastics leads to widespread rejection.	Increased operating cost, lost opportunities for resource recovery. Increased greenhouse gas emissions	• Plan to minimise biosolids mass to be removed from site • Treatment process operation to maximise destruction of harmful organics. • Remain adaptable to treatment methods that improve biosolids quality
Construction market	Increased capital cost (no commercial tension)	Saturated construction market, lack of resource available	Increased cost, delays to project implementation	• Early market engagement with attractively configured packages of work including those with a narrow scope that may suit specialist contractors.
Ground conditions	More extensive ground improvements required	Poor ground conditions. Liquefaction potential	Increased capital costs	• Early (before concept design) investigation of likely sites to allow time to alter plant configuration/change site. To be done as part of due diligence for land acquisition and easements
Greenhouse gas emissions	Increased cost of energy, chemicals and biosolids disposal	Typically, GHG emissions have largely been given lip service in comparison to other effects of an activity. Change in zero carbon legislation /targets (introduction of carbon taxes/levies) Liquid and solids discharge concerns trump concerns around greenhouse gas emissions. Reluctance to invest in energy recovery technology.	Increased capital costs and operating costs Increased rather than decreased GHG emissions over what is a readily achievable 'Baseline'.	• Develop a sound, useable and agreeable methodology for comparing the relative effects of whole-of-life cost, atmospheric emissions, emissions to water and emissions to land • The methodology will include cultural, Environmental, Social and economic criteria

Risk Area	Description	Cause	Consequences	Mitigation measures
Site Layout	Inefficient site development	Limited or poor master planning of WWTP sites	Limits population that can be served. Increased cost, H&S issues	• Certainty around potential development areas and types • Adequate resourcing of master planning process and subsequent reviews
Conveyance corridors	Pipeline routes take time to secure	Some or all conveyance corridors secured (to WWTP and from WWTP to river)	Time delay to projects	• Cooperative approach to landowner relationships and negotiations
Operational costs	Increases in operational costs	Introduction of carbon levies or taxes related to energy, biosolids or WWTP emissions.	Increasing various costs including disposal of biosolids to landfill, power to operate the facility	• These costs could be reduced if biosolids reuse (Stage 3) come to be viewed as a resource and used accordingly

5.11 Recommended investigation and design

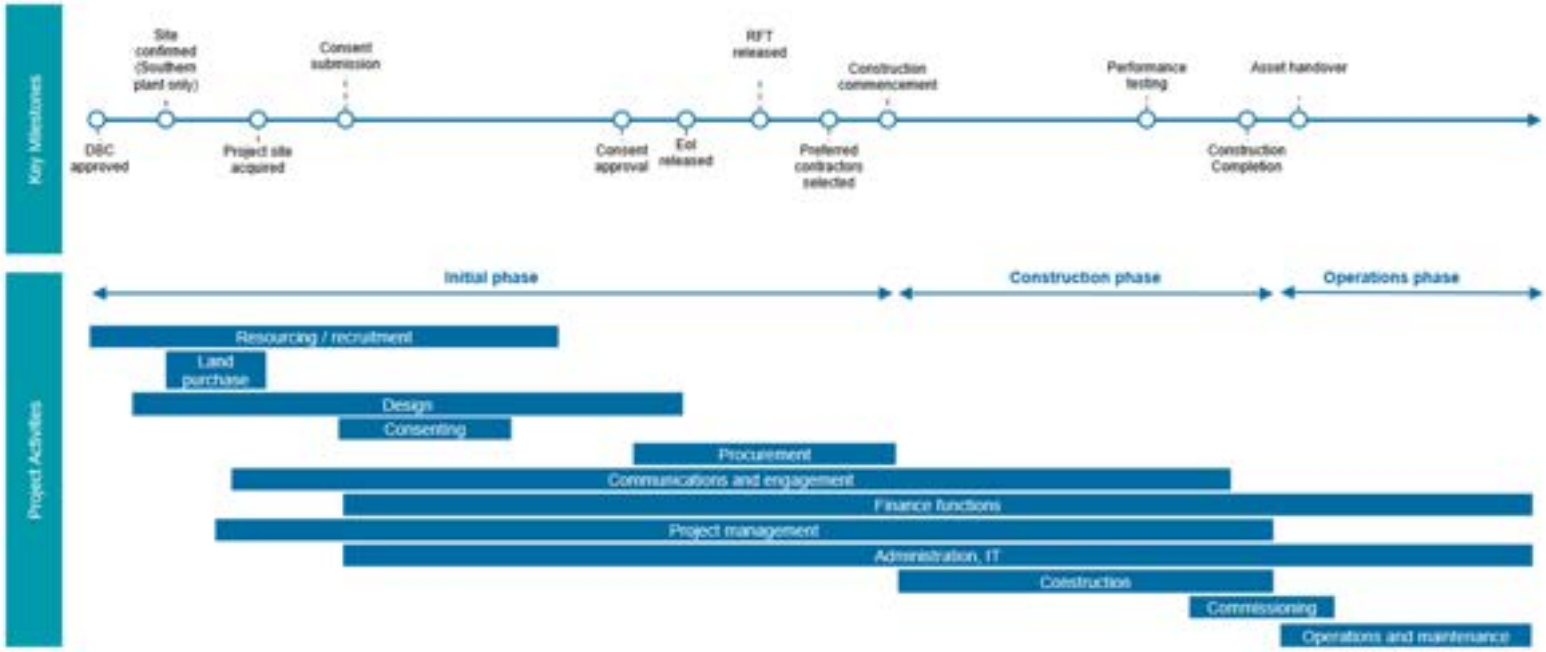
For the Preferred Option further investigation and design is recommended as follows:

- geotechnical investigations for the Southern Sub-Regional WWTP
- review of redundancy requirements for major process units e.g. screens and reactors
- investigation of biosolids reuse and disposal options
- offsetting and consenting options
- further investigation of sustainability and capital/operational carbon footprint
- further refinement of capital, operational and present value analysis
- master planning for Cambridge and Southern Sub-Regional WWTP sites.

The DBC level cost estimates include allowances for the investigations above and appropriate contingencies.

A breakdown of proposed project activities to implement the Southern Sub-Regional WWTP is provided in the Management Case (Section 1.2.4).

Figure EC - 15: Proposed Project Activities (Management Case – Section 1.2.4)



5.12 Cost estimates

Cost estimates representing capital and operating requirements to 2061 were prepared to establish the order of magnitude capital and operational costs for the Preferred Option. The estimates were developed as part of the DBC to provide early estimates for inclusion in budgeting and funding applications for implementation funding. They will need to be refined once a detailed design is developed as part the next stage in the process. The cost estimates are deemed to be Class 5 estimates as per the AACE[32] Cost Estimate Classification System and have an expected accuracy range of -30% / +50%.

The capital and operational costs for the Southern Sub-Regional WWTP are shown in Table EC - 17, Table EC - 18 and Table EC - 19 below. The costs for the other WWTPs are shown in

Table EC - 20: below. The costs are also outlined in the Financial Case and contain additional information regarding cashflows and specific timing for expenditure.

The Financial Case provides analysis of the financial implications for the delivery of the Preferred Option including capital, operational, land purchase and, procurement and construction overheads based on Council estimates.

Table EC - 17: Stage 1 Capital Cost Estimate Breakdown (2026)

Item	Cost (2020 values)
Land Acquisition *Assumes adequate land for Stage 1, 2 and 3 WWTP development*	$12 m
Master planning and consents *This includes consenting for land and water discharge for Stage 1 and 2 and includes for Master planning, designation and consents for the treatment and discharge facilities.*	$8 m
2026 Wastewater Treatment Plant & Discharge System	
Design, ground improvements and initial civil work	*$1 m*
Land disposal system: part – irrigation (sub-surface drip irrigation on approximately 10 ha)	*$1 m*
SBR reactors, screens, mechanical and electrical equipment	*$6 m*
2026 WWTP & Discharge (Capital Costs) Sub–Total:	$8 m
2026 WWTP Procurement & Council Overheads *Allowance of 10% of capital costs for procurement and Council overhead costs (as per the Financial Case*	$0.8 m
Other Stage 1 Costs – *extend the irrigation equipment and system (assumes use of land acquired in Stage 1)*	$1.1 m
Total – Capital Expenditure	**$29.9 m**

[32] Association for the Advancement of Cost Engineering – Practice No. 18R-97

Annual Operational Costs	**$0.544 m**

Table EC - 18: Stage 2 Capital Cost Estimate Breakdown (2041 and 2051)

Item	Cost (2020 values)
2041 Wastewater Treatment Plant & Discharge System	
Outfall: 1 km pipeline plus discharge structure (assumed gravity flow)	*$4.5 m*
Treatment Plant including screens, membranes, UV system, mechanical and electrical equipment, and pipework	*$19.5 m*
Civil works and buildings	*$6 m*
2041 WWTP & Discharge (Capital Costs) Sub–Total:	$30 m
2041 Procurement & Council Overheads *Allowance of 10% for procurement and Council overhead costs (as per the Financial Case*	$3 m
2041 Matangi Conveyance Costs *includes allowance of 10% for procurement and Council overhead costs (as per the Financial Case)*	$7.26 m
2051 WWTP (Capital Costs) Sub-Total *Additional reactors, membranes, screens and aeration system (2051) – includes allowance of 10% for procurement and Council overhead costs (as per the Financial Case)*	$16.5 m
Total – Stage 2 Capital Expenditure	**$56.76 m**
Annual Operational Costs WWTP	$0.672 m - $2.05 m
Annual Operational Costs Matangi Conveyance	$0.102 m

Note: Consent approvals and cost assumed to be covered under stage 1

The Stage 2 plant costings assume that all Stage 1 plant can be reused.

While the key tankage will already be in place, the costs incurred will include:

- provision of trunk infrastructure (including pipes and channels) on site for large future flows
- grit removal and second stage screening
- upgraded aeration system
- upgraded UV system
- dewatering facility
- reconfiguration work
- membrane trains and associated plant and plant room
- operator facilities.

Stage 2 also assumes that a treated water discharge to the river will be required and includes for a new outfall pipeline and a new outfall structure. The outfall cost estimates are based on 1 km distance from the river as the location, and nature of discharge are currently unknown.

Approximately 40% of the initial Stage 2 cost is associated with the outfall and dewatering facility.

Table EC - 19: Stage 3 Capital Cost Estimate Breakdown (2061)

Item	Cost (2020 values) $
2061 Wastewater Treatment Plant & Discharge Systems	
Structural and civil works	*$48 m*
Mechanical and electrical equipment	*$48 m*
Upgrade capacity outfall pipeline and structure	*$8 m*
2061 WWTP & Discharge (Capital Costs) Sub–Total	$104 m
2061 Procurement & Council Overheads *Allowance of 10% for procurement and Council overhead costs (as per the Financial Case)*	$10.4 m
2061 Hamilton South Conveyance Costs *Conveyance for Hamilton South includes allowance of 10% for procurement and Council overhead costs (as per the Financial Case) – does not include servicing the area between the Southern Links designation and existing Hamilton City boundary*	$35.75 m
Total – Stage 3 Capital Expenditure	**$150.15 m**
Annual WWTP Operational Costs	$7.44 m
Annual Matangi Conveyance Operational Costs	$0.102 m
Annual Hamilton South Conveyance Operational Costs	$0.8 m

Note: Consenting costs relating to Stage 3 have not been included for the purposes of financial modelling. The consent approval process required at that time (c2055-2060) is unknown. Approval for a significant increase in discharge volume will be required.

Cost estimates to upgrade other wastewater treatment facilities in the Southern Metro Area are included in

Table EC - 20 below. The assumptions and staging applied to each of these facilities are detailed in the Preferred Option Technical Report.

Table EC - 20: Preferred Option Cost Summary (un-escalated and excluding Southern Sub-Regional WWTP)

WWTP name	WWTP Capital Cost ($ m) up to 2061 – includes allowance of 10% for procurement and Council overhead costs (as per the Financial Case)	Operational Cost @ 2061 ($/year)
Cambridge	$ 136.84 m	$2.8 m
Mātangi	$ 0.55 m (short term improvements)	Matangi is assumed to be serviced by the Southern Sub-Regional WWTP from Stage 2 (2041)
Te Awamutu	$30.9 m	$4.0 m
Tauwhare Pā	$ 2.2 m	$0.04 m

The estimates for Cambridge are based on achieving the treatment quality standards agreed through this DBC project.

The estimates for Te Awamutu are based on the funding included in the Waipa District Council 2021 – 2031 LTP and provisional estimates of the costs of further upgrades. These estimates do not reflect the level of investment likely to be required to achieve the agreed treatment standards . The costs associated with achieving the agreed standards will need to be evaluated as part of future Te Awamutu WWTP consenting and upgrade projects.

Over time the total operational costs increase as flows increase. The large plants with PSTs and digesters have significantly lower relative costs due to energy recovery and reduced biosolids volumes for disposal. The technology associated with the addition of primary sedimentation (PST), digestion and energy recovery increase the capital cost of a treatment plant development or plant upgrade.

However, a choice to delay the installation of PSTs and digesters at the Cambridge plant would increase operational costs. Any decision on delaying energy recovery facilities should take into account the whole-of-life cost implications.

5.13 Implementation

The implementation plan is summarised in Figure EC - 16: below. Triggers have been identified to move between development stages. The Southern Sub-Regional WWTP development stages are triggered by local (Airport area and environs), Mātangi or Hamilton demand. Mātangi conveyance and Cambridge and Te Awamutu WWTP upgrades are triggered by growth and new resource consent requirements. Developer agreements will trigger the need to upgrade at Tauwhare Pā WWTP. Servicing of Ohaupo would be triggered by environmental issues with current on-site wastewater systems or significant increased demand due to higher density development.

Key implementation steps for the new Southern Sub-Regional WWTP involve:

Stage 1 – Pre-implementation

- Develop an understanding of the existing and short-term flows that will need to be managed before Stage 1 is operational. Coordination with the airport and other developers to develop a servicing concept and input into master plans for developments.
- Entering into funding agreements for pre-implementation activities and land acquisition.
- Securing land for the plant, buffers and Stage 1 land discharge. The total site area will be large enough to cater for future plant expansion.

- Master planning of the site to support staged plant development.
- Designating and consenting the treatment plant and discharge activities (Stages 1 and 2)
- Entering into funding agreements for Stage 1 of the plant.
-

Stage 1

- Commencing Stage 1 of the treatment plant development. SBR treatment technology with land disposal is proposed for the first stage. This technology provides enormous flexibility in terms of flows and load and will provide effluent quality suitable for application into or onto land. The first stage would cater for a capacity of between 400 m³/day and up to 1,000 m³/day (but with some flexibility on these limits). Soils will need to be suitable for low-rate irrigation year round.

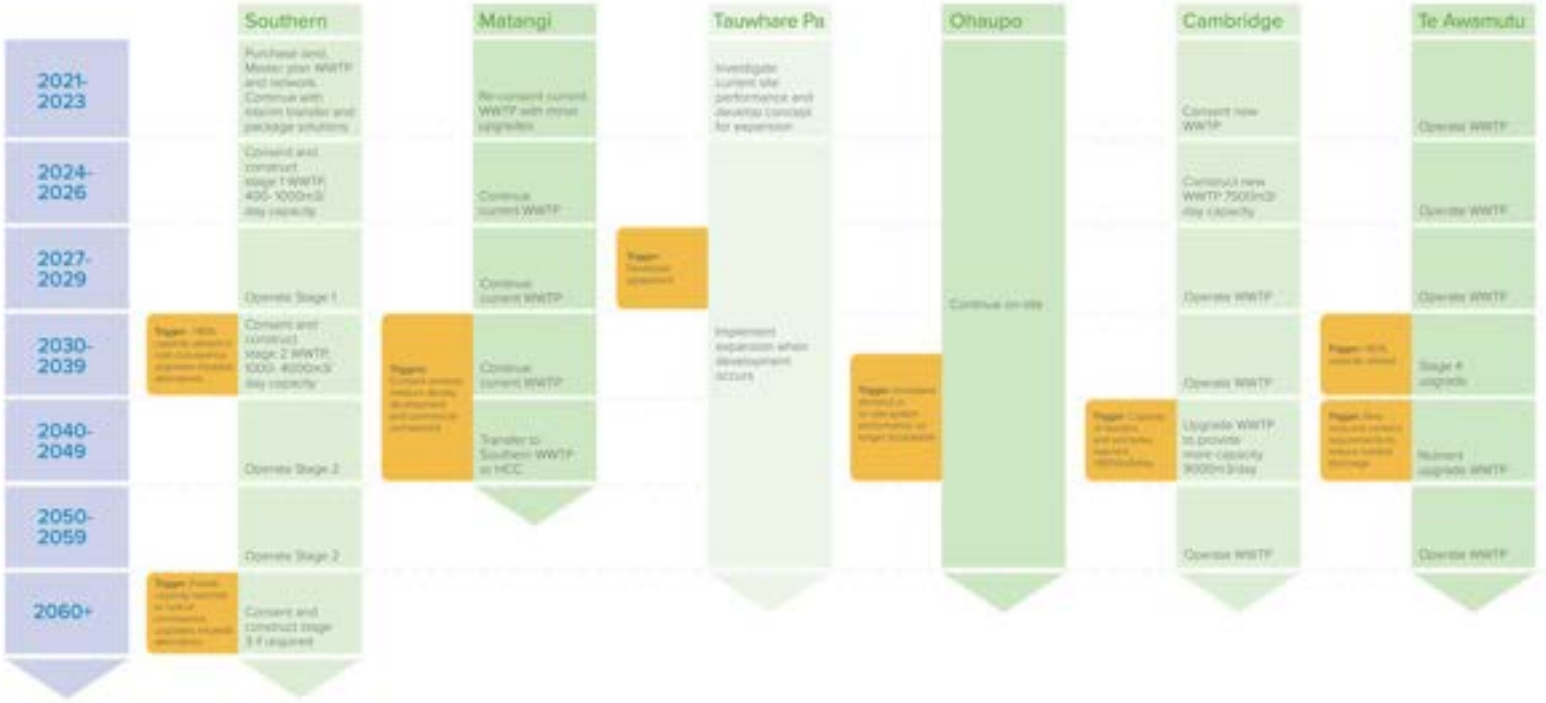
Stage 2

- When the demand to the Stage 1 plant nears 1,000 m³/day, the plant would be upgraded to an MBR system and is likely require a discharge to water. There is the potential for all or part of the Stage 1 land disposal system to continue to be used in parallel with the discharge to water. The MBR system would be able to be configured using the Stage 1 SBR reactor tanks much like what was recently with the conversion of the Pukekohe WWTP from SBR to MBR configuration. This system will be upgraded to meet demand and with local demand, is expected to be 3,600 m³/day by 2061. If servicing of parts of the Southern links or Peacocke catchments was desired, the Stage 2 plant could be potentially be upgraded to 8,000 m³/day capacity. The MBR technology would also open up opportunities for re-use of treated wastewater by selected industries.

Stage 3

The Stage 3 Treatment Plant upgrade provides additional capacity to service Hamilton South and allows for enhanced energy and resource recovery. Further system upgrades would be undertaken to meet demand.

Figure EC - 16: Preferred Option implementation plan



Master Planning

Master planning requirements for the new Southern Sub-Regional WWTP will typically include development of the following to a pre-concept design level. That is the basic size and location of the unit processes expected to be included in the ultimate development of the site:

- hydraulic grade line
- process horizontal and vertical sizing, layout and anticipated staging
- vehicle circulation and utilities / process pipe corridors
- ultimate utility requirements (electricity, water, gas, communications, stormwater, operator facilities)
- preferences for redundancy
- seismic risk management
- biosolids management
- buffers and conceptual planting plan for odour, noise and visual mitigation
- conveyance corridor alignments and design

Recommended investigations and design refinement

For the Preferred Option further investigation and design is recommended as follows:

- geotechnical investigations for Cambridge WWTP and Southern Sub-Regional WWTP
- review of redundancy requirements for major process units e.g. screens and reactors
- investigation of biosolids reuse and disposal options
- offsetting and consenting options
- further investigation of sustainability and capital/operational carbon footprint
- further refinement of capital, operational and present value analysis
- master planning for Cambridge and Southern Sub-Regional WWTP sites.

Appendices

Appendix A: Long List Options Report

Appendix B: Short List Options Report

Appendix C: Preferred Option Report

Appendix D: Wastewater Baseline and Future Nutrient Loads for Waikato Southern Metro Wastewater DBC

Financial Case Contents

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Executive Summary- Financial Case

1.1 Introduction and Scope

This report sets out the Financial Case for the Waikato Southern Metro Wastewater Treatment Detailed Business Case ("DBC").

The purpose of the Financial Case is to set out the programme costs, allocation of costs, funding requirements, preferred funding and financing solutions, and affordability impacts.

The scope of the Financial Case encompasses the preferred technical option and does not include financial analysis on the other technical options discussed in the Economic Case.

At the time of writing, the impact of the New Zealand Government's Three Waters Reform process on the Sub-regional Councils is unknown. As such, the DBC has been prepared on the basis of 'business as usual' and where relevant, the proposed structures and funding and financing tools aim to maintain optionality and flexibility to transition to a new structure if required.

1.2 Project Definition

The preferred option comprises a programme (the Programme) of wastewater treatment plant (WWTP) and conveyance works across the wider Waikato-Hamilton Waipā Metro Area (the Projects). The Projects are outlined below:

- **Southern Sub-regional WWTP (Southern WWTP):** Construction of a new WWTP to service the Waikato Regional Airport (the Airport) industrial precinct, Mātangi/Tamahere Hub and southern Hamilton. The WWTP is expected to be located between Rukuhia and the Airport and will be delivered in three stages to align to the estimated demand. Initially, the WWTP will discharge to land, but will ultimately discharge into the Waikato River once stage two triggers are reached.
- **Cambridge WWTP:** Construction of a new WWTP at Cambridge with discharge to the Waikato River to replace the existing plant. The plant will be located on the same site as the existing plant.
- **Te Awamutu upgrades:** Upgrades to the existing plant at Te Awamutu, which will continue to discharge via rock channel to the Mangapiko Stream.
- **Mātangi and Tauwhare Pā upgrades:** Improvements to the existing Mātangi WWTP, which will remain online until the wastewater is conveyed to the Southern WWTP or Hamilton City Council (HCC) network around 2040. Upgrades to the existing Tauwhare Pā WWTP, which discharges to land.

1.3 Cost Analysis

Cost estimates have been developed for the Programme and are set out in the following tables. The capital costs for each of the Projects including conveyancing costs are set out in ***Table FC - ES 1*** below. These costs are presented in real terms (today's prices) and the figures will be subject to significant cost inflation over the Programme's planned time horizon.

Table FC - ES 1: Capital (delivery) costs

Programme Capital Costs ($000's, real)

Project	2022-31	2032-41	2042-51	2052-61	2062-71	Total
Southern WWTP	29,900	40,260	16,500	150,150	-	236,810
Cambridge WWTP	115,720	4,290	6,050	10,780	-	136,840
Te Awamutu Upgrades	20,900	-	11,000	-	-	31,900
Mātangi WWTP Interim Upgrade	550	-	-	-	-	550
Tauwhare Pā WWTP upgrade	2,200	-	-	-	-	2,200
Total Capital Expenditure	**169,270**	**44,550**	**33,550**	**160,930**	**-**	**408,300**

The ongoing costs (operating expenditure and periodic renewal costs) are set out in ***Table FC - ES 2*** below. These cost forecasts have been estimated on an annual basis at the start of each 10-year period until 2071. For the purpose of the analysis included in the DBC, linear interpolation was used to estimate the ongoing costs between forecasts.

Table FC - ES 2: Ongoing costs

Programme Ongoing Costs (annual, $000's, real)					
Programme cost	**2031**	**2041**	**2051**	**2061**	**2071**
Southern WWTP operating costs	544	672	2,050	2,050	7,400
Cambridge WWTP operating costs	2,040	2,340	2,660	2,790	2,790
Te Awamutu WWTP operating costs	2,600	2,800	3,200	3,300	3,300
Tauwhare Pa WWTP operating costs	40	40	40	40	40
Hamilton South conveyancing operating costs	-	-	-	800	800
Mātangi conveyancing operating costs	-	102	102	102	102
Total operating costs	**5,224**	**5,954**	**8,052**	**9,082**	**14,432**

1.4 Risks and Complexities

There are a number of risks associated with delivering a relatively complex and long-term programme of works, which may impact these cost estimates. The key risks in relation to the Financial Case are summarised below.

- **Long-term programme**: The accuracy of cost estimates is likely to reduce the further out they are being forecasted given the increasing levels of uncertainty. Additionally, the timing of certain elements of capital expenditure could change based on population growth (i.e., those that rely on staged thresholds) which further reduces the level of certainty. Costs will also increase due to an uncertain amount of inflation which is likely to be significant over the length of the Programme.

- **Level of design work to support costings**: Detailed design work has not yet been undertaken for each of the Projects which constrains the accuracy of the cost estimates. Costs will be refined as the design work is further progressed through subsequent phases of the Programme.
- **Three Waters Reform programme**: The Three Waters Reform programme may significantly change the way wastewater projects and services are delivered across the region, which could affect the funding and other assumptions used in the DBC.

A contingency allowance of 30% was included in the capital cost estimates to recognise the degree of uncertainty at this stage of the Programme (refer to Economic Case Section [5.12 – Cost Estimates]). A contingency allowance of 10% was also included for operating costs. Costs and contingencies for each Project will continue to be refined as the Programme is progressed.

1.5 Cost Allocation

Given the potential for the Projects to service communities that are located within different Territorial Authority (Councils) districts, the Project costs may need to be allocated amongst HCC, Waipā District Council (Waipā DC) and Waikato District Council (Waikato DC) (collectively referred herein as the Sub-regional Councils).

This allocation is undertaken on a beneficiary pays basis whereby costs are split between the relevant councils depending on the proportion of communities that are served and the time period over which they are served. The objective of this approach is to ensure that the beneficiaries of the Projects are the ones that ultimately pay for them.

Commensurate with this approach, cost allocation methodologies were developed for each of the different Programme components (e.g. capital costs for local reticulation, capital costs for conveyancing, etc.), which identified the specific beneficiaries of each component. An overview of the cost allocation methodologies is provided below in ***Table FC - ES 3*** below.

Table FC - ES 3: Cost allocation methodology

Component	Methodology
Local reticulation – capital costs	Costs for upgrades or new local reticulation (where applicable) are proposed to be met by the relevant Council (or developer) on the basis that only beneficiaries within the territory would benefit from the works. The relevant Council is expected to recover these funds as additional properties are connected.
Conveyance - capital costs	Costs for upgrades or new conveyancing are proposed to be met by the Council relying on the conveyancing for connection. This is because the beneficiaries of the conveyancing would be located within that district (e.g. the capital cost of new pipes to connect Mātangi would be expected to be funded by Waikato District Council).
Conveyance - operating costs	As per conveyance capital costs, conveyance operating costs are proposed to be met by the Council that is using the conveyancing.
WWTP - capital costs (upgrades and new plants)	WWTP capital costs are proposed to be allocated between the Councils based on one of the following two formulations: • For a Project with only one stage, the level of Population Equivalent demand from users in the district serviced by the project over its useful life, compared

	to the level of Population Equivalent demand from users over its useful life; or • For a Project with multiple stages the proportion of capital costs for each stage will be allocated based on the level of Population Equivalent demand from users in its district by that stage of the Project over the useful life of that stage's assets, compared to the level of Population Equivalent demand from users over the useful life of that stage's assets. For a Project with multiple stages there will be a need to account for the reuse of assets from prior stages of the Project. In this case, immediately prior to each future stage being commissioned an assessment of the reusable value from prior stages will be undertaken. The reusable asset valuation will be used in the following ways: (i) added to the capital costs of the new stage and allocated using the same methodology set out above; (ii) used as the basis for compensation of the Council(s) that has funded the prior stage of the Project. This compensation could be delivered using a rebate to the Council or by netting off the Council's share of the reusable asset value from their funding obligations for the new stage of the Project.
WWTP - operating costs	WWTP operating costs are proposed to be allocated based on the proportion of Population Equivalent demand serviced by the WWTP, as a proxy for the distribution of beneficiaries. The calculation of the respective proportions will need to be updated regularly to reflect changes in the level of Population Equivalent demand in each district. The expectation is that the proportions will be estimated every three years (i.e. to align with Long Term Plan (LTP) cycles), and then confirmed at the start of each financial year as part of the Annual Planning process.
Land and consenting costs (Southern WWTP)	Given the land and consenting costs will benefit all stages of the Project, land acquisition, planning, and consenting costs for the Southern WWTP are proposed to be shared pro-rata according to the estimated final state of wastewater flows in 2061. The base case timing assumes that Hamilton South will have been connected to the Southern WWTP by this point. No sale proceeds are assumed for surplus land if discharge to land is discontinued as the land will be retained as part of the future plant.

Based on the cost allocation approach set out above, a breakdown of each Council's share of the costs for the Projects is set out in ***Table FC - ES 4*** below.

Table FC - ES 4: Council cost allocation

Cost allocation for each Project ($000s, real)

Project	Council	2022-31	2032-41	2042-51	2052-61	2062-71	Total
Southern WWTP	HCC	15,300	-	-	119,627	-	134,927
	Waipā DC	14,481	29,204	18,296	(5,069)	-	56,911
	Waikato DC	119	3,796	(1,796)	(158)	-	1,962
	Total	**29,900**	**33,000**	**16,500**	**114,400**	**-**	**193,800**
Mātangi conveyancing costs	Waikato DC	-	7,260	-	-	-	7,260
Hamilton South conveyancing costs	HCC	-	-	-	35,750	-	35,750
Southern WWTP (incl. conveyance)	Total	29,900	40,260	16,500	150,150	-	236,810
Cambridge WWTP	Waipā DC	115,720	4,290	6,050	10,780	-	136,840
Te Awamutu Upgrades	Waipā DC	20,900	-	11,000	-	-	31,900
Mātangi and Tauwhare Pā Upgrades	Waikato DC	2,750	-	-	-	-	2,750
Total		**169,270**	**44,550**	**33,550**	**160,930**	**-**	**408,300**

* A negative figure represents a rebate to the Council due to the reuse of assets that it has already paid for under the previous stages. Please see Table 3 for further detail on Cost Allocation Methodology.

Operating costs	Council	2031	2041	2051	2061	2071
Southern WWTP*	HCC	-	-	-	1,670	6,027
	Waipā DC	544	624	1,998	365	1,318
	Waikato DC	-	48	52	15	55
	Total	544	672	2,050	2,050	7,400
Cambridge WWTP	Waipā DC	2,040	2,340	2,660	2,790	2,790
Te Awamutu	Waipā DC	2,600	2,800	3,200	3,300	3,300
Tauwhare Pa	Waikato DC	40	40	40	40	40
Southern Hamilton Conveyance	HCC	-	-	-	800	800
Matangi Conveyance	Waikato DC	-	102	102	102	102
Total		**5,224**	**5,954**	**8,052**	**9,082**	**14,432**

The cost allocation for the Southern WWTP in 2022-31 reflects:

- the allocation of land and consenting costs which are allocated between the councils based on the estimated final state of wastewater flows in 2061; and
- The stage 1 build costs which are predominantly allocated to Waipā DC based on the population served.

Additionally, there is potential for Waikato Regional Airport Limited (WRAL or the Airport) to provide funding for the project which could influence the cost allocation and Waipā DC's funding requirements for stage one. The Airport has immediate servicing requirements for its existing and proposed developments in the area and discussions with the Airport have signalled the potential to work together to provide a wastewater solution that meets their needs.

Despite not connecting to the Southern WWTP until 2061, HCC is contributing $16 million in the ten-year period ending 2031 for land and consenting costs. Purchasing the site early has a number of benefits to HCC:

- Acquiring the land now preserves flexibility and optionality for a long term wastewater solution e.g. if Pukete capacity runs out sooner than anticipated or if the pace of development South of Hamilton is faster than anticipated. The need for flexibility is further highlighted by the Housing Supply Bill that the Government announced recently which has the potential to both bring forward development, and increase the density of development, in the Hamilton Metro area.
- Purchasing the site early ensures the planned Southern WWTP can be carried out without the need to modify consents or design work later should the site no longer be available.
- A significant amount of development is expected to occur in the sub-region resulting in strong demand for developable land parcels. Securing the site now will likely reduce the cost of the overall Programme by avoiding paying for substantial growth in land values if the site were to be purchased in future.

Costs for the other Projects in ***Table FC - ES 4*** are allocated to the council where the Project is located, which demonstrates there is limited cross boundary servicing for these assets.

1.6 Lead Council Delivery Model

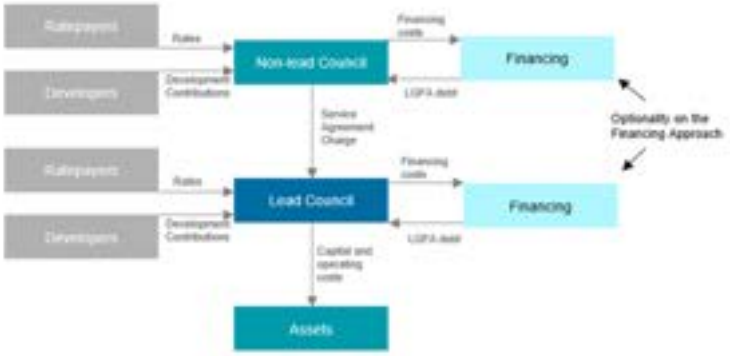
The Projects are proposed to be delivered by a single council as the sole beneficiary of the project or in the case of the Southern WWTP on behalf of the other Sub-regional Councils (the Lead Council). The Lead Council will utilise its existing resources, policies and procedures to deliver the Project (See Management Case Section [1.2.2 Project Management Arrangements]).

Under the Lead Council model there is optionality regarding how each Programme is financed:

- Financing for each Council's share of the capital costs is raised by each respective Council and passed through to the Lead Council. This is the approach generally applied in the Financial Case.
- Financing of the full project cost is proposed to be undertaken by the Lead Council and where costs have been allocated to other councils (the Non-Lead Council), costs (including financing costs) are proposed to be recouped through a service agreement. Of the different Projects, this arrangement is most relevant to the Southern WWTP. A sensitivity assessment illustrating the impacts of this approach is included in Financial Case Section [9.4l]. The Non-Lead Council is expected to meet the service payment through applying its preferred funding tools to the communities that benefit from the Project within its respective territorial boundaries.

An overview of the proposed structure is provided in Figure FC - ES 1 below.

Figure FC - ES 1: Lead Council funding and financing structure



The proposed Lead Councils for each Project are outlined in ***Table FC - ES 5*** below:

Table FC - ES 5: Project Lead Councils

Project	Lead Council
Southern WWTP	Hamilton City Council
Southern Hamilton Conveyance	Hamilton City Council
Cambridge WWTP	Waipā
Te Awamutu upgrades	Waipā
Mātangi and Tauwhare Pā upgrades	Waikato
Matangi / Tamahere Conveyance	Waikato

1.7 Funding and Financing Approach

Financing is likely to be required to smooth and spread the delivery phase costs across the life of the Projects while funding tools will be used to recover these costs from the beneficiaries. An evaluation of the funding and financing options available to the councils was undertaken using a long list, short list and preferred option multi criteria analysis framework. The options were evaluated based on a set of assessment criteria which reflected the underlying objectives and KPIs of the Programme.

The following steps were taken to determine the preferred funding and financing approach:

- Development of a long list of funding and financing options.
- Development of assessment criteria to evaluate the funding and financing options.
- Assessment of long list of options against the criteria to determine a short list of funding and financing options.

- Consultation and discussion with stakeholders on the short list to agree the preferred funding and financing approach.

Based on this assessment and options evaluation, the preferred funding and financing approach is for each Council to leverage its existing funding tools (e.g. general rates, targeted rates, development contributions, etc.), as per their current revenue and financing policies. These are outlined in ***Table FC - ES 6*** below.

Table FC - ES 6: Current Council funding and financing approaches

Council	Current funding approach	Current financing approach
HCC	General Rates and Development Contributions	Generally debt funded through the LGFA
Waipā DC	Targeted Rates and Development Contributions	Generally debt funded through the LGFA
Waikato DC	Targeted Rates and Development Contributions	Generally debt funded through the LGFA

Responsibility for collecting rates and development contributions will remain with the respective Councils within their own territories, regardless of whether they are the Lead Council. They will be responsible for determining which funding tools are utilised for each project.

1.8 Affordability

A high-level assessment of the affordability of the Programme was undertaken based on an assessment of:

- The burden on ratepayers to fund the additional general and / or targeted rates;
- The cost to developers of development contributions; and
- The debt headroom under the current relevant LGFA covenants for each of the Council.

This high-level assessment indicates that the Programme is affordable for each of the Sub-regional Councils and their ratepayers. However, this should continue to be tested as certainty over the timing and magnitude of costs improves. This is further discussed below.

1.1.1 Ratepayer Affordability

An overview of the estimated annual impact (i.e. the incremental increase in rates per ratepayer) of the Programme on ratepayers is provided in the following table.

Table FC - ES 7: Estimated rating impact

Year	2031	2041	2051	2061	2071
HCC – General Rate	$112	$88	$75	$386	$612
Waipā DC – Southern WWTP Targeted Rate	$403	$874	$468	$282	$304
Waikato DC – Southern WWTP Targeted Rate	-	$2,153	$1,631	$1,257	$1,266
Waipā DC – Cambridge WWTP Targeted Rate	$520	$394	$368	$352	$331
Waipā DC – Te Awamutu WWTP Targeted Rate	$260	$300	$315	$287	$276
Waikato DC – Mātangi & Tauwhare Pa Targeted Rate	$110	$466	$435	$404	$371

An overview of the affordability of these rates increases is provided in the table below. The assessment is based upon the 5% affordability threshold that was identified in the 2007 COVEC report into rates affordability. Ratepayer affordability has been assessed based on adding the average rating impact for a ratepayer to the average household rates bill as provided by the Councils. At the date of this document, Waikato District Council did not participate in this rating survey.

Table FC - ES 8: High-level rates affordability assessment

Council	Median Household income (2021)	Affordability threshold (5%)	Average rates per household	Average additional project rating impact	Total rating burden	Affordability check
HCC – Southern WWTP	$77,485	$3,874	$2,770	$499*	$3,269	✓
Waipā DC – Southern WWTP			$3,092	$466	$3,558	✓
Waikato DC – Southern WWTP			$2,649	$1,577	$4,226	-
Waipā DC – Cambridge WWTP			$3,092	$393	$3,485	✓
Waipā DC – Te Awamutu WWTP			$3,092	$288	$3,380	✓
Waikato DC – Mātangi & Tauwhare Pa upgrade			$2,649	$357	$3,006	✓

* Average additional project rating impact calculation only considers years 2061 and 2071 for HCC i.e. after Hamilton South switches to using the Southern WWTP. The additional rating impact would not be applied to Hamilton North.

Source: Stats NZ

Table FC - ES 8 demonstrates that the rating impacts generally fall within the affordability thresholds set out by COVEC based on the average additional project rating impact for each Council's

ratepayers. The exception to this is the Waikato DC – Southern WWTP rating impact which is above this threshold by 9%. This is primarily driven by the costs of conveyancing from Mātangi to the Southern WWTP, with the relative rating impact reducing as further growth comes online in the future. It should be noted that there are likely other costs that would need to be considered in more detail prior to implementing an increase in rates, such as additional water related costs, mortgage servicing costs and other cost of living increases.

Under current council policies, HCC uses a general rate whereas Waikato DC and Waipā DC use a targeted rate. To provide a complete picture of the ratepayer affordability, Pukete upgrade costs would also need to be included in HCC's rating impact assessment. This will be considered as part of the Northern Metro Wastewater DBC.

1.1.2 Affordability of development contributions

The size of the development contributions required for each Project was estimated using the following approach:

- An assessment was undertaken on the portion of costs that the Lead Council would need to recover from its ratepayer base.
- An estimate was made of the portion of the Project that is attributable to growth. The increase in Population Equivalent units of demand over the forecast operational life of the project was used as a proxy for growth.
- Then a calculation was made to determine the pro-rata allocation of these costs to the amount that is attributable to growth. It is assumed this amount can be recovered from development contributions.
- A financing charge was then applied based on the respective interest rates for each Council and solved for a level of development contribution that recovers the cost allocated to growth over the life of the Project.

This analysis assumes that no financial contributions are received from the Airport.

The estimated development contribution per Household Unit Equivalent (HUE) of demand for each of the Councils is provided in the table below. Population data has been divided by 2.5 to convert it into HUE's.

Table FC - ES 9: Estimated development contributions (per HUE of demand)

Council	2031	2041	2051	2061
Hamilton CC – Southern WWTP	-	-	-	-
Waipā DC – Southern WWTP	$9,728	$9,728	$9,728	$9,728
Waikato DC – Southern WWTP (Matangi and Tamahere Commercial)	-	-	-	-
Waipā DC – Cambridge WWTP	$7,327	$7,327	$7,327	$7,327
Waipā DC – Te Awamutu WWTP	$2,162	$2,162	$2,162	$2,162
Waikato DC – Mātangi & Tauwhare Pa	$6,261	$6,261	$6,261	$6,261

The development contributions reflect the portion of Project costs that are allocated to growth beneficiaries for each council. No development contributions are shown for HCC or Waikato DC for the Southern WWTP as the plant will only be servicing existing HCC and Waikato DC communities during the time period to 2061. The development contributions set out above compare reasonably to

existing levels charged by the Councils, falling near the middle of existing wastewater related charges for the Councils.

1.1.1. Affordability for Councils

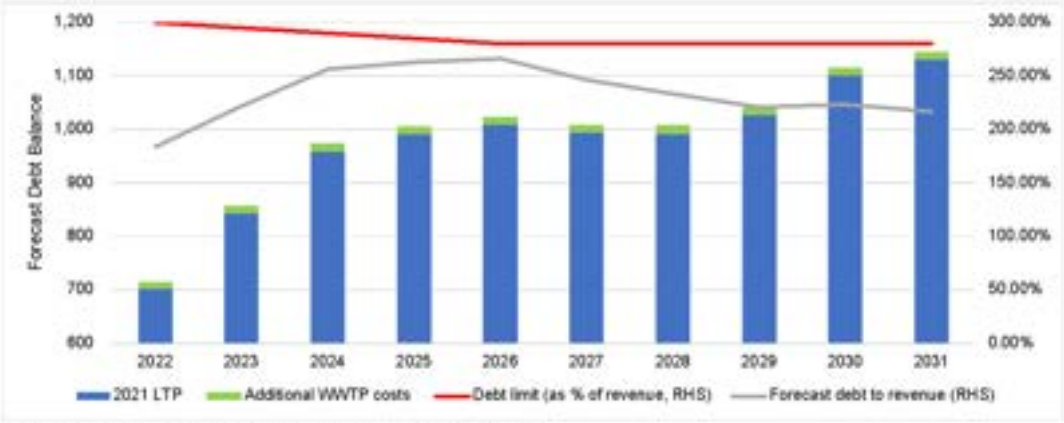
The affordability analysis for Councils was based on whether (or not) the financial impacts of the Programme resulted in any of the Councils breaching their LGFA debt to revenue financial covenants. For the purposes of this analysis, the following key assumptions were used:

- **Lead Council:** The delivery costs of the Programme were assumed to have been debt funded and treated as being 'on-balance' sheet for the purposes of the LGFA covenant calculation, and from a credit rating and accounting perspective.
- **Non-Lead Council:** The obligation to make service payments to the Lead Council were treated as being financial liabilities, and therefore 'on-balance sheet' for the purposes of the LGFA covenant calculation, and from a credit rating and accounting perspective.

The accounting and credit rating treatment for these service agreements will depend on the specific commercial arrangements that are agreed. It is recommended that formal advice should be sought once the service agreement has been agreed to confirm its treatment.

The estimated financial impact on the debt to revenue ratio for each of the Councils over the next 10 year LTP period is provided in the Figures below. Debt forecasts were not available beyond this period.

Figure FC - ES 2: Forecast HCC debt to revenue ratio

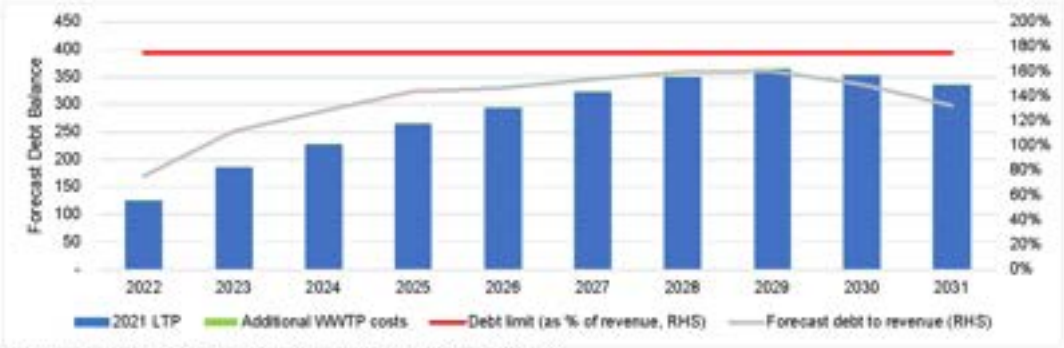


Source: Hamilton City Council Long Term Plan 2021-31

Figure FC - ES 3: Forecast Waipā DC debt to revenue ratio

Source: Waipā District Council Long Term Plan 2021-31

Figure FC - ES 4: Forecast Waikato DC debt to revenue ratio



Source: Waikato District Council Long Term Plan 2021-31

Note: Revenue received from development contributions has been excluded from the revenue figures as they are not included in the LGFA's metrics due to their one-off and uncertain nature.

As demonstrated in the charts, the councils are forecast to remain within the debt to revenue caps after allowing for the impact of the Programme over the next 10 years, although HCC do get close to breaching their debt limit.

1.1.2. Sensitivity analysis

A Net Present Value (NPV) for the overall Programme has been determined to understand the current value of all the future cash flows of the Programme. This measure can be used to test the sensitivity of the Programme to changes in the underlying assumptions (e.g. inflation or changes to costs).

The estimated NPV for the Programme is -$344.1 million, which is based upon the capital and ongoing costs outlined in Financial Case Section 3 and a five-percent real discount rate (as per the New Zealand Treasury guidance).

A similar analysis has been undertaken to test the impact on the Council debt to revenue ratios. Again these measures were evaluated after applying changes to capital costs. The analysis identified that HCC and Waikato DC are not significantly impacted in the next 10 years due to the comparatively small capital expenditure and although Waipā DC's debt does increase, this is relatively minor in scale compared to their current debt portfolio.

1.1.3. Alternative financing model

We have also considered the impact of the alternative approach whereby the Lead Council finances the project in its entirety and charges the participating Councils a service delivery charge. Under this approach HCC will need to borrow significantly more to finance the delivery of the early stages of the Southern WWTP and recover these costs through a service agreement charge. The allocation of costs will not change between either financing approach.

Figure FC - ES 5: Forecast HCC debt to revenue ratio

Source: Hamilton City Council Long Term Plan 2021-31

Under the alternative financing approach, HCC would need to borrow $15 million more than under the base case in the period up to 2031. HCC would finance the land purchase, consenting, initial plant groundworks and Stage 1 capital costs on its balance sheet, and then recover these costs from the Non-Lead Councils through a service charge. This financing approach brings HCC closer to its debt limit but still does not result in a breach.

Debt limits have not been modelled out beyond HCC's current 10-year LTP period. However, the impact of this financing approach on HCC's debt limits would be more acute in the 2032-2051 period as Stage 2 capital costs ramp up. In that period HCC would be borrowing a significant amount to fund assets that are predominantly servicing Waipā and Waikato communities.

1. Introduction, Project Definition and Scope

1.1 Introduction

This report sets out the Financial Case for the Waikato Southern Metro Wastewater Treatment DBC.

The purpose of the Financial Case is to set out the programme costs, funding requirements, and preferred funding and financing solutions.

1.2 Project definition

The preferred option comprises the Programme of WWTP works across the wider Waikato-Hamilton Waipā Metro Area. The Projects are outlined below:

Southern Sub-regional WWTP (Southern WWTP): Construction of a new WWTP to service the Waikato Regional Airport (the Airport) industrial precinct, Mātangi/Tamahere Hub and southern Hamilton. The WWTP is expected to be located between Rukuhia and the Airport and will be delivered in three stages to align to the estimated demand. Initially, the WWTP will discharge to land, but for the purposes of this DBC is assumed to involve a discharge into the Waikato River once stage two triggers are reached. The stages are summarised as:

- Stage 1: Initial build and development of WWTP to cover immediate requirements;
- Stage 2: Build base WWTP prior to 2041 to cater for Matangi and increased capacity for industrial growth and some wet industry; and
- Stage 3: Upgrade of Stage 2 assets to full service WWTP.

Cambridge WWTP: Construction of a new WWTP at Cambridge with discharge to the Waikato River to replace the existing plant. The plant will be located on the same site as the existing plant.

Te Awamutu upgrades: Upgrades to the existing plant at Te Awamutu, which will continue to discharge via rock channel to the Mangapiko Stream.

Mātangi and Tauwhare Pā upgrades: Improvements to the existing Mātangi WWTP, which will remain online until the wastewater is conveyed to the Southern WWTP or Hamilton City Council (HCC) network around 2040. Upgrades to the existing Tauwhare Pā WWTP, which discharges to land.

1.3 Scope

The scope of the Financial Case is to outline:

- The key underlying assumptions for the cost estimates.
- The capital (delivery), operating and periodic renewal costs for the Programme.
- The methodology for allocating costs between the Councils.
- The assessment of potential funding and financing options and determination of the preferred funding and financing option.
- The affordability of the Programme for each of the councils and their ratepayers.

The Financial Case is solely focused on the preferred technical option. No financial analysis was undertaken on the other technical options discussed in the Economic Case.

The terms funding and financing are used throughout the Financial Case and are defined as follows:

- **Funding:** Refers to the mechanism that recovers the costs of the Programme across its life. Commonly used funding tools include targeted rates, developer contributions and negotiated contributions.
- **Financing:** Refers to the instrument used to pay for the cost of the capital requirements of the plant. The financing tools spread the cost burden over time to align with the funding of the Programme. The typical financing approach used by Councils for assets of this nature is the use of Local Government Funding Agency (LGFA) borrowing.

2. Assumptions

The financial assessment included in the DBC is based on the following assumptions:

- Each Project was designed to have a useful life of 80 years, with mechanical and electrical components requiring renewal within this period at 20 year intervals. Capital expenditure associated with renewals is provided for in the Programme operating costs. No allowance was included to refresh individual Projects beyond their 80-year useful life.
- Local and trunk reticulation costs required to service development areas are not included in the financial assessment. These costs are typical infrastructure costs that arise from land development.
- Strategic conveyance infrastructure required to convey flows from specific communities to the Southern WWTP (i.e., Hamilton South, Mātangi/Tamahere) are included in the financial assessment.
- High level capital and operating costs are estimated for the preferred option based upon the rates observed in similar wastewater projects. All capital costs include allowances for investigations, design, procurement, and construction supervision.
- Based on discussions with Councils, overhead and procurement costs incurred by the Lead Council are included at a rate of 8% and 2% of capital costs respectively.
- Conveyance operational costs for maintenance and operations are calculated as a fixed percentage of pump station capital cost with variable components for energy and specialty-controlled chemicals based on average annual flow.
- There is significant uncertainty over the timing of staged upgrades and when HCC will connect to the Southern WWTP. This analysis assumes Southern Hamilton / HCC connects in 2061. If HCC were to connect to the Southern WWTP earlier than 2061 the same principles would be applied however the population served would change and the allocation of costs would need to be revisited. The principles based approach taken includes the flexibility to adapt to changes in timing and population growth.
- The analysis in the DBC considers future costs only, no allowance for costs incurred to date is included (e.g. costs associated with the early design of the technical solution, development of this business case, and planning and scoping work).
- Assets are depreciated on a straight line basis with a useful life of between 20 and 80 years.

- Population forecasts were developed by NIDEA based on 2013 census data and updated by each of the Councils to reflect the 2018 census data. The population forecasts have been used to inform the staging and sizing of the plants, and for cost allocation purposes. Further discussion on the population assumptions is included in the Growth Assumptions document (refer Economic Case Section [5.12 – Cost Estimates]. These assumptions include both municipal and wet-industrial wastewater flows. An overview of the population equivalent forecasts is provided in the table below:

Table FC - 1: Population equivalent forecasts across the wider Waikato-Hamilton Waipā Metro Area

Population Equivalent Forecasts								
Area	Council	Serviced from	2021	2031	2041	2051	2061	2120
Taupiri	Waikato	Current	2,063	5,176	6,167	6,991	7,256	8,400
Ngaruawahia	Waikato	Current	6,234	7,407	9,102	10,516	12,016	21,991
Horotiu	Waikato	Current	1,815	6,778	10,390	13,996	14,156	14,156
Te Kowhai	Waikato	2031	35	1,301	1,685	2,095	2,371	4,706
Hamilton North	Hamilton	Current	237,642	288,590	306,351	366,325	391,330	600,703
Hamilton South	Hamilton	2061	29,630	36,573	46,511	54,723	59,626	183,633
Tauwhare Pa	Waikato	Current	140	619	619	619	619	889
Matangi (incl Tamahere commercial)	Waikato	2040 to Southern	140	464	464	464	464	1,035
Airport	Waipa	2025	1,377	4,000	6,000	17,852	17,852	17,852
Ohaupo	Waipa	Not serviced	547	630	814	1,025	1,031	1,100
Cambridge & Hautapu	Waipa	Current	22,520	32,940	37,801	42,892	45,031	57,649
Te Awamutu & Kihikihi	Waipa	Current	24,988	27,989	30,965	34,982	36,001	42,011

Serviced by Southern WWTP
Serviced by Cambridge WWTP
Serviced by Te Awamutu WWTP

- Financing costs are calculated using the LGFA's indicative borrowing rates (as at 30 June 2021) for the longest borrowing tenor (May 2037) and each of the relevant Council's current credit ratings. The longest borrowing tenor was used to reflect a conservative estimate for borrowing costs, given the long length of the Programme. However, the expectation is that financing will be undertaken as part of the Lead Council's wider debt portfolio and treasury management, which is likely to have a significantly shorter borrowing tenor.
- Finance is assumed to amortise over the life of the asset with each Council managing this through its 'business as usual' portfolio treasury and debt management.
- Development Contributions are calculated based on the forecast increase in Population Equivalents for each relevant area, as provided by each of the Sub-regional Councils.
- All dollars set out in this report are provided in real terms (today's dollars), unless stated otherwise. Inflation was not included in the forecasts. Cost estimates will be subject to significant cost inflation due to the length of the Programme.
- A real discount rate of 5% is used in the Net Present Value (NPV) analysis based on the Treasury's discounting methodology[1].
- For the purposes of calculating rating impacts and development contributions, it has been assumed that all beneficiaries for each Council are responsible for funding their pro-rata share of total wastewater costs based on flows. That is to say, there is an assumption that trade waste users and households pay equivalent costs per unit of wastewater flow.

[1] https://www.treasury.govt.nz/information-and-services/state-sector-leadership/guidance/financial-reporting-policies-and-guidance/discount-rates

3. Cost Analysis

3.1 Capital (Delivery) Costs

The below capital costs were developed by Beca based on scope prepared by GHD and Beca for each Project (Refer to section 8 of the Preferred Option Report appended to the Economic Case for a detailed breakdown of the costs). They are P50 cost estimates and include a 20-30% risk allowance on the capital costs[3]. An allowance of 10% for procurement and Council overhead costs has been added to the capital cost estimates for inclusion in the economic and financial cases. P95 estimates have also been prepared and are included in Appendix B of the Preferred Option Report.

Table FC - 2: Capital (delivery) costs

Programme Capital Costs ($000's, real)						
Project	**2022-31**	**2032-41**	**2042-51**	**2052-61**	**2062-71**	**Total**
Southern WWTP	29,900	40,260	16,500	150,150	-	236,810
Cambridge WWTP	115,720	4,290	6,050	10,780	-	136,840
Te Awamutu Upgrades	20,900	-	11,000	-	-	31,900
Mātangi WWTP Interim Upgrade	550	-	-	-	-	550
Tauwhare Pā WWTP upgrade	2,200	-	-	-	-	2,200
Total Capital Expenditure	**169,270**	**44,550**	**33,550**	**160,930**	**-**	**408,300**

3.2 Ongoing Costs

Operating and maintenance costs will be incurred once the new WWTPs are operational, and upgrades have been completed at the existing WWTPs. These costs cover power requirements, staff costs, maintenance costs, and finance costs. The costs are based upon the specified service levels outlined in the Economic Case Section [5]

Periodic renewal costs reflect the replacement of assets as they reach the end of their useful lives. Periodic renewal costs outside of the estimated 80-year asset lives were not included. Civils and structures are assumed to have an 80-year asset life while electrical and mechanical components are assumed to be refreshed every 20 years which is considered standard for assets of this nature.

An overview of the annual estimate for ongoing cost forecasts is provided in ***Table FC - 3.***

[3] Section [5.4] of the Economic Case sets out the details of the contingency allowance. The cost estimates are deemed to be Class 5 estimates as per the AACE Cost Estimate Classification System and have an expected accuracy range of -30% / +50%.

Table FC - 3: Ongoing costs summary

Programme Ongoing Costs (annual, $000's, real)					
Programme cost	**2031**	**2041**	**2051**	**2061**	**2071**
Southern WWTP operating costs	544	672	2,050	2,050	7,400
Cambridge WWTP operating costs	2,040	2,340	2,660	2,790	2,790
Te Awamutu WWTP operating costs	2,600	2,800	3,200	3,300	3,300
Tauwhare Pa WWTP operating costs	40	40	40	40	40
Hamilton South conveyancing operating costs	-	-	-	800	800
Mātangi conveyancing operating costs	-	102	102	102	102
Total operating costs	**5,224**	**5,954**	**8,052**	**9,082**	**14,432**

4. Risks and Complexities

There are a number of risks associated with delivering a relatively complex and long-term programme of works, which may impact the cost estimates. The key risks in relation to the Financial Case are summarised below:

- **Long-term programme:** The accuracy of cost estimates is likely to reduce the further out they are being forecasted, given the increasing levels of uncertainty. Additionally, the timing of certain elements of capital expenditure could change based on population growth and demand (i.e. those that rely on staged thresholds) which further reduces the level of uncertainty. Costs will also increase due to an uncertain amount of inflation which is likely to be significant over the length of the Programme.
- **Level of design work to support costings:** The level of design work that has been completed is a key constraint on the accuracy of cost estimates. Costs will be refined as the design work is further progressed through subsequent phases. The current cost estimates are deemed to be Class 5 estimates as per the AACE Cost Estimate Classification System and have an expected accuracy range of -30%/+50%.
- **Three Waters Reform programme:** The Three Waters Reform programme may significantly change the way wastewater projects and services are delivered across the region, which may affect the funding assumptions in the DBC.

The cost estimates outlined above will need to be updated and tested as the Programme progresses and the design for different elements is further developed and refined. As expected for major infrastructure programmes of this nature, in the early part of their lifecycle, a high-level contingency is included in the cost estimates to reflect the high degree of uncertainty. Contingencies across the Programme components will therefore reduce as the Programme progresses, and the level of risk and uncertainty decreases.

The Programme's complete risk register is attached as an Appendix to the Management Case.

5. Cost Allocation

5.1 Approach to Cost Allocation

Given the potential for the Projects to service communities that are located within different Territorial Authorities (TAs), the Project costs may need to be allocated amongst the Sub-regional Councils. This is largely applicable to the Southern WWTP that will ultimately service communities from multiple Councils. The cost allocation process involves two stages, as follows:

- Cost allocation methodologies were developed for each of the different Project components (e.g. capital costs for local reticulation, capital costs for conveyancing, etc.), which looked at the specific beneficiaries for each component.
- For each of these Project components, where applicable, costs are then split between the relevant councils depending on the proportion of communities that are served and time period over which they are served.

The objective of this approach is to ensure that the beneficiaries of the Projects are the ones that ultimately pay for them.

5.2 Cost Allocation Methodology

An overview of the cost allocation methodologies for each Project component is provided in ***Table FC - 4*** below.

Table FC - 4: Cost allocation methodology

Component	Methodology
Local reticulation – capital costs	Costs for upgrades or new local reticulation (where applicable) are proposed to be met by the relevant Council (or developer) on the basis that only beneficiaries within the territory would benefit from the works. The relevant Council is expected to recover these funds as additional properties are connected.
Conveyance - capital costs	Costs for upgrades or new conveyancing are proposed to be met by the Council relying on the conveyancing for connection. This is because the beneficiaries of the conveyancing would be located within that district (e.g. the capital cost of new pipes to connect Mātangi would be expected to be funded by Waikato District Council).
Conveyance - operating costs	As per conveyance capital costs, conveyance operating costs are proposed to be met by the Council that is using the conveyancing.
WWTP - capital costs (upgrades and new plants)	WWTP capital costs are proposed to be allocated between the Councils based on one of the following two formulations: • For a Project with only one stage, the level of Population Equivalent demand from users in the district serviced by the project over its useful life, compared to the level of Population Equivalent demand from users over its useful life; or • For a Project with multiple stages the proportion of capital costs for each stage will be allocated based on the level of Population Equivalent demand

	from users in its district by that stage of the Project over the useful life of that stage's assets, compared to the level of Population Equivalent demand from users over the useful life of that stage's assets. For a Project with multiple stages there will be a need to account for the reuse of assets from prior stages of the Project. In this case, immediately prior to each future stage being commissioned an assessment of the reusable value from prior stages will be undertaken. The reusable asset valuation will be used in the following ways: (i) added to the capital costs of the new stage and allocated using the same methodology set out above; (ii) used as the basis for compensation of the Council(s) that has funded the prior stage of the Project. This compensation could be delivered using a rebate to the Council or by netting off the Council's share of the reusable asset value from their funding obligations for the new stage of the Project.
WWTP - operating costs	WWTP operating costs are proposed to be allocated based on the proportion of Population Equivalent demand serviced by the WWTP, as a proxy for the distribution of beneficiaries. The calculation of the respective proportions will need to be updated regularly to reflect changes in the level of Population Equivalent demand in each district. The expectation is that the proportions will be estimated every three years (i.e. to align with Long Term Plan (LTP) cycles), and then confirmed at the start of each financial year as part of the Annual Planning process.
Land and consenting costs (Southern WWTP)	Given the land and consenting costs will benefit all stages of the Project, land acquisition, planning, and consenting costs for the Southern WWTP are proposed to be shared pro-rata[3] according to the estimated final state of wastewater flows in 2061. The base case timing assumes that Hamilton South will have been connected to the Southern WWTP by this point. No sale proceeds are assumed for surplus land if discharge to land is discontinued as the land will be retained as part of the future plant.

No realisation of value has been attributed to any land assets that are no longer required as part of the Southern WWTP as the it progresses through the three stages.

5.3 Project Funding Responsibilities for Each Council

Based on the above cost allocation methodology, a breakdown of the funding responsibilities for each council by project scope is provided in ***Table FC - 5*** below.

Table FC - 5: Council's contributing to each Project

Project	Project Scope	Funding
Southern WWTP	Land Costs	Hamilton City Council, Waipā, Waikato

[3] These flows represent the final state of the preferred option.

	Plant capital and operating costs	Hamilton City Council, Waipā, Waikato
	Conveyance – Hamilton South to WWTP – capital and O&M costs	Hamilton City Council
	Conveyance – Matangi/Tamahere/Tauwhare Pa to WWTP – capital and O&M costs	Waikato
	Decommissioning costs (Mātangi)	Waikato
	Plant capital and operating costs	Waikato
Cambridge	Conveyance and reticulation - capital and O&M costs	Waipā
	Capital and O&M costs	Waipā
Mātangi and Tauwhare Pā upgrades	Capital and O&M costs	Waikato
Te Awamutu upgrades	Capital and O&M costs	Waikato

As can be seen in the table, the costs are generally allocated to the council where the Project is located, except for the Southern WWTP where all three councils will contribute to the costs. The specific split of costs for the Southern WWTP is further discussed below.

5.4 Funding Split for the Southern WWTP

The proportion of costs for each scope item for the Southern WWTP is determined by the proportion of communities that are served and time period over which they are served and the life of the asset. The result of this allocation is demonstrated in the table below.

Table FC - 6: Cost allocation to Southern WWTP (pre-reuse calculations)

Southern WWTP Project Stage / Scope	HCC	Waipā DC	Waikato DC
Land purchase, planning and consenting	77%	22%	1%
WWTP Groundworks	77%	22%	1%
WWTP Stage 1 – 80 year life	0%	100%	0%
WWTP Stage 1 – 20 year life	0%	100%	0%
WWTP Stage 2a – 80 year life	0%	90%	10%
WWTP Stage 2a – 20 year life	0%	93%	7%
WWTP Stage 2b – 80 year life	0%	96%	4%
WWTP Stage 2b – 20 year life	0%	97%	3%
WWTP Stage 3 – 80 year life	82%	17%	1%
WWTP Stage 3 – 20 year life	77%	23%	1%

Land, planning and consenting costs for the Southern WWTP are split between the three councils based on the proportion of wastewater flows at 2061. For the purpose of the DBC the capital costs for the early stages of the plant are largely allocated to Waipā DC given its communities are the main beneficiaries of the Project. By stage three when wastewater flows are connected from Southern Hamilton, a significant proportion of the costs are allocated to HCC as they are the main beneficiary.

Importantly, given the Southern WWTP will be delivered through a staged approach with staggered investment decisions, this framework provides flexibility to realign the allocation of costs if communities are connected at different times, or different communities are connected to what is assumed in the DBC. A 'go forward' assessment will be carried out prior to investment decisions, including a reassessment of the estimated population growth and the required technical solution.

The reuse of existing Southern WWTP assets at the commencement of each staged item has been included in the cost allocation estimates below. To ensure there is an equitable allocation of costs between the Councils, the condition and value of existing assets will need to be considered at each of the different stages.

Additionally, there is potential for Waikato Regional Airport Limited (WRAL or the Airport) to provide funding for the project which could influence the cost allocation for stage one. The Airport has immediate servicing requirements for its existing and proposed developments in the area and discussions with the Airport have signalled the potential to work together to provide a wastewater solution that meets their needs and aligns with the future servicing needs of the broader Metro area.

5.5 Council Cost Allocation

Based on the capital costs outlined in Financial Case Section [3] and the cost allocation approach set out above, a breakdown of each council's share of the costs of the Programme is set out below.

Table FC - 7: Council cost allocation

Cost allocation for each Project ($000s, real)

Project	Council	2022-31	2032-41	2042-51	2052-61	2062-71	Total
Southern WWTP	HCC	15,300	-	-	119,627	-	134,927
	Waipā DC	14,481	29,204	18,296	(5,069)	-	56,911
	Waikato DC	119	3,796	(1,796)	(158)	-	1,962
	Total	**29,900**	**33,000**	**16,500**	**114,400**	**-**	**193,800**
Mātangi conveyancing costs	Waikato DC	-	7,260	-	-	-	7,260
Hamilton South conveyancing costs	HCC	-	-	-	35,750	-	35,750
Southern WWTP (incl. conveyance)	Total	29,900	40,260	16,500	150,150	-	236,810
Cambridge WWTP	Waipā DC	115,720	4,290	6,050	10,780	-	136,840
Te Awamutu Upgrades	Waipā DC	20,900	-	11,000	-	-	31,900
Mātangi and Tauwhare Pā Upgrades	Waikato DC	2,750	-	-	-	-	2,750
Total		**169,270**	**44,550**	**33,550**	**160,930**	**-**	**408,300**

* A negative figure represents a rebate to the Council due to the reuse of assets that it has already paid for under the previous stages. Please see Table 3 for further detail on Cost Allocation Methodology.

Operating costs	Council	2031	2041	2051	2061	2071
Southern WWTP*	HCC	-	-	-	1,670	6,027
	Waipā DC	544	624	1,998	365	1,318
	Waikato DC	-	48	52	15	55
	Total	**544**	**672**	**2,050**	**2,050**	**7,400**
Cambridge WWTP	Waipā DC	2,040	2,340	2,660	2,790	2,790
Te Awamutu	Waipā DC	2,600	2,800	3,200	3,300	3,300
Tauwhare Pa	Waikato DC	40	40	40	40	40
Southern Hamilton Conveyance	HCC	-	-	-	800	800
Matangi Conveyance	Waikato DC	-	102	102	102	102
Total		**5,224**	**5,954**	**8,052**	**9,082**	**14,432**

Despite not connecting to the Southern WWTP until 2061, HCC is contributing $16 million in the ten-year period ending 2031 for land and consenting costs. Purchasing the site early has a number of benefits to HCC:

- Acquiring the land now preserves flexibility and optionality for a long term wastewater solution e.g. if Pukete capacity runs out sooner than anticipated or if the pace of

development South of Hamilton is faster than anticipated. The need for flexibility is further highlighted by the Housing Supply Bill that the Government announced recently which has the potential to both bring forward development, and increase the density of development, in the Hamilton Metro area.

- Purchasing the site early ensures the planned Southern WWTP can be carried out without the need to modify consents or design work later should the site no longer be available.
- A significant amount of development is expected to occur in the sub-region resulting in strong demand for developable land parcels. Securing the site now will likely reduce the cost of the overall Programme by avoiding paying for substantial growth in land values if the site were to be purchased in future.

Costs for the other Projects in Table 4 are allocated to the council where the Project is located, which demonstrates there is limited cross boundary servicing for these assets.

6. Lead Council Delivery Model

6.1 Overview of the Lead Council Structure

The Projects are proposed to be delivered by a single council as the sole beneficiary of the Project or in the case of the Southern WWTP on behalf of the other Sub-regional Partners (the Lead Council). The Lead Council will utilise its existing resources, policies and procedures to deliver the Project (See Management Case Section [1.2.2 Project Management Arrangements]).

Under the Lead Council model there is optionality regarding how each Programme is financed:

- Financing for each Council's share of the capital costs is raised by each respective Council and passed through to the Lead Council. This is the approach generally applied in the Financial Case.
- Financing of the full project cost is proposed to be undertaken by the Lead Council and where costs have been allocated other councils (the Non-Lead Council), costs are proposed to be recouped through a servicing agreement. Of the different Projects, this arrangement is most relevant to the Southern WWTP. A sensitivity assessment illustrating the impacts of this approach is included in Financial Case Section [9.4]
- The Non-Lead Council is expected to meet the service payment through applying its preferred funding tools to the communities that benefit from the Project within its respective territorial boundaries. These arrangements are further discussed below.

6.2 Responsibilities

The Lead Council will be responsible for the following activities:

- Purchasing land and securing consents and designations.
- Procurement, design and construction of the assets.
- Depending on the financing structure chosen, financing the construction directly and collecting funding from other councils (if required) via a service agreement or direct contribution.
- Owning and operating the assets.

Non-Lead Councils will be responsible for the following activities:

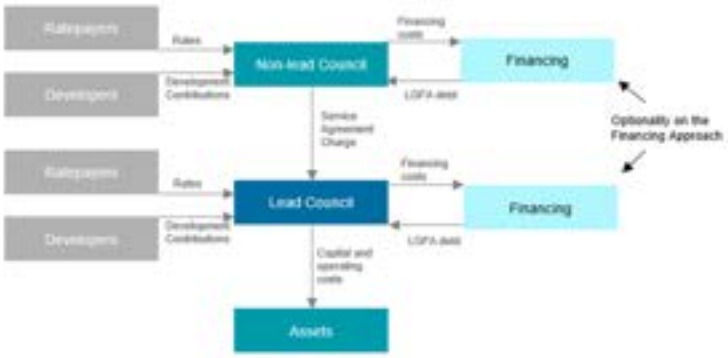
- Supporting the Lead Council with design and procurement (as required).
- Imposing and collecting the preferred funding tools within their respective territorial boundaries.
- Paying their respective contributions to the Lead Council via a service agreement.

6.3 Service Agreement and Funding and Financing Flows

If a service agreement is required, the arrangement between the Lead Council and Non-Lead Councils will be formalised through a service agreement. This service agreement will set out the levels of service and the specific cost sharing arrangements and mechanics for the Project.

An overview of how the funding and financing flows between the Lead Council and the Non-Lead Councils is provided in Figure FC - 1 below.

Figure FC - 1: Funding and financing flows



These Service Agreements will need to be established well before the commencement of each Project. Further information on the Lead Council model is provided in Management Case Section [1.4 Project Management Planning].

6.4 Project Lead Councils

An overview of the Lead Council for each of the Projects is provided in the table below. The Lead Council for each Project was determined based upon the location of the primary beneficiaries of each project.

Table FC - 8: Project Lead Councils

Project	Lead Council
Southern WWTP	Hamilton City Council
Cambridge WWTP	Waipā
Te Awamutu upgrades	Waipā
Mātangi and Tauwhare Pā upgrades	Waikato

7. Funding and Financing

7.1 Introduction and overview

Due to the size and scale of the Programme of works, there is likely to be a significant upfront and ongoing funding requirement. Accordingly, a combination of different capital and operating funding sources will be required to generate sufficient revenue. Financing is likely to be required to smooth and spread the delivery phase costs across the life of the project. This section sets out the evaluation of funding and financing options and recommends a preferred funding and financing solution.

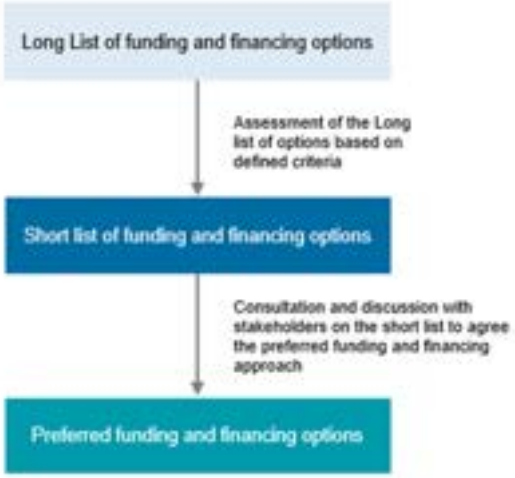
7.2 Approach

The following steps were taken to determine the preferred funding and financing approach.

- Development of a long list of funding and financing options.
- Development of assessment criteria to evaluate the funding and financing options.
- Assessment of long list of options against the criteria to determine a short list of funding and financing options.
- Consultation and discussion with stakeholders on the short list to agree the preferred funding and financing approach.

This approach is outlined in Figure FC - 2 below.

Figure FC - 2: Funding and financing option long list to preferred option process



7.3 Long List of Options

The following long lists of funding and financing options were developed to capture all reasonable options available to fund and finance the Programme.

Figure FC - 3: Long list of funding and financing options

Funding Options	Financing Options

Council funding	General rates	**Debt**	LGFA
	Targeted rates		Bank debt
	Development contributions[4]		Bespoke Crown loan
Crown funding	Specific Crown fund		Crown DMO lending
	Crown operational subsidy/assistance		Bonds/private placements
Direct funding	User pays		Subordinated/convertible instruments
	Long term commercial arrangements	**Equity**	Council equity
Value capture	IFF levy		Crown equity
	Negotiated contribution		Iwi equity
	Private sector partnering		Private equity
	Public sector partnering		

Transferring financing risk to the private sector through the contracting model (e.g. through a Design, Build, Finance, Operate and Maintain model) was considered as part of the Commercial Case, but was not ultimately preferred.

7.4 Assessment Criteria

A set of assessment criteria to evaluate funding and financing options were developed based on:

- **Precedent transactions:** Consideration given to learnings from other comparable projects.
- **Stakeholder input:** Workshopping with key stakeholders to ensure that all interests were appropriately considered.
- **Applicability:** The criteria needed to ensure that options were effectively evaluated and were applicable to the proposed long lists.
- **Wider objectives and criteria:** Where relevant, the criteria reflect the investment objectives and Programme KPIs (refer Strategic Case [Section 3.3 Investment Objectives]).

The assessment criteria are outlined in Table FC - 1 below.

Table FC - 9: Funding and financing assessment criteria

Criteria	Description and application to Financial Case options
Customer / Social Outcomes	The extent to which the funding and financing options enhance the social objectives of the Programme, prioritising ratepayer affordability and promoting intergenerational equity. The funding and financing options should accommodate investment from stakeholders who prioritise the long-term health of Waikato's rivers and the sustainability of the Programme.
Timing and Budget Certainty	The extent to which the funding options provide certainty and predictability to stakeholders on the level and timing of contributions. How predictable are the rating implications of the funding options. The extent to which financing options are able to meet changes in the Programme budget to deliver the Programme. Are councils able

[4] Inclusive of trade waste and bulk supply arrangements.

	to reliably forecast the timing and quantum of their capital contributions. Do the funding and financing options create additional risk to project timeframes.
Deliverability	The extent to which the funding and financing options can be easily implemented. Can the funding or financing options be achieved within the timelines of the project and are the financial case options likely to place significant administrative burden on the project. Are the funding or financing options likely to incur public opposition, require public consultation or a lengthy design and implementation processes.
Risk Allocation and Management	The extent to which the funding and financing options allocate risk to the party best able to manage it, promoting equity between ratepayers and other stakeholders. Where external capital providers are included in the Programme, they should bear some exposure to the operating performance of the entity.
Market Interest & Capability	The extent to which the funding and financing options will maximise interest in the project, improving competition, pricing and cost outcomes and ultimately delivering value for money. Financing options should generate sufficient interest to achieve competitive pricing and / or bring capability that is beneficial to the delivery of the project.
Flexibility	The extent to which the funding and financing options are able to adapt to changes in economic regulation and sector reform throughout the delivery life of the project. Are the funding and financing options able to be adjusted during the operations of the project to maintain equity of cost sharing across ratepayers and other stakeholders.

7.5 Evaluation and Short Listing of Options

Options were initially evaluated against the assessment criteria outlined above, with a focus on identifying whether there were any reasons that would prevent an option from being taken through to the short list. An overview of the assessment is provided in the tables below.

Funding options were assessed against the criteria for each of the key beneficiary groups of the Programme; municipal users and trade waste users. All funding tools were progressed to the short list stage as no funding tools were fatally flawed for all key beneficiary groups of the Programme. The full long list assessment of the funding options is set out in Appendix 1.

Table FC - 10: Evaluation of funding options

Funding Option	Assessment	Progress to short list
General rates	No material issues identified for any beneficiary groups.	Yes.
Targeted rates	No material issues identified for any beneficiary groups.	Yes
Development contributions	Not appropriate for Household beneficiaries, by appropriate for other groups.	Yes.
Crown funding support	Would benefit the Programme by reducing the financing burden required from other beneficiary groups.	Yes.

User pays	Not appropriate for property developers as they do not own the property long term, but appropriate for other beneficiary groups.	Yes.
Long-term commercial arrangements	Only appropriate for large industrial and commercial users due to the complexity of negotiating bespoke arrangements.	Yes.
IFF levy	No material issues identified for any beneficiary groups.	Yes.
Negotiated contribution	Not taken forward for municipal (household) and smaller trade waste users due to concerns regarding Deliverability.	Yes.
Public or Private development partnering (e.g. Kāinga Ora)	Only relevant to property developers, not applicable for the other user groups.	Yes.

At the time of the short listing process, it was unclear as to whether a new entity would be used to deliver the Programme. The table below summarises the long list evaluation of financing options, which were assessed against whether a new entity was required or whether it would be delivered by Councils. The full long list assessment of the financing options is set out in Appendix 2.

Table FC - 11: Evaluation of financing options

Financing Option	Assessment	Progress to short list
LGFA	No material issues identified.	Yes.
Term lending - bank debt or non-bank private placement loan	Not taken forward for Council entity due to higher interest costs than LGFA debt (Social Outcomes criteria).	Yes, for new entity borrowing.
Bespoke Crown loan	No issues identified, subject to Crown willingness.	Yes.
Crown DMO lending	Not taken forward as LGFA financing negates the need, and would introduce complexity and Deliverability risk.	No.
Bonds	Not progressed due to material issues with Deliverability and Timing and Budget Certainty.	No.
Subordinated / convertible instruments	Only progressed for a new entity, however significant hurdles identified due to the likely return requirements of these types of instruments.	Yes, for a new entity only.
Council equity	Only suitable for a new entity.	Yes, for a new entity only.
Crown equity	Only suitable for a new entity.	Yes, for a new entity only.
Iwi equity	Only suitable for a new entity.	Yes, for a new entity only.
Private equity	Only suitable for a new entity.	Yes, for a new entity only.

7.6 Short List

The long list assessment process resulted in the following short list:

Table FC - 12: Funding and financing short lists

Funding Option	Progress to short list	Financing Option	Progress to short list
General rates	✓	LGFA	✓
Targeted rates	✓	Term lending - bank debt or non-bank private placement loan	X Concerns regarding customer outcomes regarding affordability
Development contributions	✓	Bespoke Crown loan	✓
Crown funding support	✓	Crown DMO lending	X Deliverability risk as LGFA already fills this role
User pays	✓	Bonds	X Concerns regarding customer outcomes regarding Deliverability
Long-term commercial arrangements	✓	Subordinated / convertible instruments	X Deliverability risk as no new entity to be established
IFF levy	✓	Council equity	X Deliverability risk as no new entity to be established
Negotiated contribution	✓	Crown equity	X Deliverability risk as no new entity to be established
Public or Private development partnering (e.g. Kāinga Ora)	✓	Iwi equity	X Deliverability risk as no new entity to be established
		Private equity	X Deliverability risk as no new entity to be established

7.7 Preferred Funding and financing solution

The preferred funding and financing solution was determined following engagement with each of the Councils on the short list of funding and financing options. The preferred solution was to leverage the current funding and financing approaches for each Council (i.e. aligned to the relevant revenue and financing policies). Under this solution, each Council is responsible for determining and implementing their preferred funding and financing approach.

This solution was preferred for the following key reasons:

- Existing approaches are well understood by Councils.
- Existing approaches are easily implementable and reduce costs associated with establishing a new funding methodology.
- Under the Lead Council structure these funding and financing tools align with existing policies and procedures.

- These "business as usual" tools maintain flexibility to transition to a new three waters entity, if required as a result of sector reform.

The potential to impose a long-term levy through the Infrastructure Funding and Financing Act was considered, however the additional implementation challenges (e.g. requirement to develop a Levy Proposal, requirement to receive Ministerial approval, etc.) were considered a significant barrier.

An overview of the current funding and financing approaches for each Council is provided in the table below.

Table FC - 13: Preferred options - Current Council funding and financing approaches

Council	Current funding approach	Current financing approach
HCC	General Rates and Development Contributions (including trade waste or bulk supply arrangements)	Generally debt funded through the LGFA
Waipā DC	Targeted Rates and Development Contributions (including trade waste or bulk supply arrangements)	Generally debt funded through the LGFA
Waikato DC	Targeted Rates and Development Contributions (including trade waste or bulk supply arrangements)	Generally debt funded through the LGFA

Commensurate with the requirement to operate in a financially prudent manner and within a balanced budget, the expectation is that financing is only used for capital costs. The Financial Case does not include any allowance for Crown funding support.

7.8 Potential Airport Involvement

The Airport requires a wastewater solution to meet existing demand and proposed development and population growth around the Airport. Given the Airport will need to meet the costs of these upgrades themselves, they are open to contributing to a Southern WWTP if it would meet their requirements. This contribution may provide financial assistance to the Southern WWTP in the future through a contribution of either land to use for the Southern WWTP or direct financial support. Further discussions between the Airport and the Programme are required to further develop the Airport's role and contribution to the Programme. Any impacts that result from the Airport's involvement (including technical design changes, unbudgeted financial contributions etc) will need to be assessed. There is likely a need for an interim wastewater servicing solution at the Airport until the Southern WWTP is operational. This has not been included within the preferred option.

8. Affordability

8.1 Introduction and Overview

A high-level assessment of the affordability of the Programme was undertaken based on as assessment of:

- The burden on ratepayers to fund the additional general and / or targeted rates;
- The cost to developers of development contributions; and

- The debt headroom under the current relevant LGFA covenants for each of the Council.

The high-level assessment indicates that the Programme is affordable. However, this should continue to be tested as certainty over the timing and magnitude of costs increases.

8.2 Ratepayer Affordability

An overview of the estimated annual impact (i.e. the incremental increase in rates per ratepayer) of the Programme on ratepayers is provided in the following table.

Table FC - 14: Estimated rating impact

Year	2031	2041	2051	2061	2071
HCC – General Rate	$112	$88	$75	$386	$612
Waipā DC – Southern WWTP Targeted Rate	$403	$874	$468	$282	$304
Waikato DC – Southern WWTP Targeted Rate	-	$2,153	$1,631	$1,257	$1,266
Waipā DC – Cambridge WWTP Targeted Rate	$520	$394	$368	$352	$331
Waipā DC – Te Awamutu WWTP Targeted Rate	$260	$300	$315	$287	$276
Waikato DC – Mātangi & Tauwhare Pa Targeted Rate	$110	$466	$435	$404	$371

An overview of the affordability of these rates increases is provided in the table below. The assessment is based upon the 5% affordability threshold that was identified in the 2007 COVEC report into rates affordability. Ratepayer affordability has been assessed based on adding the average rating impact for a ratepayer to the average household rates bill as provided by the Councils. At the date of this document, Waikato District Council did not participate in this rating survey.

Table FC - 15: High-level rates affordability assessment

Council	Median Household income (2021)	Affordability threshold (5%)	Average rates per household	Average additional project rating impact	Total rating burden	Affordability check
HCC – Southern WWTP	$77,485	$3,874	$2,770	$499*	$3,269	✓
Waipā DC – Southern WWTP			$3,092	$466	$3,558	✓
Waikato DC – Southern WWTP			$2,649	$1,577	$4,226	-
Waipā DC – Cambridge WWTP			$3,092	$393	$3,485	✓
Waipā DC – Te Awamutu WWTP			$3,092	$288	$3,380	✓

Waikato DC – Mātangi & Tauwhare Pa upgrade			$2,649	$357	$3,006	✓

* Average additional project rating impact calculation only considers years 2061 and 2071 for HCC i.e. after Hamilton South switches to using the Southern WWTP. The additional rating impact would not be applied to Hamilton North.

Source: Stats NZ

Table FC - 15 demonstrates that the rating impacts generally fall within the affordability thresholds set out by COVEC based on the average additional project rating impact for each Council's ratepayers. The exception to this is the Waikato DC – Southern WWTP rating impact which is above this threshold by 9%. This is primarily driven by the costs of conveyancing from Mātangi to the Southern WWTP, with the relative rating impact reducing as further growth comes online in the future. It should be noted that there are likely other costs that would need to be considered in more detail prior to implementing an increase in rates, such as additional water related costs, mortgage servicing costs and other cost of living increases.

Under current council policies, HCC uses a general rate whereas Waikato DC and Waipā DC use a targeted rate. To provide a complete picture of the ratepayer affordability, Pukete upgrade costs would also need to be included in HCC's rating impact assessment. This will be considered as part of the Northern Metro Wastewater DBC.

8.3 Affordability of development contributions

The potential affordability of the development contributions required for the Programme was estimated through the following approach.

- An assessment was undertaken on the portion of costs that the Lead Council would need to recover from its ratepayer base[5].
- An estimate was made of the portion of the Project that is attributable to growth. The increase in Population Equivalent units of demand over the forecast operational life of the project was used as a proxy for growth.
- Then a calculation was made to determine the pro-rata allocation of these costs to the amount that is attributable to growth. It is assumed this amount can be recovered from development contributions.
- A financing charge was then applied based on the respective interest rates for each Council and solved for a level of development contribution that recovers the cost allocated to growth over the life of the Project.

A more detailed assessment of the proportion of total capital costs that are attributable to growth, service improvement and renewal expenditure will need to be completed once cost estimates are refined. Any third-party contributions made to the project will also need to be considered when calculating the level of development contributions. This analysis assumes that no financial contributions are received from the Airport.

The estimated development contribution per Household Unit Equivalent (HUE) of demand for each of the Councils is provided in the table below. Population data has been divided by 2.5 to convert it into HUE's.

[5]Assumed that trade waste users and households pay equivalent costs per unit of wastewater flow.

Table FC - 16: Estimated development contributions (per HUE of demand)

Council	2031	2041	2051	2061
Hamilton CC – Southern WWTP	-	-	-	-
Waipā DC – Southern WWTP	$9,728	$9,728	$9,728	$9,728
Waikato DC – Southern WWTP (Matangi and Tamahere Commercial)	-	-	-	-
Waipā DC – Cambridge WWTP	$7,327	$7,327	$7,327	$7,327
Waipā DC – Te Awamutu WWTP	$2,162	$2,162	$2,162	$2,162
Waikato DC – Mātangi & Tauwhare Pa	$6,261	$6,261	$6,261	$6,261

The development contributions reflect the portion of Project costs that are allocated to growth beneficiaries for each council. No development contributions are shown for HCC or Waikato DC for the Southern WWTP as the plant will only be servicing existing HCC and Waikato DC communities during the time period to 2061. The development contributions set out above compare reasonably to existing levels charged by the Councils, falling near the middle of existing wastewater related charges for the Councils.

8.4 Affordability for Councils

An overview of the indicative impact on each Council is provided in the following figures, including a comparison against the Council's current LGFA debt to revenue covenants.

As a debt obligation, the full borrowings are expected to be treated as being 'on-balance sheet' from a credit rating and accounting perspective.

For a Non-lead Council that has entered into a servicing agreement with a Lead Council, it will have a contractual payment obligation in respect of its allocation of capital and operating costs for the Project. The accounting treatment for these servicing agreements will depend on the specific commercial arrangements that are agreed. It is recommended that formal accounting advice should be sought once the service agreement has been agreed to confirm its accounting treatment.

From an accounting perspective, the accounting treatment follows the substance of the arrangement rather than its legal form. Since the arrangement constitutes the use of an asset, it would need to be determined whether:

- The arrangement constitutes a service concession arrangement in the scope of PBE IPSAS 32;
- Whether the arrangement constitutes / contains a lease in the scope of PBE IPSAS 13; and
- Whether the lease should be classified as an operating lease or finance lease.

The key factors assessed under these tests include:

- Level of control
- Exclusivity of use; and
- Residual interest in the asset

The affordability analysis for Councils was based on whether (or not) the financial impacts of the Programme resulted in any of the Councils breaching their LGFA debt to revenue financial covenants.

The estimated financial impact on the debt to revenue ratio for each of the Councils over the next 10 year LTP period is provided in the Figures below. Debt forecasts were not available beyond this period.

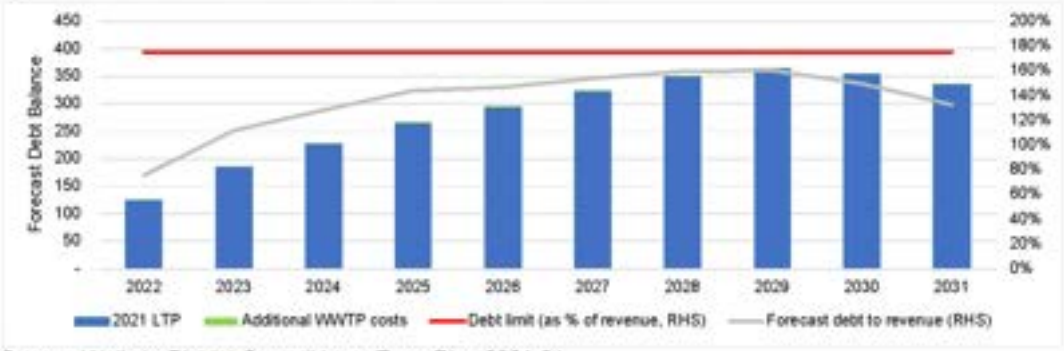
Figure FC - 4: Forecast HCC debt to revenue ratio

Source: Hamilton City Council Long Term Plan 2021-31

Figure FC - 5: Forecast Waipā DC debt to revenue ratio

Source: Waipā District Council Long Term Plan 2021-31

Figure FC - 6: Forecast Waikato DC debt to revenue ratio



Source: Waikato District Council Long Term Plan 2021-31

Note: Revenue received from development contributions has been excluded from the revenue figures as they are not included in the LGFA's metrics due to their one-off and uncertain nature.

As demonstrated in the charts, the councils are forecast to remain within the debt to revenue caps after allowing for the impact of the Programme over the next 10 years, although HCC do get close to breaching their debt limit.

9. Sensitivity Analysis

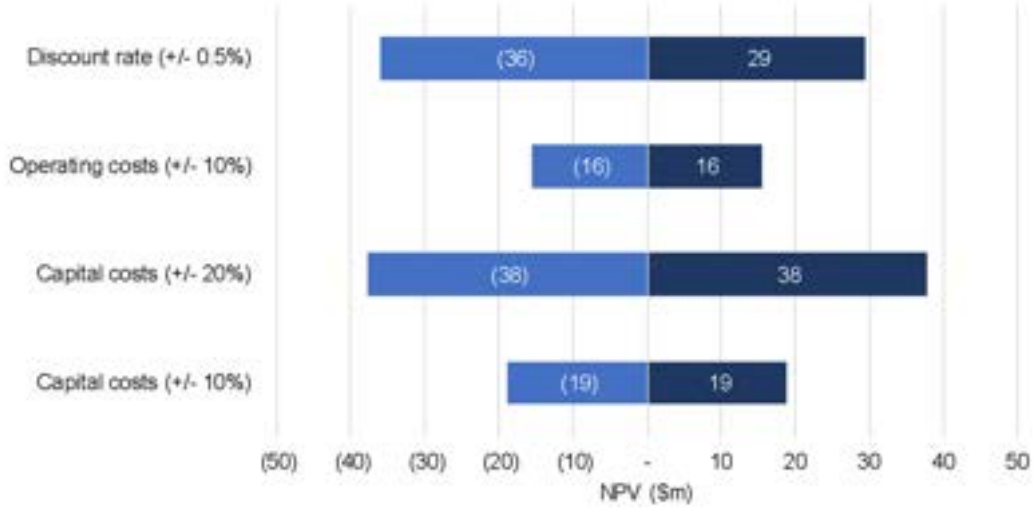
9.1 NPV analysis

A NPV for the overall Programme has been determined to understand the current value of all the future cash flows of the Programme. This measure can be used to test the sensitivity of the Programme to changes in the underlying assumptions (e.g. inflation or changes to costs).

The estimated NPV for the Programme is -$344.1 million, which is based upon the capital and ongoing costs outlined in [Section 3- Cost Analysis] and a five-percent real discount rate (as per the New Zealand Treasury guidance).

Sensitivity analysis was carried out to understand the potential impact on the NPV as a result of several key risks eventuating. The risks include changes to inflation, operating costs and capital costs and the results are outlined in Figure FC - 7 below.

Figure FC - 7: NPV sensitivity analysis



The NPV sensitivity analysis indicates that the impact of these risks eventuating is relatively minor in the context of the overall NPV for the Programme. However, this is primarily because most of the capital and ongoing costs are expected to be incurred later in the Programme and are therefore heavily discounted as part of the NPV analysis. Accordingly, there is still expected to be a material impact on affordability if there are significant cost overruns.

9.2 Debt limit sensitivities

A similar analysis has been undertaken to test the impact on the Council debt to revenue ratios. Again these measures were evaluated after applying changes to inflation and capital costs. The results of this analysis are outlined below:

Figure FC - 8: HCC debt limit sensitivities

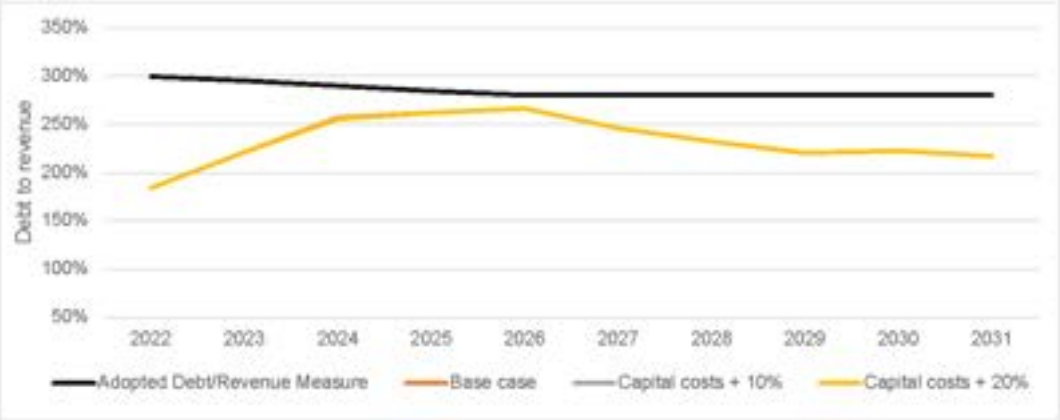


Figure FC - 9: Waipā DC debt limit sensitivities

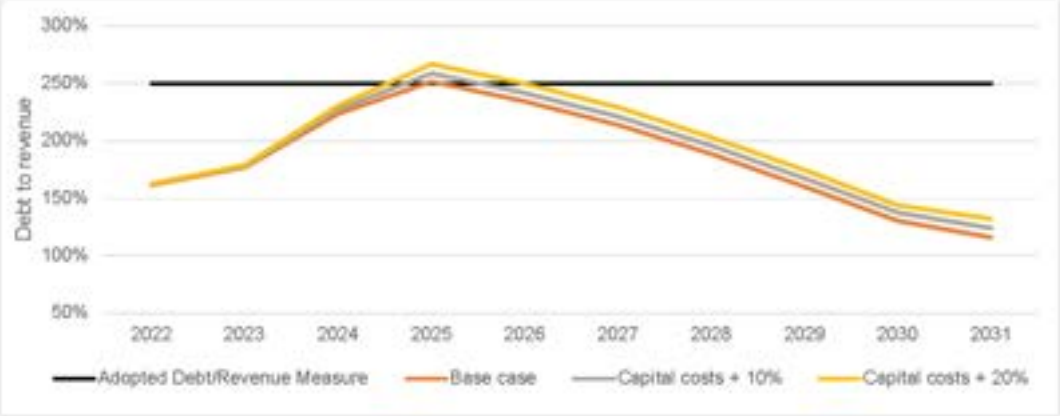
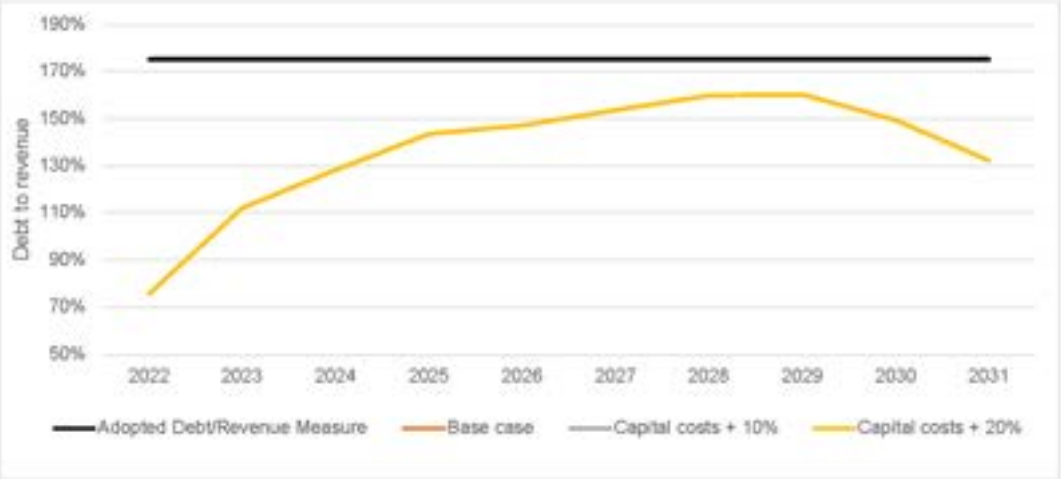


Figure FC - 10: Waikato DC debt limit sensitivities



The analysis above identified that HCC and Waikato DC are not significantly impacted in the next 10 years due to the comparatively small capital expenditure and although Waipā DC's debt does increase, this is relatively minor in scale compared to their current debt portfolio.

9.3 Subregional cost allocation approach

At the request of the Councils, a scenario has also been considered to examine the impacts of a sub-regional approach to wastewater cost allocation to understand the level of charging that would be required to distribute the costs of the Programme equitably across the subregion.

Under this scenario, costs and beneficiaries from the Northern Metro area are included in the analysis so that rates are harmonised across the Northern and Southern Metro areas. Costs of $393.1 million for the construction of the Pukete and Ngaruawahia WWTPs are included in the analysis. These costs exclude buffer storage, reuse and outfall replacement costs. These are being considered in more detail as part of the Northern DBC.

There is potential that other Northern Metro area wastewater capital costs may need to be included in the final calculation that have not been captured as part of this analysis.

The estimated targeted rate and development contribution are presented below in ***Table FC - 17***.

Table FC - 17: Subregional cost allocation approach

Year	2031	2041	2051	2061+
Subregional targeted rate (per Population Equivalent)	$73	$85	$81	$79
Development Contribution (averaged across the region)	$2,249	$2,249	$2,249	$2,249

9.4 Alternative financing model

We have also considered the impact of the alternative approach whereby the Lead Council finances the project in its entirety and charges the participating Councils a service delivery charge. Under this approach HCC will need to borrow significantly more to finance the delivery of the early stages of the Southern WWTP and recover these costs through a service agreement charge. The allocation of costs will not change between either financing approach.

Figure FC - 11: Forecast HCC debt to revenue ratio

Under the alternative financing approach, HCC needs to borrow $15 million more than under the base case. HCC will finance the land purchase, consenting and initial plant groundworks on its balance sheet, and then recover these costs from the Non-Lead Councils. This impact would be more severe in the 2032-2051 period where HCC will need to borrow a significant amount to fund assets it carries only a small amount of cost burden for. This financing approach brings HCC closer to its debt limit but still does not result in a breach.

10. Appendices

Appendix 1 – Funding Options Assessment

#	Description	Municipal (households)	Municipal (developers)	Trade waste (smaller commercial)	Trade waste (larger industrial)	Comments /Justification
Council funding						
1	General rates	✓	✓	✓	✓	No material issues identified for any user group.
2	Targeted rates	✓	✓	✓	✓	No material issues identified for any user group.
3	Development contributions	✗	✓	✓	✓	Development contributions not taken forward for municipal (household) users who cannot be charged these. Development contributions appropriate for remaining user groups although larger trade waste users likely to fall under negotiated contributions.
Crown funding						
4	Crown funding support	✓	✓	✓	✓	No material issues identified for any user group. Although this option does not align with the user groups, the impact of Crown funding support would be to reduce the funding requirements of the project. We note that upfront Crown funding is likely preferred.
Direct funding						
5	User pays	✓	✗	✓	✓	Not taken forward for property developers as

[6] General rates were originally excluded in the material presented to the Stakeholder and Governance Groups due to not aligning the costs of the Programme with beneficiaries. Following a change in the preferred option, we have revised this conclusion to now carry general rates forward to the short list to accommodate the Councils preferences.

						they do not hold the property long term and therefore do not provide a long term source of funding for the WWTP.
6	Long-term commercial arrangements	X	X	X	✓	Not taken forward for municipal waste users and smaller trade waste users as it is not viable to negotiate with these user groups individually. Dismissed over Deliverability concerns. No material issues identified for larger industrial trade waste users.
Value Capture						
7	IFF levy	✓	✓	✓	✓	No material issues identified for any user group.
8	Negotiated contribution	X	✓	X	✓	Not taken forward for municipal (household) and smaller trade waste users due to complexity and time requirements for negotiations with individual parties. Dismissed over Deliverability concerns. Negotiated contributions viable for developers/large users.
9	Public or Private development partnering (e.g. Kāinga Ora)	X	✓	X	X	Only relevant to property developers, not applicable for the other user groups.

1.

Appendix 2 – Financing Options Assessment

#	Description	Assessment	Comments/Justification
Debt			
1	LGFA	✓	No material issues identified.
2	Term lending - bank debt or non-bank private placement loan	✗	Not taken forward as commercial lending may be more expensive than LGFA debt. If lending directly to councils then it will be on-balance sheet at higher cost, providing questionable benefit.
3	Bespoke Crown loan	✓	No material issues identified. Need to understand extent of Crown appetite and risk of precedent setting.
4	Crown DMO lending	✗	Not taken forward as access to LGFA financing negates the need for DMO lending.
5	Bonds	✗	Not taken forward. Bonds would need to be of sufficiently large scale to be viable, would incur large expenses in securing the financing and would place a large administrative burden on the WWTP. Dismissed due to Timing and Budget Certainty, Market Interest and Capability, and Deliverability concerns.
6	Subordinated / convertible instruments	✗	Not taken forward if no new entity is created as it would not be able to provide a third party equity stake.
Equity			
7	Council equity	✗	Council equity is only relevant if a new entity e.g. CCO, is created to deliver the WWTP and is not applicable otherwise.
8	Crown equity	✗	Crown equity is only viable if a new entity is created to deliver the WWTP.
9	Iwi equity	✗	Third party equity is only necessary if a new entity is created to deliver the WWTP either as part of the delivery structure.
10	Private equity	✗	Third party equity is only necessary if a new entity is created to deliver the WWTP either as part of the delivery structure.

Commercial Case Contents

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Executive Summary – Commercial Case

1.1. Introduction

This document sets out the Commercial Case for the Waikato Southern Metro Wastewater Treatment Detailed Business Case (DBC).

The purpose of the Commercial Case is to demonstrate the preferred option will result in a viable procurement and a well-structured deal between the public sector and its service providers.

The Commercial Case considers the approach to packaging and contracting options, the procurement plan, potential for risk sharing and the planned contractual arrangements.

1.2. Project Definition

The preferred option comprises a programme (the Programme) of wastewater treatment plant (WWTP) and conveyance works across the wider Waikato-Hamilton Waipā Metro Area (the Projects). The Projects are outlined below:

- Southern Sub-regional WWTP (Southern WWTP): Construction of a new WWTP to service the Waikato Regional Airport (the Airport) industrial precinct, Mātangi/Tamahere Hub and southern Hamilton. The WWTP is expected to be located between Rukuhia and the Airport and will be delivered in three stages to align to the estimated demand. Initially, the WWTP will discharge to land, but will discharge to water and ultimately into the Waikato River once stage two triggers are reached.
- Cambridge WWTP: Construction of a new WWTP at Cambridge with discharge to the Waikato River to replace the existing plant. The plant will be located on the same site as the existing plant.
- Te Awamutu upgrades: Upgrades to the existing plant at Te Awamutu, which will continue to discharge via rock channel to the Mangapiko Stream.
- Mātangi and Tauwhare Pā upgrades: Improvements to the existing Mātangi WWTP, which will remain online until the wastewater is conveyed to the Southern WWTP or Hamilton City Council (HCC) network around 2040. Upgrades to the existing Tauwhare Pā WWTP, which discharges to land.

These Projects will be delivered by a single council on behalf of the other Sub-regional Partners (the "Lead Council"). The Lead Council will utilise its existing resources, policies and procedures for project delivery.

1.3. The Procurement Strategy

1.1.1 Project Attributes

The key project attributes which are relevant to the procurement strategy are outlined below:

Table CC - ES 1: Project attributes

Project	Size	Complexity	Integration risk	Timing
Southern WWTP	At Stage one, the WWTP will be small to medium size (starting flow of 400 m^3/day with capacity up to 1,200 m3/day). By stage three, the WWTP will be medium to large size (flow of >15,000 m^3/day).	Stage one will have relatively straight forward treatment processes. However, it will be designed to be compatible with stages two and three which will require more bespoke design work than for a typical plant of this size.	The plant will be on a greenfield site with no integration risk with existing operations. New conveyancing will be necessary to connect the plant with the existing wastewater network.	Delivery of stage one of the project has short time frames driven by growing servicing needs at the airport precinct. There is expected to be sufficient time to plan and deliver the project. However interim servicing solutions will be required to meet the needs of the airport precinct while stage one is being delivered. Timing of future staging will be based on demand.
Cambridge WWTP	The WWTP is expected to be of medium / large size (2031 flow 6,800 m^3/day up to 2061 11,700m^3/day).	It is likely some bespoke process equipment will be required.	The WWTP will be located on a brownfield site adjacent to the existing Cambridge WWTP. There will be significant integration risks with the existing WWTP. No significant additional conveyancing is required over and above what would be needed to service the Cambridge area.	The project has short time frames driven by the consenting conditions.
Te Awamutu Upgrades	The WWTP is expected to be of medium / large size (2031 flow 5,600 m^3/day up to 2061 7,200 m^3/day). Future demands will be serviced through	The upgrades will encompass some design work that smaller contractors may not have the necessary resource or skills to undertake.	The works are brownfield in nature, resulting in integration risk with the existing WWTP.	The WWTP has recently been upgraded. A further upgrade will be required to meet demand by 2030. There is expected to be sufficient time to

	upgrades to the existing WWTP			plan and deliver the upgrades.
Mātangi and Tauwhare Pā Upgrades	The upgrades are expected to be small in size.	More likely to be a straightforward package plant or a duplication of existing technology.	The works are brownfield in nature, resulting in integration risk with the existing WWTP.	Matangi requires immediate upgrades to address existing performance issues and support renewal of the existing consent. There is expected to be enough time to plan and deliver these immediate and longer-term upgrades.

Long Lists

The long list of packaging options assessed for the Projects is provided below: Figure CC - ES 1: Long list of package options

Note, the Cambridge WWTP and the upgrade works do not have any conveyancing requirements.

The long list of contracting options is provided below.

Table CC - ES 2: Contracting options long list

Contracting model	Description
1) Construction only (traditional)	Private contractor is contracted to develop the facility. All design work is completed prior to the tender and a detailed specification is provided to bidders. Financing is managed by the procuring entity.
2) Design and build (D&B)	Private contractor is responsible for design and construction. Procuring entity will prepare the functional and technical performance requirements that are used in the tender process to guide developer design. Financing is managed by the procuring entity.
3) Managing contractor	Single managing contractor engages with the procuring entity and undertakes the procurement process on its behalf. The managing contractor enters into a contractual arrangement for each of the proposed packages.
4) Alliance	Collaborative model that will bring together the procuring entity and other parties, including contractors and designers, to deliver a 'best for project' outcome. Pain / gain share arrangements where costs below and above target are shared between parties.
5) Design, build, operate and maintain (DBOM)	Private contractor is responsible for design and construction as well as long-term operation and maintenance services. The procuring entity secures the financing independently and retains operating demand risk.
6) Design, build, finance, operate and maintain (DBFOM)	Concession style arrangement where responsibilities for designing, building, financing, operating and maintaining are bundled together and transferred to a private sector consortium. This model is similar to a number of PPPs that have been completed in NZ with a large degree of risk transfer passed to the private sector.
7) Private provision	Development of the facility is outcomes based with the private sector engaged to provide all aspects of work including design, construction, operation and maintenance. The private sector also takes responsibility for approvals and management. The procuring entity would use the facility under a service agreement.

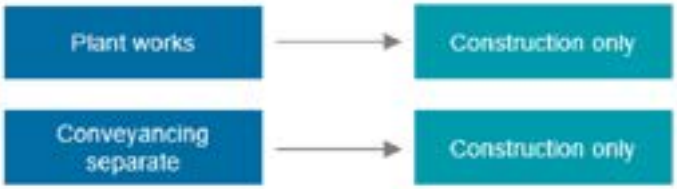
The methodology for selecting the preferred option used an iterative process, where the long lists were objectively filtered to a short list and preferred option based on Multi Criteria Analysis (MCA).

The preferred procurement strategy for each of the Projects is outlined below:

Southern WWTP

The procurement strategy for the Southern WWTP is focussed on stage one only. The preferred strategy is to tender two separate work packages; a main plant works package (including civil works and process equipment) and a separate conveyancing package. Both packages are proposed to be tendered using a traditional construction only contract.

Table CC - ES 3: Procurement strategy – Southern WWTP



Packaging

The key drivers for the packaging approach are outlined below:

- **Risk allocation and management (interface risk)**: By contracting the main plant works as one package, the private sector (contractor) will have responsibility for managing interfaces between the main civil works and supply of the process equipment. The Lead Council will also benefit from reduced tender and administration costs. The interface risk between the plant and the conveyancing to be retained by the Lead Council is considered modest by comparison.
- **Risk allocation and management (different risk profiles):** The plant works and conveyancing works have different risk profiles that require specialised expertise. It will be beneficial to tender these packages separately and select the preferred contracting model and contractor for each of them.
- **Deliverability (scale and timeframes):** Stage one of the Southern WWTP is considered too small to justify a separate enabling works package (starting flow of 400 m3/day with capacity up to 1000 m3/day).

Contracting

The key drivers for the contracting approach are outlined below:

- Main plant works:
  - **Risk allocation and management (design risk):** Construction only is a more straightforward procurement option to tender multiple stages over time. Given the importance of future proofing the WWTP for stages two and three, control over the full design is likely to be more critical. Accordingly, the Lead Council may be better placed to undertake design activities.
  - **Market interest and capability (scale):** Stage one of the Southern WWTP is also not large enough to justify using the DBOM, DBFOM or Private provision contracting models that transfer a high degree of risk to the private sector given the high tender and transaction costs.
- Conveyancing separate:
  - **Risk allocation and management (design risk):** Conveyance pipelines carry toxic substances, travel through public and private land, have a 50–80-year life and represent a huge

task to pull up or replace if changes need to be made. It is best to have the rigour of in-house engineers designing conveyance assets, rather than under a tender process where contractors may look to minimise cost. In this instance, transfer of design risk may not be appropriate.

Given the short time frames for stage one of the Southern WWTP driven by growing servicing needs at the airport precinct, it is recommended to proceed with the procurement of professional services to assist with delivery of the pre-implementation tasks. These include:

- Site selection.
- Land acquisition (the site acquired for the WWTP will include the land for discharge).
- Designations and consenting.
- Engagement.

Cambridge WWTP

The preferred strategy for the Cambridge WWTP is to tender two separate work packages, an enabling works package and a main plant works package (including civil works and process equipment). Both packages are proposed to be tendered using a traditional Construction only contract.

Table CC - ES 4: Procurement strategy – Cambridge WWTP

Packaging

The key drivers for the packaging approach are outlined below:

- **Timing and budget confidence (consenting time restraints):** Packaging the enabling works separately scores highly because it provides scope to begin the groundworks in advance of the main plant works contract. The enabling works would otherwise have the potential to delay the main works. This is more important for the Cambridge WWTP than the Southern WWTP given the larger size, its brownfield nature and the consenting time constraints.
- **Risk allocation and management (interface risk):** As per the Southern WWTP, the scoring reflects the level of interface risk between the main plant works and process equipment packages. This becomes more important as the plant gets larger and the process equipment is more bespoke. This creates more interface points, more feedback loops, larger technical process units and therefore higher risk costs associated with supporting the civil works, justifying retaining these works together in one package.
- **Customer / social outcomes (local content):** The separate enabling works contract provides greater opportunity for local contractor participation.

Contracting

The key drivers for the contracting approach are outlined below:

- Enabling works:
  - **Risk allocation and management (complexity):** This will be a simple contract with limited design work required. A traditional Construction only contract is best suited to this package.

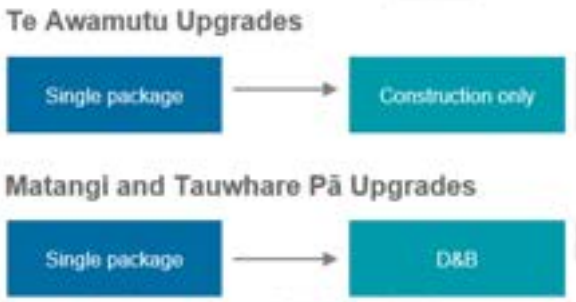
  - **Market interest and capability (scale):** The enabling works are not large enough to justify using the DBOM, DBFOM or Private provision contracting models that transfer a high degree of risk to the private sector.

- Main plant works:
  - **Timing and budget confidence (consenting time restraints):** Tender timeframes for Construction only are the most streamlined of the options considered. For the Cambridge WWTP, this is likely be the fastest procurement option.
  - **Market interest and capability (design risk):** There is likely to be more market interest in a Construction only contract than a D&B or DBOM for a medium size plant that has this degree of bespoke design work. Additionally, the higher contractor bid costs for D&B and DBOM may discourage bidders. The medium size of the plant (starting flow 5,000 m3/day up to 9,000 m3/day) does not justify the higher tender and transaction costs of the DBFOM or private provision models.

WWTP Upgrades

The preferred strategy for the Te Awamutu upgrades is to tender a single work package using a Construction only contract. The preferred option for the Mātangi and Tauwhare Pā upgrades is to tender a single work package using a D&B contract.

Table CC - ES 5: Procurement strategy – WWTP upgrades



Packaging

The key drivers for the packaging approach are outlined below:

- **Deliverability (brownfield):** A single package is preferred because the brownfield nature of the upgrades do not require enabling works.
- **Risk allocation and management (interface risk):** The small / medium scale of upgrades does not justify segregating civils and treatment systems. The Lead Council would retain responsibility for managing the interface risk with no single point of responsibility. The higher administrative, management and tender costs for two procurement processes are not justified.

Contracting

The key drivers for the contracting approach are outlined below:

- Te Awamutu upgrades:
  - **Risk allocation and management (design risk):** Construction only is considered most appropriate for brownfield upgrades of this nature because there will be multiple complex interfaces with the existing plant. The Te Awamutu scope involves adding a new reactor and

aeration system to the plant that smaller contractors may not be capable of accepting design risk on. Meanwhile, it may not of sufficient value for the larger contractors.

- **Market interest and capability (contractor capability and appetite):** Construction only scores better due to the strong capability of contractors in New Zealand to undertake works of this nature under a Construction only contract. The higher contractor bid costs for D&B may also discourage bidders.

- Mātangi and Tauwhare Pā upgrades:
  - **Risk allocation and management (design risk):** The Tauwhare Pā upgrades are likely to be a straightforward package-type plant or would duplicate existing technology. The design risk is likely to be well understood and it would be efficient for a D&B contractor to assume.

1.4. The Procurement Plan

Procurement for all the Projects will be undertaken through a competitive tender process. This will ensure market tension and drive value for money outcomes.

The procurement plan for each Project intends to use a two-stage procurement process with the first stage Expression of Interest (EOI) being publicly advertised through GETS, followed by a Request for Tender (RFT) being made available to the successful respondents.

1.5. Payment Mechanisms

All payment mechanisms under the proposed procurements are expected to use a milestone payment methodology whereby contractor remuneration will be linked to agreed project milestones. Payment will be based on the suppliers' successful completion of milestones as detailed in the contract.

1.6. Type of Contract

The Construction only contracts are proposed to be contracted using the New Zealand Standard form NZS 3910:2013.

The D&B contract is proposed to be contracted using the New Zealand standard form NZS 3916:2013.

These are both widely understood by councils in New Zealand and are well proven for projects such as these. Given the nature of wastewater assets and the importance of process commissioning at completion, these standard form contracts often undergo revisions to allow for these specific requirements. Alternative international contracts (e.g., New Engineering Contracts (NEC) or International Federation of Consulting Engineers (FIDIC)) can sometimes be better placed for wastewater construction however are less widely used and understood in New Zealand.

1.7. Accountancy Treatment

The intended accountancy treatment is for the Lead Council to own the wastewater assets as an asset on their balance sheet. There is not anticipated to be any off-balance sheet treatment under the Construction only or D&B contracting structures. It is envisaged that the assets underpinning delivery of the services will be held on the balance sheet of the Lead Council.

1. Commercial Case

1.1. Introduction, Project Definition and Scope

1.1.1. Introduction

This document sets out the Commercial Case for the Waikato Southern Metro Wastewater Treatment Detailed Business Case (DBC).

The purpose of the Commercial Case is to demonstrate that the preferred option will result in a viable procurement and a well-structured deal between the public sector and its service providers.

The Commercial Case considers the approach to packaging and contracting options, the procurement plan, potential for risk sharing and the planned contractual arrangements.

1.1.2. Project Definition

The preferred option comprises a programme of WWTP upgrades, conveyance works and the construction of two new WWTPs across the wider Waikato-Hamilton Waipā Metro Area. A detailed description of the preferred option is included in Economic Case Section [5 Preferred Option] and an overview is provided below:

Table CC - 1: Project definition

Project	Description
Southern Sub-regional Plant (Southern WWTP)	Construction of a new WWTP to service the Waikato Regional Airport (the Airport) industrial precinct, Mātangi and southern Hamilton. The WWTP is expected to be located between Rukuhia and the Airport and will be delivered in three stages to align to the estimated demand. Initially, the WWTP will discharge to land, but will discharge into the Waikato River once stage two triggers are reached. An overview of the recommended staged development is provided below: • **Stage one:** Construction of a bespoke WWTP consisting of a sequencing batch reactor (SBR) with discharge to land (8-10 ha). Starting flow of 400 m³/day with capacity up to 1,200 m³/day. Thickened sludge is to be transferred to Cambridge WWTP. • **Stage two:** Convert SBR WWTP into a membrane bioreactor (MBR) WWTP with discharge to river. Starting flow of 1,200 m³/day, with capacity up to 15,000 m³/day. A sludge processing facility and limited operator facilities will be constructed onsite. • **Stage three:** Large-scale MBR WWTP >15,000 m³/day with discharge to river. The plant will be upgraded to include energy recovery. HCC is proposed to deliver this project as the Lead Council (see Management Case Section [1.2.2 Project Management Arrangements]).
Cambridge WWTP	Construction of a new WWTP at Cambridge with discharge to the Waikato River. Waipā District Council (Waipā DC) is proposed to deliver this project as the Lead Council (see Management Case Section [1.2.2

	Project Management Arrangements]). The plant will have a starting flow of 5,000m³/day with capacity up to 11,700m³/day.
Te Awamutu Upgrades	Upgrades at Te Awamutu/Kihikihi WWTP, which will continue to discharge via rock channel to the Mangapiko Stream. Waipā DC is proposed to deliver this project as the Lead Council (see Management Case Section [1.2.2 Project Management Arrangements]).
Mātangi and Tauwhare Pā Upgrades	Improvements to the existing Mātangi WWTP, which will remain online until the wastewater is conveyed to the Southern WWTP or HCC network around 2040. Upgrades to the existing Tauwhare Pā WWTP, which discharges to land. Waikato District Council (Waikato DC) is proposed to deliver this project as the Lead Council (see Management Case Section [1.2.2 Project Management Arrangements]).

1.2.3. Scope

The scope of the Commercial Case is to identify, assess and determine the preferred procurement approach for each of the Projects outlined above. Each Project will be evaluated on a standalone basis. The procurement scope for the Southern WWTP will focus on stage one, with consideration given to the implications of moving directly to Stage two.

1.2. Procurement Rules

1.2.1. NZ Government Procurement Rules

Local Government Agencies are encouraged to follow the Government Procurement Rules.

The Government Procurement Rules support sustainable and inclusive procurement through the promotion of good practice for procurement planning, approaching the supplier community and contracting.

The Procurement Strategy should align with The Principles of Government Procurement and seek to meet as many of the Charter expectations as possible.

Relevant rules include those relating to open advertising, improving New Zealand business involvement, contributing to social outcomes, and providing sufficient time for tendering.

1.2.2. HCC Procurement Methodology

HCC's Procurement Methodology will apply to the Southern WWTP. The guidelines for appointing suppliers are outlined below:

- **Direct appointments:** Where there is no price tension to be gained through the tender process and the total cost of the works is less than $100,000, works are required to be procured through direct appointments.
- **Public request for quote:** For physical works or procurement of assets of a value between $10,000 and $100,000, three quotes must be evaluated using this method, in accordance with HCC Procurement Policy.
- **Public request for tender:** For works or procurement of assets over $100,000, the request for tender method must be used in accordance with HCC Procurement Policy.

The Southern WWTP stage one capital costs will be in excess of $100,000, hence a public request for tender will be required under HCC's Procurement Policy.

1.2.3. Waipā DC Procurement Policy and Manual

Waipā DC's Procurement Policy and Manual will apply to the Cambridge WWTP and Te Awamutu upgrades. The guidelines for appointing suppliers are outlined below:

- Procurement under $50,000 and considered low or medium risk requires:
  - one quote where a preferred supplier is utilised or spend is under $20,000; or
  - Two quotes where a non-preferred supplier and spend is over $20,000; or
  - For up to $5,000 a purchase order can be used.
- Procurement between $50,000 and $250,000 and considered either low or medium risk requires:
  - Three quotes; or
  - a public (open) or invited request for tender process to be used as signed off in the procurement plan.
- Procurement over $250,000, or any high-risk procurement regardless of dollar value requires:
  - a public or invited request for tender process, as signed off in the procurement plan.

The Cambridge WWTP and Te Awamutu upgrade capital costs will be in excess of $250,000, hence a public or invited request for tender will be required under Waipā DC's Procurement Policy and Manual.

1.2.4. Waikato DC Procurement Policy

Waikato DC's Procurement Policy will apply to the Mātangi and Tauwhare Pā upgrades. The guidelines for appointing suppliers are outlined below:

- Procurement of less than $50,000 and a low to medium risk level requires:
  - Single quote in writing where an existing supplier exists, or
  - Two quotes in writing where there is no existing supplier arrangement for the goods and services.
  - Services engaged via electronic purchase order or appropriate minor physical works contract.
- Procurement of $50,000 to $250,000 and a low to medium risk level requires:
  - A light procurement plan
  - Three written quotes required, or
  - Public or invited request for tender process where identified in the procurement plan.
  - Services engaged via contract.
- Procurement of over $250,000 and any high-risk level procurement regardless of dollar value:
  - Full procurement plan required.
  - Single or multi-stage request for tender process as identified in the procurement plan.
  - Open procurement process required.
  - Services engaged via contract.

The Mātangi and Tauwhare Pā upgrades capital costs will be in excess of $250,000, hence a public or invited request for tender will be required under Waikato DC's Procurement Policy and Manual.

1.3. The Procurement Strategy

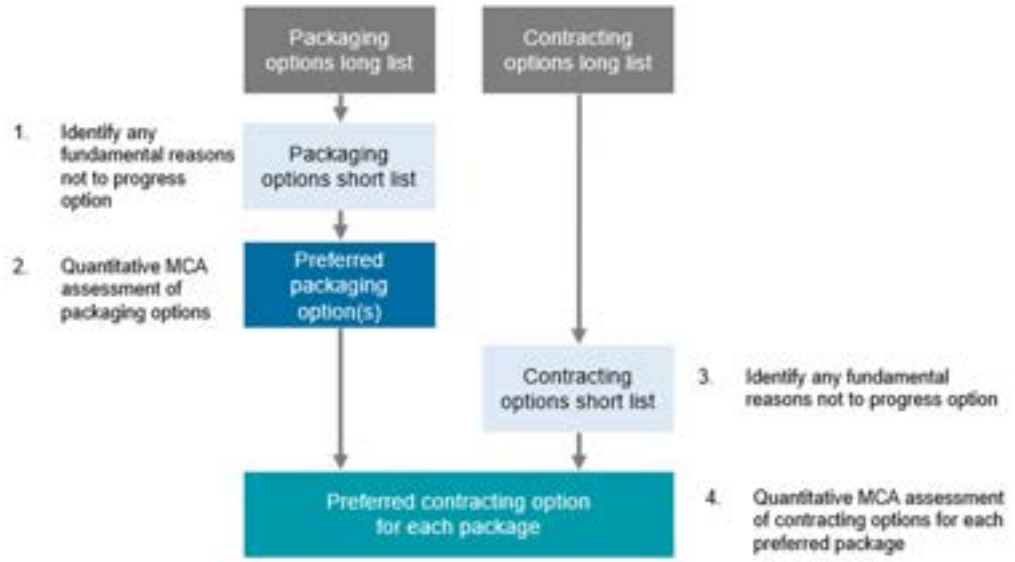
1.3.1. Commercial Strategy

The Projects within the wider Programme of works will be delivered by a single council on behalf of the other Sub-regional Partners (the "Lead Council"). The Lead Council will utilise its existing resources, policies and procedures to deliver the Project. The Lead Council structure is discussed in the Management Case Section [1.2.2 Project Management Arrangements].

1.3.2. Methodology

The procurement strategy documents the process of identifying, evaluating and determining the preferred packaging and contracting options[1] for each Project included in the Programme. The methodology for selecting the preferred option used an iterative process, where the long lists were objectively filtered to a short list and preferred option based on MCA. An overview of the process is outlined below:

Figure CC - 1: Procurement strategy methodology



1. The long list of packaging options was initially filtered to a short list by removing any flawed options.
2. The short list of packaging options was then refined to a preferred option using MCA scoring.
3. A short list of contracting options was assessed for each preferred package of works.
4. The short list was then refined to a preferred contracting option using MCA scoring. The MCA scoring is further discussed under Section [1.3.6 Approach to MCA Scoring].

[1] The packaging options refer to the level of disaggregation of works used to deliver the Project (i.e. the degree to which each Project is split into separate work packages for tendering). The contracting model refers to the contracting method used to tender for the capital works and operations.

Throughout the development and assessment process, engagement and workshops were undertaken with the Sub-regional Partners. This included staff at each organisation, the DBC Control Group and the DBC Governance Group.

The procurement strategy is discussed within the Commercial Case rather than as a separate document. As discussed in Section [1.4 The Procurement Plan], Lead Council's will prepare a separate Procurement Plan for each Project.

1.3.3. Project Attributes

Table CC - 2: Project attributes

Project	Attributes
Southern WWTP	• **Size:** At Stage one, the WWTP will be small to medium size (starting flow of 400 m³/day with capacity up to 1,200 m³/day). By stage three, the WWTP will be medium to large size (flow of >15,000 m³/day). • **Complexity:** Stage one will likely involve relatively straight forward treatment processes. However, it will be designed to be compatible with stages two and three, which will require more bespoke design work than a typical plant of this size. The site will need to be appropriately master planned to support the staged upgrade and to provide an overall plant hydraulic design that is future proofed. • **Integration risk:** The plant will be on a greenfield site with no integration risk with existing operations. New conveyancing will be necessary to connect the plant with the existing wastewater network. The site acquired for the WWTP will include the land for discharge. The discharge systems, including transfer pipe, are expected to be procured with the main plant works. Land acquisition and consenting risk is assumed to sit with the Lead Council. • **Timing:** Delivery of stage one of the Project has short time frames driven by growing servicing needs at the airport precinct. There is expected to be sufficient time to plan and deliver the project; however interim servicing solutions will be required to meet the needs of the airport precinct while stage one is being delivered. The timing of future staging will be based on demand.
Cambridge WWTP	• **Size:** The WWTP is expected to be of medium / large size (starting flow 6,800 m³/day up to 11,700m³/day). • **Complexity:** It is likely some bespoke process equipment will be required. • **Integration risk:** The WWTP will be located on a brownfield site adjacent to the existing Cambridge WWTP. There will be significant integration risks with the existing WWTP. No significant additional conveyancing is required over and above what would be needed to service the Cambridge area. • **Timing:** The project has short time frames driven by the consenting conditions.
Te Awamutu Upgrades	• **Size and complexity:** The WWTP is expected to be of medium / large size (starting flow 5,600 m3/day up to 7,200 m3/day). Future demand will be

	serviced through upgrades to the existing WWTP. The upgrades will encompass some design work that smaller contractors may not have the necessary resource or skills to undertake. • **Integration risk:** The works are brownfield in nature, resulting in integration risk. • **Timing:** The WWTP has recently been upgraded. A further upgrade will be required to meet demand. There is expected to be sufficient time to plan and deliver the upgrades.
Mātangi and Tauwhare Pā Upgrades	• **Size and complexity:** More likely to be a straightforward package plant or a duplication of existing technology. This means smaller contractors may be capable of undertaking the design work. • **Integration risk:** The works are brownfield in nature, resulting in integration risk. • **Timing:** Mātangi requires immediate upgrades to address existing performance issues and support renewal of the existing consent. There is expected to be enough time to plan and deliver these immediate and longer-term upgrades.

1.3.4. Market Feedback

A process of targeted market feedback and industry consultation was undertaken to assess market appetite, capacity and capability. Relevant projects were also reviewed to identify lessons learned and key procurement risks. Participants included civil contractors, process equipment suppliers, operations and maintenance providers, engineering firms and potential investors.

References to small, medium and large plants in the market feedback are based on the following indicative ranges:

- Small: flows of 800m3/day – 1,000m3/day (4,000-5,000 population equivalent)
- Medium: flows of 1,000m3/day – 8,000m3/day (5,000-40,000 population equivalent)
- Large: flows of greater than 8,000m3/day (greater than 40,000 population equivalent)

The key findings are summarised below:

Table CC - 3: Market feedback

Area of feedback	Description
Packaging – Scope for disaggregation	• Based on comparable projects, the scope for disaggregation into separate work packages could include: — Enabling works — Main plant civil works — Treatment systems — Conveyancing
Packaging – Market capacity and capability	• Larger civil contractors in New Zealand have appetite to deliver the new WWTPs as the main contractor, while international water companies are more interested in the design and equipment supply. • There is strong local market capability from smaller contractors to deliver the enabling works and conveyance components. • General feedback was that it would be inefficient to package the conveyance component with the main plant works due to the different risk profiles and contractor skill sets. • For smaller WWTPs a separate enabling works package would not provide significant schedule benefits and would likely be too small to efficiently tender separately. • For larger WWTPs it may be worthwhile to package the technical systems and civil works separately. This would allow direct sourcing of specific process equipment, which can avoid mark-up by the lead contractor and has the potential to provide a schedule benefit (direct sourcing of process equipment with long lead times can be faster). • For a small to mid-sized WWTP, it is generally not considered worthwhile to package the process equipment contracts and civil works separately because the higher tender costs would outweigh the benefits.
Packaging – Interface risk	• The key interface risk for a new WWTP is between the civil works and the treatment systems, which generally gets more significant as the plant gets larger. • The interface risk between the conveyance network and the WWTP is reasonably modest but depends on the load conditions and any process guarantees. It is important the assumptions made upfront are well understood and there is a clearly defined take or give point that is a reasonable distance from the civil works. • A separate enabling works contract can create interface risk, depending on what is included in the scope of works. Ground preparation can be a big risk given the main contractor is reliant on building on it.

	• Having different network operators could lead to inter-operability issues. Ideally, it is not preferable to have the conveyance network split between different operators.
Packaging - Cost	• Generally, costs are likely to be cheaper with separate packages. A single package may result in contractors pricing for risks they are not comfortable with, which often results in mark-ups on subcontracts / equipment. • However, separate tender processes will result in higher aggregate tender costs.
Contracting – Transfer of design risk	• In general, the design risk for smaller WWTPs is straightforward ("off the shelf") and can be readily accepted by contractors in New Zealand. • A medium sized WWTP will have more bespoke design requirements. New Zealand contractors may be less willing to tender for these elements, given they typically don't have the necessary resources or skills to undertake this degree of design work. • A medium sized plant would be unlikely to have sufficient scale to attract larger contractors which would have the resources to undertake this type of design work. • Larger WWTPs are likely to be of a sufficient scale to attract larger contractors with the appropriate design expertise. • In general, it is preferable for the public sector to retain design risk for high risk items; the rigour of using your own design team is important. • When transferring design risk, it can take a long time to negotiate contractual terms. Retention of design work in the wastewater industry tends to be the quickest option.
Contracting - Alliance	• Alliance often works well when there are uncertain risks or very short timeframes. • Alliances often have higher overheads for the Lead Council, given the additional complexity and administration in managing the contract.
Contracting – Transfer of operating risk	• Larger contractors generally have appetite and expertise to take operating risk, assuming there is sufficient scale to justify resourcing the project. • The transfer of operating risk as part of the initial tender can be beneficial because it incentivises a whole-of-life approach (operating costs can be 10-20 times the cost of the plant over the project life). However, sufficient scale is needed to attract operators to tender. • Consideration needs to be given as to whether Lead Councils would be comfortable having a third party operate the asset. • Tendering operating risk will add time to the procurement process.
Contracting – Transfer of financing risk	• Contractors generally had a low appetite for financing risk in relation to WWTP development.

Contracting - Private provision	• Some participants have considered private provision of wastewater assets previously. However, these projects have generally not proceeded because ownership of the asset and corresponding debt recognition is often retained by councils (as these models are unlikely to achieve off balance sheet treatment).

1.3.5. Evaluation Criteria

The MCA evaluation criteria used to refine the options were developed based on:

- Precedent transactions: Criteria have been developed with consideration given to learnings from other comparable projects.
- Stakeholder input: Workshopping with key stakeholders was undertaken to ensure that all interests were appropriately considered in the development of the preferred option.
- Applicability: The criteria needed to ensure options were effectively evaluated and were applicable to the proposed long lists.
- Wider objectives and criteria: Where relevant, the criteria reflect the investment objectives and KPIs of the DBC (See Strategic Case Section [3.3 Investment Objectives])

The criteria that have been used and how they are applied to the options development process in the Commercial Case are outlined below:

Table CC - 4: Multi criteria analysis

Criteria	Description and application to Commercial Case options
Customer / Social Outcomes Option considers the wider impacts on stakeholders and environment	The extent to which the commercial options provide optimised operational outcomes, promoting whole-of-life considerations including where possible Waikato river quality and improved use and recovery of resources. Does the contracting model promote innovation in design and construction approaches.
Timing and Budget Confidence Option delivers a high degree of confidence in project timing and budget	The extent to which the commercial options provide confidence for project timing and budget. Assessment of the degree of fixed price and date certainty in the contracting model as well as the overall delivery timeframes based on procurement strategy and packaging. Consideration of the degree of confidence that the commercial model provides for contractors to undertake the works within the agreed budget.
Deliverability Option does not have significant barriers to implementation	The extent to which the commercial options will be implementable. Are there significant barriers to progressing with the option, i.e. is there significant consultation required, a significant administrative process / burden or significant community or political opposition to a particular delivery model or structure.
Risk Allocation and Management Option allocates risks appropriately to the parties best able to manage them	The extent to which the commercial option appropriately allocates risk. Making sure that risks are allocated to the party best capable of managing them and that the risk transfer is real and not just perceived. Where risk is transferred to contractors or other parties under a commercial delivery structure or contracting model they have to be capable of managing the risk and face the financial implications of not doing so.
Market Interest & Capability Option facilitates private sector interest and delivers a high level of competition	The extent to which the commercial options will optimise market interest in the project, improving competition and contestability and therefore driving value for money. Facilitating the involvement of potential project partners with appropriate skill and capacity by optimising the size and scale of packages, complexity of the options and attracting the necessary market expertise.
Flexibility Option is flexible to changes in scope of works and sector structural changes	The extent to which the commercial options can accommodate unexpected changes to scope and / or specification of the treatment plant during delivery, as well as wider structural and regulatory changes within the sector. This includes changes that could arise from the Government's Three Waters Reform programme. The extent to which the commercial options accommodate the use of a broad range of funding and financing options.

1.3.6. Approach to MCA Scoring: Short List to Preferred Option

An overview of the approach to the MCA scoring process is outlined below:

Figure CC - 2: Approach to MCA Scoring

The high-level MCA criteria discussed above were broken down into different sub-criteria for each short list (both packaging and contracting options). Weightings were applied to each of the sub-criteria to capture their relative importance. Sub-criteria that were deemed to be relatively more important than others were given a higher rating. Different weightings were utilised for the Cambridge WWTP to reflect the importance of timing for this project. The sub-criteria, weights and scoring definitions for the packaging and contracting model options are outlined below:

Table CC - 5: Packaging option MCA sub criteria

Packaging - MCA Sub Criteria		
MCA	**Sub Criteria**	**Weight**
Customer / social outcomes	Facilitation of innovative approach to design and delivery	5%
	Opportunities for local SME suppliers to be involved in the delivery of services	5%
	Affordability considerations - level of mark up on subcontracts	10%
Timing and budget confidence	Level of confidence in timing and budget for the project	10%
Deliverability	Administrative burden on delivery entity	15%
Risk allocation and management	Level of project interface risk that resides with council	20%
Market interest and capability	Ability for councils to choose preferred contractors for each activity	10%
	Attractiveness to large domestic and international contractors (bringing economies of scale and specialist skills)	5%
	Competitiveness of procurement process	5%
Flexibility	Flexibility to align packages with the right contracting model for specific risks and skills	10%
	Flexibility and ease of making changes in scope	5%
Total		100%

Table CC - 6: Contracting Model MCA sub criteria - Southern WWTP and WWTP upgrades

Contracting Model MCA sub criteria – Southern WWTP and WWTP upgrades		
MCA	**Sub Criteria**	**Weight**
Customer / social outcomes	Maximisation of whole of life outcomes	10%
	Facilitation of innovative approach to design and delivery	5%
	Affordability considerations - transaction / procurement cost	5%
Timing and budget confidence	Speed to market of procurement process	5%
	Degree of contractual time and budget certainty for project delivery	10%
Deliverability	Administrative burden on delivery entity	5%
	Political risk	5%
Risk allocation and management	Risks allocated to the party best able to manage them	20%
Market interest and capability	Market depth and contractor appetite	10%
	Degree of market capability	10%
Flexibility	Ability to include large degree of staging / scaling in the project	5%
	Ability to make changes in scope	5%
	Flexibility to future state and ease to unwind if necessary	5%
Total		100%

Table CC - 7: Contracting Model MCA sub criteria - Cambridge WWTP

Contracting Model MCA sub criteria – Cambridge WWTP		
MCA	**Sub Criteria**	**Weight**
Customer / social outcomes	Maximisation of whole of life outcomes	10%
	Facilitation of innovative approach to design and delivery	5%
	Affordability considerations - transaction / procurement cost	5%
Timing and budget confidence	Speed to market of procurement process	15%
	Degree of contractual time and budget certainty for project delivery	10%
Deliverability	Administrative burden on delivery entity	5%
	Political risk	5%
Risk allocation and management	Risks allocated to the party best able to manage them	15%
Market interest and capability	Market depth and contractor appetite	5%
	Degree of market capability	10%
Flexibility	Ability to include large degree of staging / scaling in the project	5%
	Ability to make changes in scope	5%
	Flexibility to future state and ease to unwind if necessary	5%
Total		100%

Figure CC - 3: Scoring definitions

SCORE	
3	Significant positive impact compared with other options overtime
2	Moderate positive impact compared with other options overtime
1	Minor positive impact compared with other options overtime
0	Very limited to no positive or negative impact (neutral) overtime

1.3.7. Packaging Options Long List (Delivery Phase)

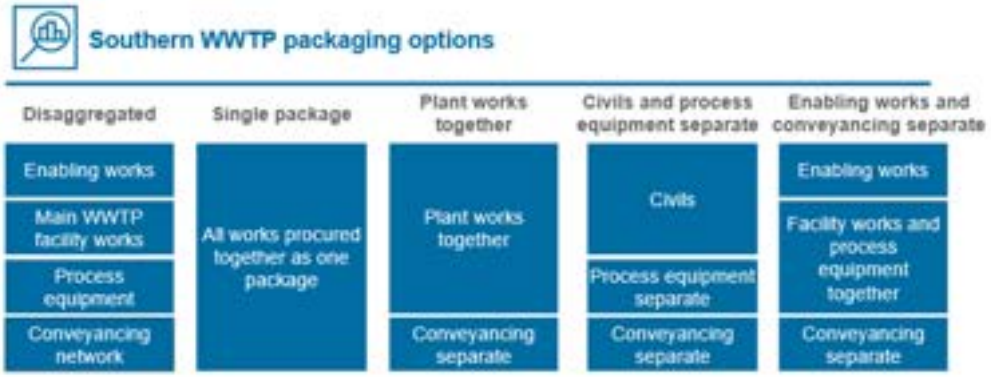
The potential opportunities to break the scope of works into separate individual work packages for the new wastewater treatment plants (new Southern WWTP and the Cambridge WWTP) are presented below:

- Enabling works: Site preparation works that could take place prior to the main construction contract. This could include site clearance, geotechnical investigations, ground works, site access and provision of utilities to site.
- Main WWTP facility works: The main construction contract that would include civil engineering, construction of the plant, discharge transfer pipes and land application system (where relevant). This would cover general construction work carried out in relation to preparation of foundations, roads, canals, ponds, control buildings, fences etc.
- Process equipment: Supply and installation of the equipment for mechanical, chemical and biological wastewater treatment.
- Conveyancing network: The construction of the new conveyance network required to connect the plant to the existing network. This will involve the construction of pipes, pumps and tanks. This is not relevant to the Cambridge WWTP because there are no significant additional conveyancing requirements.

The inclusion of operations and maintenance components in the delivery phase packages was considered in the contracting model section below.

The long list of packaging options for the Southern WWTP includes five combinations of these different packages as below:

Figure CC - 4: Packaging options long list – Southern WWTP



The long list of packaging options for the Cambridge WWTP and the WWTP upgrades is the same as the Southern WWTP but excludes the conveyancing package. The Cambridge WWTP and other WWTP upgrades have therefore been grouped together for the purposes of presenting the long list of packaging options. This results in four combinations of the different packages as below:

Figure CC - 5: Packaging options long list – Cambridge WWTP and other WWTP upgrades

The advantages and disadvantages for each of the packaging options are included in Appendix [A].

1.3.8. Contracting Model Long List

Contracting options have been developed based on New Zealand procurement guidelines and previous comparable transactions. The long list of contracting options and a brief description of each option is outlined below. These are used consistently across the different packages and Projects.

Figure CC - 6:Contracting options long list

Contracting model	Description
1) Construction only (traditional)	Private contractor is contracted to develop the facility. All design work is completed prior to the tender and a detailed specification is provided to bidders. Financing is managed by the procuring entity.
2) Design and build (D&B)	Private contractor is responsible for design and construction. Procuring entity will prepare the functional and technical performance requirements that are used in the tender process to guide developer design. Financing is managed by the procuring entity.
3) Managing contractor	Single managing contractor engages with the procuring entity and undertakes the procurement process on its behalf. The managing contractor enters into a contractual arrangement for each of the proposed packages.
4) Alliance	Collaborative model that will bring together the procuring entity and other parties, including contractors and designers, to deliver a 'best for project' outcome. Pain / gain share arrangements where costs below and above target are shared between parties.
5) Design, build, operate and maintain (DBOM)	Private contractor is responsible for design and construction as well as long-term operation and maintenance services. The procuring entity secures the financing independently and retains operating demand risk.
6) Design, build, finance, operate and maintain (DBFOM)	Concession style arrangement where responsibilities for designing, building, financing, operating and maintaining are bundled together and transferred to a private sector consortium. This model is similar to a number of PPPs that have been completed in NZ with a large degree of risk transfer passed to the private sector.
7) Private provision	Development of the facility is outcomes based with the private sector engaged to provide all aspects of work including design, construction, operation and maintenance. The private sector also takes responsibility for approvals and management. The procuring entity would use the facility under a service agreement.

The advantages and disadvantages for each of the contracting options are included in Appendix [A]. Where the contracting option transfers the operating risk (DBOM, DBFOM and private provision) it is assumed the third party would be responsible for achieving consent compliance.

1.3.9. Southern WWTP Packaging and Contracting Options Assessment

The following section steps through the packaging and contracting long list to preferred option process for the Southern WWTP.

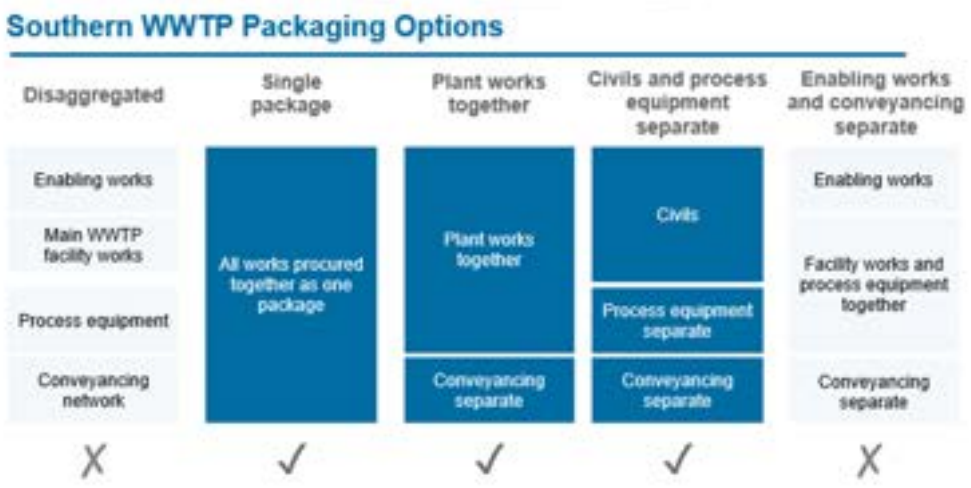
The packaging long list to short list assessment is provided below:

Table CC - 8: Packaging options long list to short list assessment – Southern WWTP

Packaging approach	Reasons for not progressing to shortlist	Progressed to short list
Disaggregated	• Council would retain responsibility for managing interface risk for all project elements with no single point of responsibility. • Enhanced administration and management costs. • Increased tender costs for separate procurement processes. • The project is likely to be too small to justify a separate early works package. • Timetable savings from early works package are less important given the sufficient time available to deliver the project.	No
Single package	• A single package provides the lowest level of interface risk, however the different skill set required and risk profile between the WWTP works and conveyancing works may mean it is inappropriate to group them together. This option was progressed for further evaluation.	Yes
Plant works together and conveyancing separate	• Size of the package is not expected to limit participation and complexity of procurement is considered manageable.	Yes
Civils, process equipment and conveyancing separate	• Separate civils and process equipment packages would result in the Lead Council having to manage greater interface risk and increased contract administration, management costs and tender costs. This option was progressed for further evaluation of how material this would be for a plant of this size.	Yes
Enabling works and conveyancing separate	• A separate enabling works package would result in council having to manage greater interface risk and will increase contract administration, management costs and tender costs. • The project is likely to be too small to justify a separate early works package.	No

Based on the long list to short list assessment, the following packaging options were short listed:

Figure CC - 7: Packaging long list to short list results – Southern WWTP



✓ = Progressed to shortlist

✗ = Not progressed to shortlist

MCA scoring was undertaken for the three shortlisted packaging options. A summary of the results is provided below, with the full analysis is provided in Appendix [B].

Table CC - 9: Packaging MCA scoring outcome – Southern WWTP

Southern WWTP Packaging - Scoring Outcome				
	Combined Weighting	Weighted Scores		
		Single Package	Plant works together and conveyancing separate	Civils, process equipment and conveyancing separate
Customer / social outcomes	20%	0.10	0.25	0.30
Timing and budget confidence	10%	0.20	0.20	0.10
Deliverability	15%	0.45	0.30	0.15
Risk allocation and management	20%	0.60	0.40	0.20
Market interest and capability	20%	0.05	0.20	0.30
Flexibility	15%	0.05	0.15	0.20
Total	**100%**	**1.45**	**1.50**	**1.25**

Based on the weighted scoring, the "Plant works together and conveyancing separate" is the preferred option. The primary drivers of this outcome are discussed below:

- **Deliverability:** The higher level of aggregation inherent in the "plant works together and conveyancing separate" option provides less ongoing administration for the Lead Council relative to the more disaggregated approach.
- **Risk allocation and management:** The scoring reflects the level of interface risk that resides with the Lead Council which is higher where there are more packages and therefore interfaces between them. This is most significant for the civil works and treatment systems packages. The "plant works together and conveyancing separate" option outperforms the more disaggregated model in this regard. The interface risk between the plant and the conveyancing is considered modest and is limited to:
  - construction timing mismatches between the conveyance and the plant; and
  - interfaces at the point of connection.
- **Timing and budget confidence:** The scoring reflects the higher tender and administration costs of running two separate tender processes for process equipment and civils. This is not worthwhile for a small to medium size plant without complex process equipment.
- **Market interest and capability:** Procuring the conveyancing with the main WWTP works is considered inappropriate because of the different contractor skill set required and different risk profile of the assets. It is beneficial to be able to tender these packages separately and select the preferred contracting model for each package.

The contracting option long list to short list process for each of the preferred packages (plant works and conveyancing) is provided below:

Table CC - 10: Contracting options long list to short list assessment – Southern WWTP plant works package

Plant Works		
Contracting model	**Reasons for not progressing to shortlist**	**Progressed to short list**
1. Construction only	• Straightforward procurement option to tender multiple stages over time	Yes
2. D&B	• Well suited to small 'off the shelf' package plants where design risk can be easily accepted by the private sector	Yes
3. Managing contractor	• The use of a managing contractor is only applicable to a disaggregated approach which has not been progressed to the shortlist. • This approach is only applicable for complex plant procurement. • An additional management fee would apply.	No
4. Alliance	• The risks that would traditionally be transferred to the private sector are relatively well understood and accepted - reducing the effectiveness and value for money of a pain-share / gain-share arrangement. • An alliance is unlikely to deliver cost and timing certainty. • This approach would require significant resourcing from the Lead Council in terms of governance and management. • Complexity in establishment that is not justified given smaller scale of works.	No
5. DBOM	• Incentivises whole of life approach by combining delivery with operations. • Stage one of the plant might be too small to attract market interest for operations, however progressing for further evaluation.	Yes
6. DBFOM	• Small / medium size of plant does not justify higher tender and transaction costs. • Unlikely to be market appetite for a PPP style transaction of this size. • Financing provided by private sector (likely to be more expensive than the NZ Local Government Funding Agency). • It would be difficult to change scope during delivery or deliver the works in stages.	No
7. Private provision	• Small / medium size of plant unlikely to provide market appetite from private providers - private provision requires sufficient scale to be feasible. • Implicit financing cost (likely to be more expensive than the NZ Local Government Funding Agency). • Low control of asset for the Lead Council. • Difficult to change scope during delivery.	No

Based on this assessment, the following options were short listed:

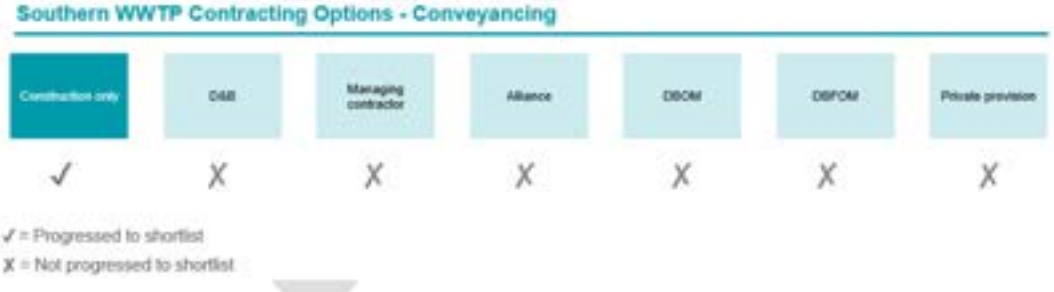
Figure CC - 8: Contracting long list to short list results – Southern WWTP plant works package

Table CC - 11: Contracting options long list to short list assessment – Southern WWTP conveyance package

Conveyancing Package		
Contracting model	**Reasons for not progressing to shortlist**	**Progressed to short list**
1. Construction only	• Good appetite from local NZ market for straight forward conveyance works and lower tender costs than other options. • Provides rigour of employers engineers undertaking the design.	Yes
2. D&B	• Conveyance pipelines carry toxic substances, travel through public and private land, have a 50-80 year life and are a huge task to pull up if changes need to be made. It is best to have the rigour of your own engineers designing conveyance assets, rather than under a tender process where contractors are looking to minimise cost. In this instance, transfer of design risk is not appropriate.	No
3. Managing contractor	• Only applicable for complex procurement (i.e. where there are multiple packages and / or a high degree of interface risk to manage), not suitable for conveyance. • An additional management fee would apply.	No
4. Alliance	• Only applicable for complex procurement where there is a high degree of uncertainty, not suitable for conveyance. • The risks that would traditionally be transferred to the private sector are relatively well understood and accepted - reducing the effectiveness and value for money of a pain-share / gain-share arrangement.	No
5. DBOM	• Councils already maintain (or have external contracts to maintain) the conveyance network and this is not material enough for a stand alone operator.	No
6. DBFOM	• The size of conveyance works does not justify the higher tender and transaction costs. • There is unlikely to be market appetite for a PPP style transaction of this size. • The financing that is provided by private sector is likely to be more expensive than the NZ Local Government Funding Agency). • Difficult to change scope or stage during delivery.	No
7. Private provision	• Size of conveyance works unlikely to provide market appetite from private providers - private provision requires sufficient scale to be feasible. • Implicit financing cost (likely to be more expensive than NZ Local Government Funding Agency). • Low control of asset for councils. • Difficulty to change scope during delivery.	No

Based on the assessment, the following options as short listed:

Figure CC - 9: Contracting long list to short list results – Southern WWTP conveyance package



MCA scoring was undertaken for the three shortlisted contracting options for the plant works package. A summary of the results is provided below, with the full analysis provided in Appendix [B]. There is no requirement to undertake an MCA scoring process for the conveyancing package because there was only one contracting option shortlisted.

Table CC - 12: Contracting MCA scoring outcome – Southern WWTP plant works package

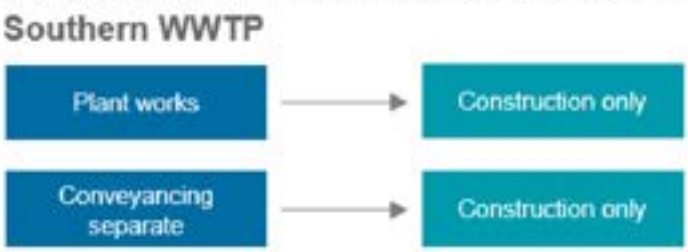
Southern WWTP Contracting – Scoring Outcome				
	Combined Weighting	Weighted Scores		
		Construction only	D&B	DBOM
Customer / social outcomes	20%	0.20	0.15	0.30
Timing and budget confidence	15%	0.25	0.25	0.25
Deliverability	10%	0.15	0.20	0.20
Risk allocation and management	20%	0.40	0.00	0.00
Market interest and capability	20%	0.50	0.30	0.10
Flexibility	15%	0.25	0.10	0.05
Total	**100%**	**1.75**	**1.00**	**0.90**

Based on the weighted scoring, the Construction only contracting model was preferred for the plant works package. The primary drivers of this outcome are discussed below:

- **Risk allocation and management**: The risk allocation inherent in the Construction only model is preferred because the market is unlikely to accept design risk. This is because of the bespoke nature of the design work required to ensure the plant is compatible with stages two and three.
- **Market interest and capability:** As above, the market is unlikely to accept the transfer of design risk. Further, the additional bid costs associated with a D&B or DBOM contracting model may discourage contractors from tendering.
- **Flexibility:** Construction only is a more straightforward procurement option to tender multiple stages over time. Given the importance of future proofing the WWTP for stages two and three, control over the full design is likely to be more critical. Accordingly, the Lead Council may be better placed to undertake design activities.

Based on this assessment, the following contracting options were preferred for the Southern WWTP:

Figure CC - 10: Preferred Packaging and Contracting options – Southern WWTP



Moving directly to stage two for the Southern WWTP would not require material changes to the procurement strategy, given it reflects design requirements compatible with stages two and three.

Given the short time frames for stage one of the Southern WWTP driven by growing servicing needs at the airport precinct, it is recommended to proceed with the procurement of professional services to assist with delivery of the pre-implementation tasks. These include:

- Site selection.
- Land acquisition.
- Designations and consenting.
- Engagement.

The Lead Council's internal procurement systems are expected to be adopted for the scale of this work. This would likely involve the appointment of a single lead consultant (with appropriate sub-consultants to complement their team) to complete the site selection and investigation processes. That work would then inform the land acquisition strategy and preliminary plant design, consenting and engagement activities.

The land acquisition strategy is expected to be implemented alongside the airport property team.

In parallel with land acquisition activities, it is recommended the work needed to support the designation and consenting processes commence. A lead consultant (with an appropriate team) is expected to be appointed to manage and deliver this package of work including site master planning, process design, interfacing with incoming conveyance systems, enabling works (transport assessments, utilities etc), land discharge/irrigation system design, landscape architecture design, engagement (as needed), and preparation of the applications. More accurate cost estimates would also be needed for budgeting and funding request purposes. The above work would be sufficient to inform the EOI documentation. Detailed design and preparation of tender documents would be completed following confirmation of consents and funding.

1.3.10. Cambridge WWTP Packaging and Contracting Options Assessment

The packaging long list to short list assessment is provided below:

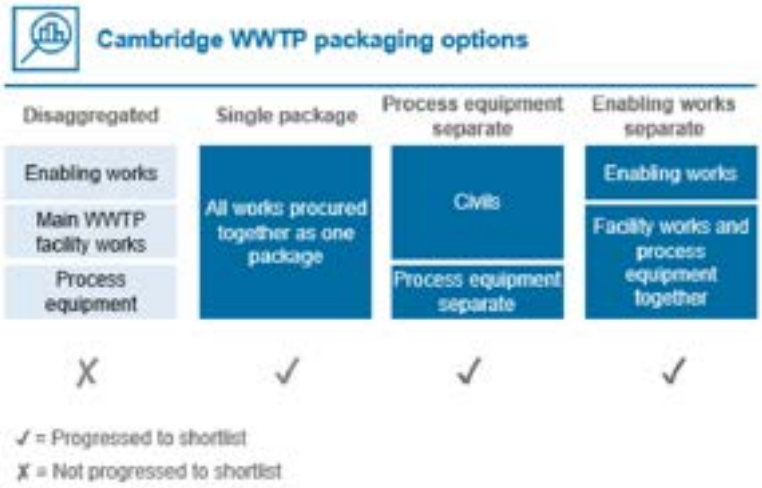
Table CC - 13: Packaging options long list to short list assessment – Cambridge WWTP

Packaging approach	Reasons for not progressing to shortlist	Progressed to short list
Disaggregated	• Council would retain responsibility for managing interface risk for all project elements with no single point of responsibility. • Enhanced administration and management costs. • Increased tender costs for separate procurement processes.	No
Single package	• A single package provides the lowest level of interface risk, however the different skill set required and risk profile between the WWTP works and conveyancing works may mean it is inappropriate to group them together. This option was progressed for further evaluation.	Yes
Process equipment separate	• Separate civils and process equipment packages would result in the Lead Council having to manage greater interface risk and will increase contract administration, management costs and tender costs. This option was progressed for further evaluation of how material this would be for a plant of this size.	Yes
Enabling works separate	• A separate enabling works package would result in council having to manage greater interface risk and will increase contract administration, management costs and tender costs. However, we have progressed because there is potential for the enabling ground works at Cambridge to be a bottleneck if not dealt with separately. This is particularly relevant given the time pressure faced to deliver the plant.	Yes

Based on this assessment, the following options were short listed:

Figure CC - 11: Packaging long list to short list results – Cambridge WWTP

MCA scoring was undertaken for the four shortlisted packaging options. A summary of the results is provided



below, with the full analysis provided in Appendix [B].

Table CC - 14: Packaging MCA scoring outcome – Cambridge WWTP

Cambridge WWTP Packaging - Scoring Outcome				
	Combined Weighting	Weighted Scores		
		Single package	Process equipment separate	Enabling works separate
Customer / social outcomes	20%	0.10	0.40	0.35
Timing and budget confidence	10%	0.20	0.20	0.30
Deliverability	15%	0.45	0.15	0.15
Risk allocation and management	20%	0.60	-	0.40
Market interest and capability	20%	0.05	0.40	0.20
Flexibility	15%	0.05	0.20	0.20
Total	**100%**	**1.45**	**1.35**	**1.60**

Based on the weighted scoring, the "Enabling works separate" is the preferred option. The primary drivers of this outcome are discussed below:

- **Customer / social outcomes:** The separate enabling works contract provides greater opportunity for local contractor participation.
- **Timing and budget confidence:** Packaging the enabling works separately scores highly because it provides scope to begin the groundworks in advance of the main plant works contract. The enabling works would otherwise have the potential to delay the main works. This is more important for the Cambridge WWTP than the Southern WWTP given the larger size, its brownfield nature and the consenting time constraints.
- **Risk allocation and management:** The scoring reflects the level of interface risk between the main plant works and process equipment packages. This becomes more important as the plant gets larger and the process equipment is more bespoke. This creates more interface points, more feedback loops, larger technical process units and therefore higher risk costs associated with supporting the civil works.

The contracting option long list to short list for each of the preferred packages is provided below:

Table CC - 15: Contracting options long list to short list assessment – Cambridge WWTP enabling works package

Enabling works package		
Contracting model	**Reasons for not progressing to shortlist**	**Progressed to short list**
1. Construction only	• Good appetite from local NZ market for straight forward enabling works and lower tender costs than other options. • Provides rigour of employers engineers undertaking the design.	Yes
2. D&B	• Lead Council will have likely undertaken significant design work as part of the main contract. • Requires substantial investment from market to bid compared to Construction only.	No
3. Managing contractor	• This approach is only applicable for complex procurement (i.e. where there are multiple packages and / or a high degree of interface risk to manage), not suitable for enabling works. • An additional management fee would apply.	No
4. Alliance	• Only applicable for complex procurement where there is a high degree of uncertainty, not suitable for enabling works. • The risks that would traditionally be transferred to the private sector are relatively well understood and accepted - reducing the effectiveness and value for money of a pain-share / gain-share arrangement.	No
5. DBOM	• No standalone operating or maintenance component for enabling works, therefore this approach is not appropriate.	No
6. DBFOM	• No standalone operating or maintenance component for enabling works, therefore this approach is not appropriate.	No
7. Private provision	• Private provision of enabling works is not applicable.	No

Based on this assessment the following option as short listed:

Figure 12: Contracting long list to short list results – Cambridge WWTP enabling works package

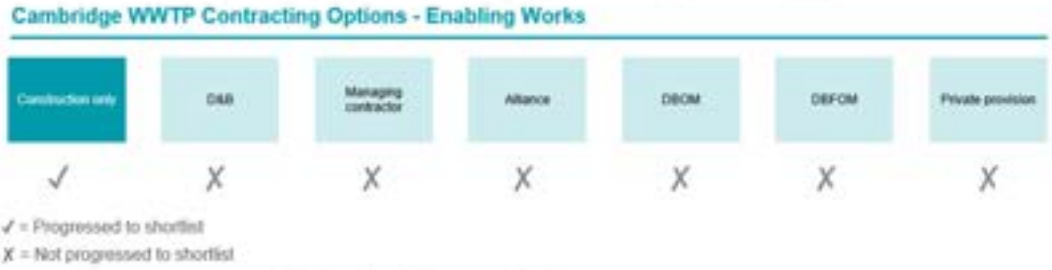
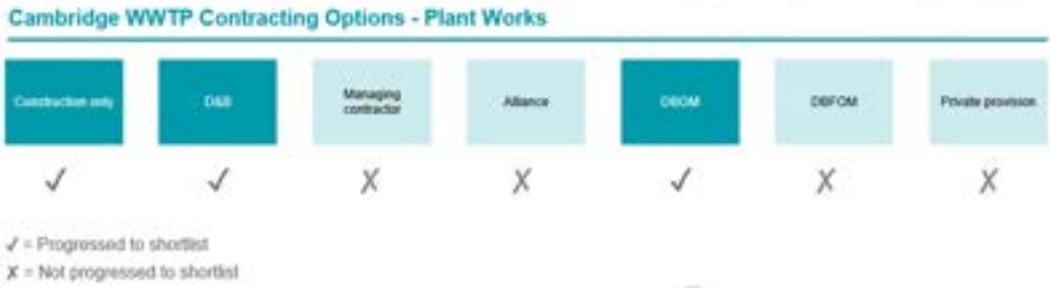


Table CC - 16: Contracting options long list to short list assessment – Cambridge WWTP plant works package

Based on this assessment the following options were short listed:

Plant Works Package		
Contracting model	**Reasons for not progressing to shortlist**	**Progressed to short list**
1. Construction only	• Tender timeframes for Construction only are the most streamlined of the options considered.	Yes
2. D&B	• As a medium sized plant, Cambridge would be unlikely to have sufficient scale to attract larger contractors who would have the resources to undertake this type of design work. Progressing for further evaluation. • Provides potential for innovation in plant design.	Yes
3. Managing contractor	• Managing contractor only applicable to disaggregated approach which has not been progressed to shortlist. • Only applicable for complex plant procurement. • An additional management fee would apply.	No
4. Alliance	• The risks that would traditionally be transferred to the private sector are relatively well understood and accepted - reducing the effectiveness and value for money of a pain-share / gain-share arrangement. • This approach is unlikely to deliver cost and timing certainty. • This approach will require significant resourcing from the Lead Council in terms of governance and management.	No
5. DBOM	• Incentivises whole of life approach by combining delivery with operations. • Sufficient scale to attract market interest for operations.	Yes
6. DBFOM	• The medium size of the plant does not justify the higher tender and transaction costs. • There is unlikely to be market appetite for a PPP style transaction of this size. • The financing provided by private sector (likely to be more expensive than the NZ Local Government Funding Agency). • It would be difficult to change scope during delivery or deliver in stages.	No
7. Private provision	• The medium size of the plant is unlikely to provide market appetite from private providers - private provision requires sufficient scale to be feasible. • The implicit financing cost is likely to be more expensive than the NZ Local Government Funding Agency. • Low control of asset for Lead Council. • It would be difficult to change scope during delivery.	No

Figure CC - 12: Contracting long list to short list results – Cambridge WWTP plant works package



MCA scoring has been undertaken for the three shortlisted contracting options relevant to the plant works package. A summary of the results is provided below, and the full analysis is provided in Appendix [B]. There is no requirement to undertake an MCA scoring process for the enabling works packages because only one contracting option was shortlisted.

Table CC - 17: Contracting MCA scoring outcome – Cambridge WWTP plant works package

Cambridge WWTP Contracting Model – Scoring Outcome

	Combined Weighting	Weighted Scores		
		Construction only	D&B	DBOM
Customer / social outcomes	20%	0.20	0.15	0.30
Timing and budget confidence	25%	0.55	0.35	0.35
Deliverability	10%	0.15	0.20	0.20
Risk allocation and management	15%	0.15	0.00	0.15
Market interest and capability	15%	0.40	0.25	0.30
Flexibility	15%	0.25	0.10	0.05
Total	**100%**	**1.70**	**1.05**	**1.35**

Based on the weighted scoring, "Construction only" is the preferred contracting option for the main plant works. The primary drivers of this outcome are discussed below:

- **Timing and budget confidence:** Tender timeframes for "Construction only" are the most streamlined of the options considered, noting the design work required upfront. For the Cambridge WWTP, this is likely be the fastest procurement option.
- **Market interest and capability:** There is likely to be more market interest in a "Construction only" contract than a D&B or DBOM for a medium size plant that has this degree of bespoke design work. Additionally, the higher contractor bid costs for D&B and DBOM may discourage bidders.
- **Flexibility:** "Construction only" is more straightforward to tender multiple contracts over time and the design can be varied with relative ease after the construction contract has been awarded, noting variation costs.

This results in the following preferred options for the Cambridge WWTP:

Figure CC - 13: Preferred Packaging and Contracting options – Cambridge WWTP

1.3.11. Other WWTP Upgrades Packaging and Contracting Options Assessment

The packaging long list to short list assessment for the other project WWTP (Mātangi, Tauwhare Pā and Te Awamutu) is provided below:

Table CC - 18: Packaging options long list to short list assessment – Other WWTP upgrades

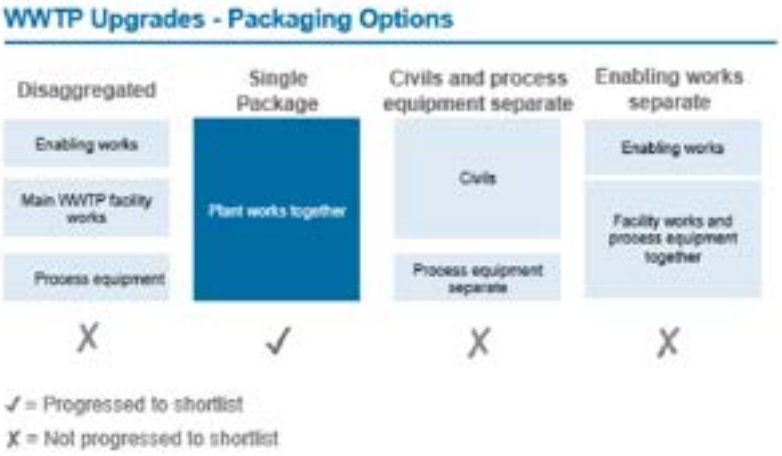
Packaging Approach	Reasons for not progressing to shortlist	Progressed to short list
Disaggregated	• Brownfield nature of upgrades do not require enabling works. • The small / medium scale of upgrades does not justify segregating civils and treatment systems. Tender costs for two procurement processes not justified. • Council would retain responsibility for managing interface risk with no single point of responsibility. • Enhanced administrative and management costs. • Increased tender costs for separate procurement processes.	No
Single package	• No immediate reason for not progressing, the small / medium scale of the upgrades means single package most appropriate.	Yes
Civils and process equipment separate	• The small / medium scale of upgrades does not justify segregating civils and treatment systems.	No
Enabling works separate	• A separate enabling works package would result in council having to manage greater interface risk and will increase contract administration, management costs and tender costs. • These upgrades are likely to be too small to justify a separate early works package. • Timetable savings from early works package are less important given the sufficient time available to deliver the projects.	No

This results in only one packaging option being shortlisted:

Figure CC - 14: Packaging long list to short list results – Other WWTP upgrades

The contracting option long list to short list for the "Plant works together" package is provided below:

Table 19: Contracting options long list to short list assessment – Other WWTP upgrades plant works package



Contracting model	Reasons for not progressing to shortlist	Progressed to short list
1. Construction only	• Good appetite from local NZ market for straight forward enabling works and lower tender costs than other options. • Provides rigour of employers engineers undertaking the design. • Considered appropriate for brownfield upgrades when there are interfaces with the existing plant.	Yes
2. D&B	• Suitable for a straightforward package type plant where existing technology is duplicated. The design risk is likely to be well understood and it would be efficient for a D&B contractor to assume.	Yes
3. Managing contractor	• Simple nature of WWTP upgrades does not require managing contractor - no package disaggregation. Only applicable to complex procurement. • Additional management fee.	No
4. Alliance	• Option 4A does not have a sufficient number of treatment plant upgrades of similar timing, scale, complexity and location to justify an ongoing relationship style procurement. • The risks that would traditionally be transferred to the private sector are relatively well understood and accepted - reducing the effectiveness and value for money of a pain-share / gain-share arrangement. • This option is unlikely to deliver cost and timing certainty. • Will require significant resourcing from the procuring entity in terms of governance and management.	No
5. DBOM	• The brownfield nature of the plant means there is already an operator.	No
6. DBFOM	• The brownfield nature of the plant means there is already an operator. • The WWTP upgrades do not have the scale to absorb the higher transaction costs. • No market appetite for a PPP style transaction of this size. • Financing provided by private sector (likely to be more expensive than LGFA). • Difficult to change scope or stage during delivery.	No
7. Private provision	• Private provision not applicable for brownfield plant upgrades.	No

This results in the following options being taken through to the short list:

Figure CC - 15: Contracting long list to short list results – Other WWTP upgrades plant works

✓ = Progressed to shortlist
X = Not progressed to shortlist

package

The preferred contracting option was assessed independently for each of the other WWTP upgrade projects;

- Te Awamutu; and
- Mātangi and Tauwhare Pā

For the Te Awamutu WWTP upgrades, MCA scoring has been undertaken for the two shortlisted contracting options relevant to the plant works package. A summary of the results is provided below, and the full analysis is provided in Appendix [B].

Table CC - 19: Contracting MCA scoring outcome – Te Awamutu plant works package

Te Awamutu Contracting Model – Scoring Outcome

	Combined Weighting	Weighted Scores	
		Construction only	D&B
Customer / social outcomes	20%	0.20	0.15
Timing and budget confidence	15%	0.25	0.30
Deliverability	10%	0.15	0.20
Risk allocation and management	20%	0.60	0.00
Market interest and capability	20%	0.50	0.30
Flexibility	15%	0.25	0.10
Total	**100%**	**1.95**	**1.05**

The key drivers of the "Construction only" option scoring the highest are as follows:

- **Risk allocation and management:** "Construction only" is considered most appropriate for brownfield upgrades because there will be multiple complex interfaces with the existing plant. The Te Awamutu scope involves adding a new reactor and aeration system to the plant, smaller contractors may not be capable of accepting design risk on, while it is not of sufficient value for the larger contractors.
- **Market interest and capability**: Construction only scores better due to the strong capability of contractors in New Zealand which undertake works of this nature under a "Construction only" contract. The higher contractor bid costs for D&B may also discourage bidders.

For Mātangi and Tauwhare Pā, MCA scoring has been undertaken for the two shortlisted contracting options relevant to the plant works package. A summary of the results is provided below, and the full analysis is provided in Appendix [B].

Table CC - 20: Contracting MCA scoring outcome – Mātangi and Tauwhare Pā plant works package

Tauwhare Pā Contracting Model – Scoring Outcome

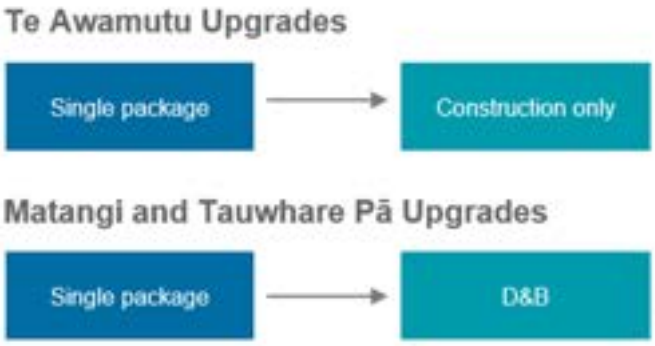
	Combined Weighting	Weighted Scores	
		Construction only	D&B
Customer / social outcomes	20%	0.20	0.15
Timing and budget confidence	15%	0.25	0.30
Deliverability	10%	0.15	0.20
Risk allocation and management	20%	0.00	0.40
Market interest and capability	20%	0.50	0.30
Flexibility	15%	0.25	0.10
Total	**100%**	**1.35**	**1.45**

The key drivers of the "D&B" option scoring the highest are as follows:

- Risk allocation and management: The Mātangi and Tauwhare Pā upgrades are likely to be a straightforward package-type plant or would duplicate existing technology. The design risk is likely to be well understood and it would be efficient for a D&B contractor to assume.

This results in the following preferred options for the WWTP upgrades:

Figure CC - 16: Preferred Packaging and Contracting options – WWTP upgrades



1.4. The Procurement Plan

In line with the Procurement Rules outlined in Section [1.2 Procurement Rules], procurement for all the Projects will be undertaken through a competitive tender process. This will ensure market tension and drive value for money outcomes.

A detailed procurement plan will be prepared for each package of works within each Project by the relevant Lead Council before going to market. The proposed principles for the approach to the market, evaluation of offers and identification of the preferred supplier for all the Projects is outlined below:

- The procurement plan for each Project will use a two-stage procurement process with the first stage Expression of Interest (EOI) being publicly advertised through GETS, followed by a Request for Tender (RFT) being made available to the successful respondents. Once further design work has been undertaken, it may be worthwhile to consider using a one-stage process for the WWTP upgrades that are of a smaller scale.
- The EOI will be evaluated by a Pass/Fail score for the non-price attributes.
- The RFT stage will be evaluated using a Weighted Attribute Method[2] and will include extensive interaction with the respondents. The Weighted Attribute Method is a supplier selection method in which the preferred supplier meets the required outcomes set out in the RFT and provides the best value for money. A balanced decision is taken that weighs up the whole-of-life costs and/or non-financial attributes in addition to the up-front price. Under this method, the financial and non-financial attributes are defined and weighted to reflect their relative importance to achieving the stated outcome. Non-financial attributes are expected to consider overall methodologies including sustainability issues such as:
    - strategies to avoid unnecessary consumption and manage demand (such as reducing waste to landfill and achieving efficiencies on use of raw materials).
    - minimising environmental impacts and embedded carbon in the delivery of the goods/services over the life of the contract.
    - suppliers' socially responsible practices including compliance with legislative obligations to employees.

[2] https://www.procurement.govt.nz/procurement/guide-to-procurement/plan-your-procurement/evaluation-methodology/

- innovation around social procurement opportunities and meeting each Lead Council's social procurement targets and aspirations.

- The relevant procurement team and supporting advisers (where relevant) will undertake the description of attributes and assignment of weightings.
- A cross functional tender evaluation team will be established to evaluate the bids and recommend the preferred supplier. Team members will collectively have significant experience with evaluating contracts of this scale and complexity and operating under the principles of relevant procurement guidelines.
- An independent Probity Auditor will be appointed to shadow the tender process to ensure a transparent procurement process, ensure all parties are treated equitably and ensure potential third-party risks are managed proactively.

The proposed timeline for the procurement is as follows:

Table CC - 21: Southern WWTP - Indicative procurement timeline

Key Procurement Milestone (Stage 1 only)	Start Date	End Date
Pre-implementation activities: land acquisition, preliminary design, consenting and designation processes	November 2021	November 2023 *(24 months to complete)*
Detailed design, includes preparation EOI/RFT	November 2023	May 2024 *(7 months to complete)*
EOI released (main plant works and conveyancing)	April 2024 *(Undertaken in parallel with detailed design)*	May 2024 *(2 months to complete)*
RFT and award – main plant works	June 2024 *(8 months after consent issued – assuming consent issued in October 2023)*	September 2024 *(Preferred contractor selected 4 months after RFT is released)*
RFT and award – conveyancing	June 2024	Sept 2024
Construction	November 2024 *(2 months after preferred contractor selected)*	November 2025 *(1-year construction period – excludes 2 months commissioning period)*

Table 23: Cambridge WWTP - Indicative procurement timeline

Key Project Milestone (Stage 1 Construction only)	Start Date	End Date
Pre – implementation		
RFT and award – enabling works	June 2022	August 2022

		(2 -month procurement period)
Construction - enabling works	August 2022	December 2022 *(4-month construction period)*
RFT and award – main plant works	June 2023	October 2023 *(4-month procurement period)*
Construction - main plant works	October 2023	August 2025 *(22-month construction period)*
Commissioning	August 2025	January 2026 *(5-month commissioning period)*

1.5. Required Outputs and Service Streams

The specific required outputs for each of the individual procurements will be detailed by the Lead Council as part of the Procurement Plan.

Information on the technical attributes of the new WWTPs and the WWTP upgrades is discussed in the Economic Case Section [5 Preferred option]. This will continue to be refined as the individual projects are progressed through the detailed design phase by the Lead Councils.

The Projects anticipated to be delivered through a traditional "Construction only" contracting approach (Southern WWTP, Cambridge WWTP and the Te Awamutu upgrades) will engage technical consultants to undertake design work and prepare tender documentation prior to approaching the market. The Mātangi and Tauwhare Pā upgrades that will be delivered through a D&B contract will approach the market with a detailed output specification. The tender documentation will include the functional performance requirements of the upgrade works rather than prescriptive design specifications.

1.6. Potential for Risk Sharing

Key procurement risks have been identified, evaluated and recorded in the risk register (see Management Case Section [1.5 Risk Management Planning]).

An assessment of how the project proposes to apportion these risks between the public sector and potential providers is outlined in the risk allocation table below.

Table CC - 22: Risk allocation table

Project and Package	Potential Risk Allocation			
	Risk Category	Lead Council	Supplier	Shared
Southern WWTP (Construction only) (Plant works and conveyancing packages)	Design risk	✓		
	Construction and development risk		✓	
	Transition and implementation risk			✓
	Performance risk		✓	
	Operating risk	✓		
	Interface risk (Plant works)		✓	
	Interface risk (Plant works and conveyance)	✓		
	Technology and obsolescence risks	✓		
	Financing risks	✓		
	Legislative risks	✓		
Cambridge WWTP (Construction only) (Enabling works, plant works packages)	Design risk	✓		
	Construction and development risk		✓	
	Transition and implementation risk			✓
	Performance risk		✓	
	Operating risk	✓		
	Interface risk (Plant works)		✓	
	Interface risk (Enabling and Plant works)	✓		
	Technology and obsolescence risks	✓		
	Financing risks	✓		
	Legislative risks	✓		
Te Awamutu Upgrades (Construction only) (Single package)	Design risk	✓		
	Construction and development risk		✓	
	Transition and implementation risk			✓
	Performance risk		✓	

	Operating risk	✓		
	Interface risk (Plant works)	✓		
	Technology and obsolescence risks	✓		
	Financing risks	✓		
	Legislative risks	✓		
Mātangi and Tauwhare Pā Upgrades (D&B) (Single package)	Design risk		✓	
	Construction and development risk		✓	
	Transition and implementation risk			✓
	Performance risk		✓	
	Operating risk	✓		
	Interface risk (Plant works)	✓		
	Technology and obsolescence risks	✓		
	Financing risks	✓		
	Legislative risks	✓		

1.7. Payment Mechanisms

All payment mechanisms under the proposed procurements are expected to use a milestone payment methodology whereby contractor remuneration will be linked to agreed project milestones. Payment will be based on the supplier's successful completion of milestones as detailed in the contract.

1.8. Contractual and Other Issues

The planned contractual arrangements and key contractual issues relating to the procurement of the services and key outputs are outlined below:

1.8.1. Type of Contract

The Construction only contracts are proposed to be contracted using the New Zealand Standard form NZS 3910:2013.

The D&B contract is proposed to be contracted using the New Zealand standard form NZS 3916:2013.

These are both widely understood by councils in New Zealand and are well proven for projects such as these. Given the nature of wastewater assets and the importance of process commissioning at completion, these standard form contracts often undergo revisions to allow for these specific requirements. Alternative international contracts (e.g., New Engineering Contracts (NEC) or International Federation of Consulting Engineers (FIDIC)) can sometimes be better placed for wastewater construction. However, these are less widely used and understood in New Zealand.

Specific contractual arrangements including remedies, intellectual property rights, dispute arrangements and end of the contract options will be assessed by each Lead Council.

1.8.2. Contract Management

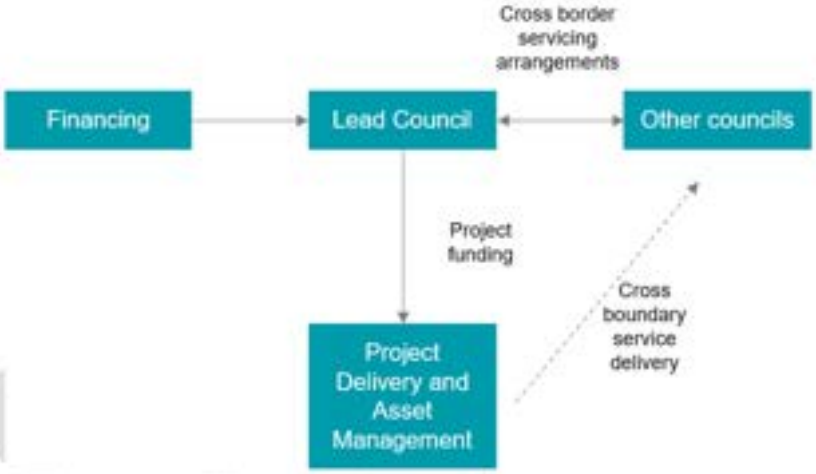
The responsibility for managing delivery under the contract as well as supplier relationship management will pass to the project manager at each Lead Council on the signing of the contract. This person will develop a contract and relationship management plan in consultation with the successful supplier.

1.8.3. Accountancy Treatment

The intended accountancy treatment is for the Lead Council to own the wastewater assets as an asset on their balance sheet. There is not anticipated to be any off-balance sheet treatment under the Construction only or D&B contracting structures. It is envisaged the assets underpinning delivery of the services will be on the balance sheet of the Lead Council.

As per the Financial Case Section [1.2.4 Preferred Funding and Financing Options] the Lead Council is expected to own and finance the delivery of the respective Projects. The Lead Council will enter into an agreement based on commercial terms for servicing of cross-boundary communities. These arrangements are summarised in the diagram below:

Figure CC - 17: Financing and cross boundary servicing arrangements



The Lead Council is anticipated to recognise an asset on its balance sheet as milestone payments are made in return for delivery of the services under the Construction only and D&B contracting options. There is not expected to be any off-balance sheet treatment under these contracting structures.

The Lead Council is anticipated to recognise a corresponding financial liability on its balance sheet as debt is drawn to finance the milestone payments.

Service agreements between councils that commit to funding obligations over time are likely to be treated as financial liabilities.

Appendix A

Advantages and Disadvantages of Packaging and Contracting models

Packaging Approach	Pros	Cons
Disaggregated	• Ability to select preferred contractor for each individual work component (this can sometime be achieved through novation). • Schedule benefit from undertaking works concurrently and beginning certain tender processes earlier (i.e., you may be able to tender enabling works package prior to main works). • Potential to involve smaller local contractors, which would be unable to tender for the larger packages. • Greater flexibility to tailor the contracting model to the specific risk profile of each element (i.e., addressing high risk utility/geotech risks through an enabling works alliance contract). • Potentially greater market appetite from contractors delivering small components, which do not want to be 'jointly and severally' liable for the whole project. • May improve competitive tension, as contractors are not required to form consortia to tender.	• Council retains full risk and responsibility for managing the interface between the each of the packages. This is particularly challenging where multiple contractors are working in the same area (i.e., need to allocate risks for third party damage, etc.). • Greater contract administration burden, given multiple contracts to manage. • Higher time and costs associated with the multiple procurement processes. • No single point of responsibility. • Smaller size and scale of individual packages may discourage larger contractors from bidding. • Variations for one package may have implications on the other packages as well. •
Single package	• Full risk transfer of interface risk to the private sector. • Single point of accountability.	• Limited control over individual contractors (i.e., accept contractors as a consortium

Packaging Approach	Pros	Cons
	• May deliver time and cost efficiencies in procurement, as only need to complete one procurement process. • Lower contract administration burden, as only managing a single contract. • Less administration and management requirements. • Larger size and scale may be more attractive to bigger contracting firms that could bring international expertise. • Potential for greater innovation through requiring contractors to work together as a single consortium. Greater degree of risk transfer provides additional incentive.	rather than selecting preferred ones). • Risk that smaller local contractors cannot tender, given size, scale and/or complexity. Requirement for 'joint and several' liability can also be a barrier for smaller contractors participating in consortia. • Typically, a more complex and more expensive procurement process is required. • Risk of contractors pricing in a higher risk premium (i.e., margin on margin where a main contractor applies a margin on the process equipment). • More challenging to optimise risk allocation through contracting models, as all elements procured through a single contract. • Less ability to achieve time benefits through delivering works early.

Contracting Model	Pros	Cons
1. Construction only	• Good appetite from Construction only contractors in NZ for a small / medium size WWTP. • Provides rigour of owner's engineers' design, rather than under a tender process where contractors are looking to minimise cost. • Suitable where council has already undertaken extensive design work. • Highest level of cost certainty, as detailed design completed prior to tender.	• No whole-of-life approach with separate O&M contractor; however less important for a small / medium plant that is less complex. • No scope for contractor market to provide innovation in design. • Slower overall delivery, as detailed design completed prior to procurement. • Council assumes full design risk.

Contracting Model	Pros	Cons
	• Relatively simple procurement process.	
2. D&B	• Provides greater time and cost certainty. • Good appetite for D&B contractors in NZ for a small WWTP. Technology reasonably standard (off the shelf) so a number of contractors willing to take design risk. As plant reaches medium size and is more complex there is less contractor appetite (risk / reward not worthwhile). • Compared to Construction only, encourages bidders to economise because they are not given a specific design to price and are trying to find all avenues possible by which to gain a cost advantage over their competitors. • Potential to commence construction shortly after contract award, in advance of detailed design being finalised. • Potential innovation through integration of construction and design.	• Requires a relatively fixed scope, given fixed price. • Limited whole-of-life approach, given focus is solely on the capital elements. However, not uncommon for contractors to provide short operating period of 1-2 years. Longer defects liability periods can also incentivise whole of life. • Risk of compromised quality as contractors minimise design cost. • Requires substantial investment from market to bid compared to Construction only. • Development of procurement documents is a significant undertaking compared to Construction only. • Tender process takes longer than Construction only and evaluation of different designs can be significant. • Risk of higher risk pricing, given greater risk is transferred to the private sector. • Risk of duplication of costs, as council may require another design consultant to independently review design, given designer's primary duty is to the contractor. • More challenging for council to exert control over the design unless detailed specifications provided to contractors prior to tender.

Contracting Model	Pros	Cons
3. Managing contractor	• The procuring entity will only interact with one party, simplifying the process. • Council retains overall control of the project, including design aspects. • Transfers interface risk to the private sector (i.e., managing contractor) • Enhanced construction management expertise, which can assist with overall project integration, coordination and help keep to budgeted time and cost. • Less council resource dedicated to contract administration. • Design can be varied with relative ease, even after awarding contracts	• Managing contractor only applicable to disaggregated approach. • Only applicable for complex plant procurement. • Additional management fee. • Additional complexity associated with terms of liability, insurance, etc. • Less certainty of final construction costs than for traditional procurement. • Greater degree of design risk retained by council.
4. Alliance	• Risk sharing desirable to contractors, especially where there are high risk elements involved (e.g., seismic risk). • Potential cost benefits, where contractors would otherwise build in considerable risk pricing for high-risk elements. • Faster procurement due to the considerable scope flexibility. This is particularly beneficial for large, complex projects that are challenging to scope, price and deliver. • Maximum flexibility across all aspects of delivery. • Alignment of interests may reduce contractual disputes. • Can increase the level of knowledge sharing / transfer.	• Does not provide time or cost certainty. • Greater administrative/contract administration/cost management burden. • Requires significant resourcing to manage governance and management arrangements. • Increased complexity associated with procurement and alliance set up. • Risks that are typically passed to the private sector are already well understood and accepted, with traditional contracting methods already providing for risk sharing for high-risk elements. Accordingly, value for money benefits of alliance may be reduced. • "No blame" philosophy means legal claims are generally

Contracting Model	Pros	Cons
	• Incentivises a 'best for project' and integrated approach.	limited to matters of wilful default or insolvency, with other contract and negligence issues excluded. • More susceptible to risks associated with staff turnover, poor culture, etc as relationship/collaboration critical to success.
5. DBOM	• Incentivises whole of life approach by combining delivery with operations. • Cost and time certainty - likely to be fixed price and / or fixed date. • Single package / full scope gives contractor ability to innovate in design. • Single contractor to monitor. • Greater opportunity for innovation as design, construction and operations all working together, also provides for early operator involvement.	• Requires a certain size/scale to be attractive to the market. • Difficult to change scope during delivery. • Higher tender costs due to the complexity of the procurement. • Potential for greater risk pricing, given the higher degree of risk transferred. • Risk not having an operator led consortia, if value of capital works is disproportionally high compared to the operation works.
6. DBFOM	• Incentivises whole-of-life approach by combining delivery with operations. • Cost and time certainty - likely to be fixed price and / or fixed date. • Single package / full scope gives contractor ability to innovate in design. • Single contractor to monitor. • Greater opportunity for innovation as design, construction and operations all working together, also provides for early operator involvement.	• Highest procurement costs and complexity. • Significant ongoing contract administration requirements. • Requires highly skilled people to manage procurement and the contract. • Limited market appetite unless significant size and scale. • Financing provided by private sector (more expensive than Local Government Funding Agency). • Difficult to change scope or stage during delivery. • Uncertain whether 'true' risk transfer actually occurs, which

Contracting Model	Pros	Cons
	• Inclusion of private finance brings contract administration and due diligence expertise. • Inclusion of private finance increases the degree of risk transfer	reduces value for money (i.e., contractor pricing risk premium, but not actually the risk).
7. Private provision	• Highest degree of risk transfer	• Small / medium size of plant unlikely to provide market appetite from private providers - private provision requires sufficient scale to be feasible. • Implicit financing cost (likely to be more expensive than Local Government Financing Agency). • Low control of asset for councils. • Difficulty to change scope during delivery. • Potentially more challenging legislatively for a WWTP.

Appendix B

MCA Scoring

Management Case Contents

Figures

Tables

Executive Summary – Management Case

1.1 Introduction and Scope

This document sets out the Management Case for the Waikato Southern Metro Wastewater Treatment Detailed Business Case (DBC).

The purpose of the Management Case is to confirm the proposal is achievable and detail the arrangements needed to ensure successful delivery as well as manage project risks.

The preferred option comprises a programme (the Programme) of wastewater treatment plant (WWTP) and conveyance works across the wider Waikato-Hamilton Waipā Metro Area (the Projects). The Projects include:

- Southern Sub-regional Plant (Southern WWTP): Construction of a new WWTP to service the Waikato Regional Airport (the Airport) industrial precinct, Mātangi/Tamahere Hub and southern Hamilton. Initially, the WWTP will discharge to land, but will discharge to the water and ultimately into the Waikato River once capacity triggers are reached.
- Cambridge WWTP: Construction of a new WWTP at Cambridge to replace the existing plant with discharge to the Waikato River.
- Te Awamutu upgrades: Upgrades to the existing plant at Te Awamutu WWTP, which will continue to discharge via rock channel to the Mangapiko Stream.
- Mātangi and Tauwhare Pā upgrades: Improvements to the existing Mātangi WWTP, which will remain online until the wastewater is conveyed to the Southern WWTP or Hamilton City Council (HCC) network around 2040. Upgrades to the existing Tauwhare Pā WWTP, which discharges to land.

The scope of the Management Case includes the management, governance and risk management arrangements for the wider Programme as well as those applicable to each individual Project.

At the time of writing, the impact of the New Zealand Government's Three Waters Reform process on the sub-regional councils is unknown. As such, the DBC has been prepared on the basis of 'business as usual' and where relevant, the proposed structures aim to maintain optionality and flexibility to transition to a new structure if required.

1.2 Memorandum of Understanding

Given the Projects will be undertaken at different times, locations and by different parties, strong collaboration between the respective councils, iwi and mana whenua will be required to successfully deliver the strategic outcomes agreed in the DBC. A Memorandum of Understanding (MoU) is intended to be entered into shortly after the finalisation of the DBC to capture these requirements.

The key terms of the MoU will include:

- Minimum treatment plant performance standards
- Governance and programme delivery structure
- Cost allocation, funding and financing
- Southern WWTP staged development thresholds
- Identification of Lead Councils

- Cross-boundary servicing arrangements
- Project ownership

1.3 Lead Councils

The Projects within the wider Programme of works will be delivered by a single council on behalf of the other Sub-regional Partners (the Lead Council). The Lead Council will utilise its existing resources, policies and procedures to deliver the Project.

The Lead Councils for each Project are outlined below:

Table MC - ES 1 : Lead Councils

Project	Lead Council
Southern WWTP	Hamilton City Council
Cambridge WWTP	Waipā
Te Awamutu upgrades	Waipā
Mātangi and Tauwhare Pā upgrades	Waikato

1.4 Governance Structure

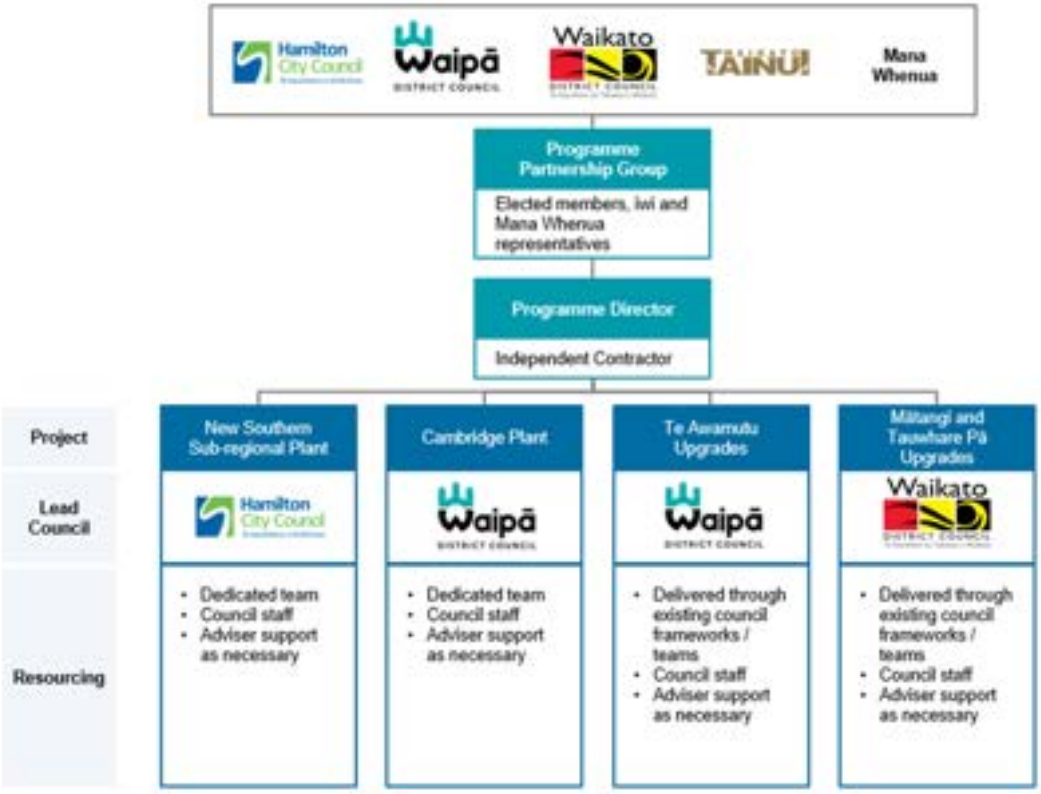
The governance structure comprises:

- Project level: Existing governance arrangements applicable to each Lead Council.
- Programme level: The Programme Partnership Group (PPG) and the Programme Director.

The Project level governance arrangements reflect the Lead Council structure and are consistent with existing project delivery policies and decision-making frameworks. The Programme level governance is structured on a joint basis with representation from Waikato-Tainui, mana whenua, Waipā District Council (Waipā DC), Waikato District Council (Waikato DC) and HCC (collectively referred herein as the Sub-regional Partners). The purpose of the joint governance structure is to provide oversight to ensure the strategic objectives in the DBC/MoU are being followed by each Lead Council and opportunities for collaboration and integration are being captured.

The proposed governance structure is outlined below:

Figure MC - ES - 1: Governance structure



The PPG is a senior level joint governance group that will be established contractually between the Sub-regional Partners and will provide direct oversight of the areas relevant to the wider Programme. The PPG members will still be required to seek endorsement for decisions at their home organisations (i.e., the PPG cannot make decisions that utilise the powers of Local Government). All PPG decisions are expected to be made by consensus, however, if voting is needed, all member organisations will have one vote each.

The Programme Director will be independent of the Sub-regional Partners, sit across the whole Programme and report to the PPG. The Programme Director will be the key intermediary between the individual Projects and the PPG.

The Lead Council will retain oversight of core Project delivery functions and provide oversight through existing governance arrangements. The scope of the Lead Council will include consenting and planning, procurement, construction management and asset management.

1.5 Project Organisation Structure

Resourcing for each Project will be managed by the Lead Council. The two new WWTPs (Southern WWTP and Cambridge WWTP) will require a mix of dedicated resourcing, existing council teams and advisory support.

The two upgrades (Te Awamutu WWTP, Matangi/Tauwhare Pa WWTPs) are expected to be managed through existing council resources given their smaller scale (supported by advisers as necessary).

The proposed organisational structure for the two new WWTPs is based on Project activities to be undertaken at each stage. The organisational structure will evolve over time to ensure it remains fit-for-purpose. They have been broken down into three key stages:

- Initial phase (pre-implementation)
- Construction phase (implementation)
- Operations phase (post-implementation)

1.6 Use of Special Advisors

Where additional support is required to supplement existing council resources and expertise, specialist advisors and/or external contractors will be used. Each Project will require varying levels of specialist support, likely to cover planning, engineering, commercial, financial and legal expertise.

1.7 Project Plan and Milestones

A summary of the key milestones for the Projects included within the preferred option is presented below:

Figure MC - ES - 2: Key Milestones – Programme

1.8 Change Management Planning

The delivery of the new WWTPs and upgrades that make up the Programme of works are not expected to significantly change the culture or systems of the Lead Councils. The key cultural shift will be the need for the Lead Council to provide Project reporting to the Programme Director and PPG. Specific reporting recommendations have been put in place to manage this change (refer below).

Operationally, the technology of stage one of the Southern WWTP is expected to be comparable to other HCC assets although the scale will be smaller. The Cambridge WWTP will be more complex than existing wastewater assets managed by Waipā DC. Training of staff will be undertaken as part of the commissioning and handover process. The design team is expected to be involved in this process alongside the contractor and process equipment supplier. The scale and technology of the Te Awamutu, Mātangi and Tauwhare Pā upgrades is comparable to existing assets managed by Waipā DC and Waikato DC.

1.9 Benefits Management Planning

The strategy, framework and plan for dealing with the management and delivery of benefits are detailed in the Benefits Realisation Plan (BRP) attached to this business case as Appendix [A]. The BRP outlines the proposed approach for managing benefits and provides a framework for ongoing assessment against the Project objectives and Key Performance Indicators (KPIs).

1.10 Monitoring and Reporting

Monitoring and reporting will include:

- Pre-implementation Monitoring: During planning and consenting phases monthly cost and progress reporting will be prepared for each of the Projects by the relevant Project Manager
- Construction Monitoring: During construction, monthly cost and progress reporting will be prepared for each of the Projects by the relevant Project Manager.
- PPG Reporting: High level reporting will be prepared for the PPG meetings every quarter. This will summarise the key updates from each of the projects based on planning, consenting, construction and / or BRP reporting.
- Project Closure Report and Post Implementation Review: On completion of each Project, a project closure report will be drafted by the Project Manager. A post implementation review will be undertaken by the respective Lead Council to assess the success of the Project, including the business case, planning and delivery phases.
- Operational Reporting: The Local Government Act 2002 requires that all councils provide annual reporting on the performance of their wastewater systems. This reporting will be provided by the Lead Council for each project. This reporting will be in addition to any specific reporting required to comply with resource consent and/or designation conditions.
- BRP Reporting: Benefits management will be managed by the Lead Council at a Project level and reported directly to the Programme Director and PPG. Benefit realisation reviews will be undertaken annually during the life of the assets.

1.11 Risk Register

Project level risks will be managed by the Lead Council using their existing risk management framework. Programme level risks will be compiled by Programme Director using monthly risk reporting received from each of the Lead Councils.

The key risks from the risk register are provided below:

Table MC - ES 2: Top risks

Risk Description	Cause	Controls	Likelihood	Consequence	Residual Risk Rating	Risk Treatment	Action Plan
The recommended DBC projects cannot be funded leading to the projects being delayed, not proceeding or lower standards being adopted	- Competing priorities leading to unwillingness to fund the Projects. - Insufficient financial headroom for councils to fund the Projects. - Cost increases or affordability the ability to secure funding or financing - Lack of integration, coordination and planning at a sub-regional level.	- Staging for the Southern WWTP. - Traditional approach to financing. - Lead council structure agreed in principle and to be confirmed through MOU. - Funding to commence implementation of projects recommended in the DBC included in LTPs.	Likely (3)	Catastrophic (5)	Very High Risk (15)	Mitigate	- MoU signed by project partners which confirms principles agreed in the DBC including approach to ownership, funding and financing. - Establish governance and delivery structure recommended in the DBC for the Programme. - Ensure appropriate joint engagement between Councils/Partners occurring throughout project - For Southern Plant, HCC to enter into service agreement with Waipa DC to contribute toward funding the plant.
Costs to implement recommended DBC projects are significantly higher than estimates further impacting on affordability and leading to the project being delayed, not proceeding or lower standards being adopted.	Increasing land costs, high contractor demand, limited providers, increasing costs of key materials, supply chain disruption or poor risk allocation in the construction contracts.	- Monitor market conditions. - Procure works and services as early as possible to reduce impact and likelihood of escalation. -Undertake a procurement methodology that attracts multiple tenderers. - Sensitivity assessments completed as part of the DBC to assess the effect of changing inflation rates and operating and capital costs. -Recommended immediate initiation of key projects in the DBC.	Likely (3)	Catastrophic (5)	Very High Risk (15)	Accept	- Complete site selection, land acquisition, consenting and designation processes early as recommended in the DBC. - Early contractor engagement and identification of preferred procurement method. - Procure works and services as early as possible to reduce impact and likelihood of escalation - Undertake a procurement methodology that attracts multiple tenderers
The recommended DBC projects do not meet iwi / mana whenua expectations which may impact ability to implement the recommendations, consentability and adversely impact relationships	- Lack of meaningful engagement with relevant groups throughout project delivery. - Insufficient resourcing made available to enable meaningful iwi / mana whenua participation in project. - Mana whenua/iwi views not reflected in Governance discussions and decision making. - Differing priorities/points of view on level of treatment and discharge methods. - Insufficient budget available to deliver "best for river" outcomes in timeframes that are acceptable to iwi/mana whenua.	- Project has been co-designed and developed by mana whenua/iwi and council and this approach will be built on through the project pre-implementation and implementation phases. - Metro WW Project vision and objectives embed Te Ture Whaimana and incorporate iwi/mana whenua values and aspirations (e.g. Iwi Env Plans, Economic Aspirations) - Recommended governance and project delivery structure provides iwi/mana whenua representation at senior level.	Likely (3)	Major (4)	Very High Risk (12)	Mitigate	- MoU signed by project partners which confirms principles agreed in the DBC including minimum wastewater treatment standards and project governance structure. - Establish governance and delivery structure recommended in the DBC for the Programme. - Review & implement communications and engagement plan for each project including specific provision for iwi/mana whenua engagement and partner councils (at multiple levels). Project engagement and delivery approaches to incorporate co-design to solutions and seek mutual agreement.

Risk Description	Cause	Controls	Likelihood	Consequence	Residual Risk Rating	Risk Treatment	Action Plan
Resource consents and designations for recommended wastewater projects cannot be secured or the costs to deliver a consentable solution are prohibitive.	- New activity and discharge to the Waikato River (considered in isolation) is not consistent with the Te Ture whaimana, NPS FM, and other policy (incl. current NES for Sources of Human Drinking Water and land application requirements). - Other WWTPs consent renewal timeframes do not align. - Legislative change Vision and Strategy and legislative change	- Collaborative approach to delivering the project that involves equal Iwi / TLA representation. Project Governance Group. - Having regulator involved in the project to offer advice. - Utilise the technical teams involved in Cambridge WW Consenting, PC1 Healthy Rivers Processes and Pukekohe WW consenting and leveraging off of that work - Consenting Strategy - consistent with the current Vision & Strategy for the river. Identification of alternative consenting pathways to link to other discharges	Likely (3)	Catastrophic (5)	Very High Risk (15)	Mitigate	- Secure the site for new Southern WWTP. - Thoroughly explore beneficial re-use opportunities to avoid or reduce the need for water based wastewater discharges. - Look for mechanisms to link discharge activities across the broader catchment in order to clearly demonstrate betterment despite a new WW discharge. - Ensuring appropriate treatment standards are adopted including WRP, TTVMA, Iwi Mgmt. Plans etc. - Develop and implement appropriate engagement strategies and plans, including project governance. Ensure consistent messaging across related projects and workshops.
Reform of the Three Waters sector impacts the ability or commitment to implement the DBC programme recommendations.	-Potential views that all work should be deferred until clear decisions on sector reform resulting in slowing down of critical infrastructure investment. - If reform occurs, the 'actors' involved in project delivery may change and impact on project prioritisation and delivery. - Principles and obligations agreed in the MoU are not carried over to a new water entity that is set up as a result of the planned sector reform.	-The preferred options were prepared on the basis of 'business as usual' -The recommended programme and project delivery structures aim to maintain optionality and flexibility to transition to a new structure if required. - Agreements clearly documented in the MoU and DBC so knowledge transfer can occur to the new water entity.	Likely (3)	Major (4)	Very High Risk (12)	Mitigate	- Continue to implement recommendations in the DBC and MoU in line with proposed implementation schedule. - Accelerate implementation of the recommended projects.
in ability for councils to move to integrated delivery of programme results in uncoordinated delivery of the overall programme results in misalignment of objectives and 'Best for River' principles.	Misalignment of objectives and commitment of resources from Sub-regional Partners.	- MoU to include agreement on minimum performance standards and project governance and delivery structures. - Benefit Management reporting and monitoring processes recommended in the DBC. - Compliance with consent requirements.	Likely (3)	Major (4)	Very High Risk (12)	Mitigate	- Include agreement upfront in the MoU - Ongoing joint visibility through the governance structure and reporting processes recommended in the MoU

The mitigations for these top risks demonstrate that the Programme is reliant on the partners continuing to work together constructively, implementing the recommendations in the DBC and entering into the MoU in good faith. Failure to do so would likely result in materialisation of a number of these risks.

The risk register is included as Appendix [D] to this document. The full document includes the full list of risks and further information in relation to categorisation, responsible parties, target dates and post action plan target risk ratings.

1.12 Next Steps

This DBC seeks formal approval from the Sub-regional Partners to progress the implementation of the preferred option.

The immediate next steps are outlined below:

1. Finalise and enter into the MoU.
2. Establish the proposed governance structure, including the PPG and the Programme Director.
3. Progress with the proposed Project Plans as per Section [1.2.7 Project Plan and Milestones]. The initial activities are outlined below:
    a) Southern WWTP:
        i. Continue discussions with the Waikato Regional Airport regarding interim arrangements.
        ii. Finalise the preferred site (October 2021).
        iii. Acquire the land for the WWTP (April 2022).
        iv. Begin concept design / master plan / consent application preparation (May 2022).
    b) Cambridge WWTP:
        i. Finalise preliminary work including the Procurement Plan and Risk Register (September 2021).
        ii. Continue progressing the activities that are already underway:
            1) Consenting.
            2) Technical investigations.
            3) Concept engineering.

Management Case - Planning for Successful Delivery

1.1 Introduction and Scope

1.1.1 Introduction

This document sets out the Management Case for the Waikato Southern Metro Wastewater Treatment DBC.

The purpose of the Management Case is to confirm the proposal is achievable and detail the arrangements needed to ensure successful delivery as well as to manage project risks.

The Management Case considers:

- Programme and project management arrangements.
- The proposed governance structure.
- Roles and responsibilities.
- The project plan and milestones.
- Change management.
- Benefits management.
- Risk management.

The preferred option comprises a programme of WWTP works across the wider Waikato-Hamilton Waipā Metro Area. The Projects are outlined below:

- Southern WWTP: Construction of a new WWTP to service the Airport industrial precinct, Mātangi/Tamahere Hub and southern Hamilton. The WWTP is expected to be located between Rukuhia and the Airport and will be delivered in three stages to align to estimated demand. Initially, the WWTP will discharge to land, but will discharge to water and ultimately to the Waikato River once stage two triggers are reached. Interim servicing arrangements to meet the current and short-term needs of the Airport industrial precinct will also be required.
- Cambridge WWTP: Construction of a new WWTP at Cambridge to replace the existing plant with discharge to the Waikato River. The plant will be located on the same site as the existing plant.
- Te Awamutu upgrades: Upgrades to the existing plant at Te Awamutu, which will continue to discharge via rock channel to the Mangapiko Stream.
- Mātangi and Tauwhare Pā upgrades: Improvements to the existing Mātangi WWTP, which will remain online until the wastewater is conveyed to the Southern WWTP or HCC network around 2040. Upgrades to the existing Tauwhare Pā WWTP, which discharges to land.

1.1.2 Scope

The scope of the Management Case includes the management arrangements for the wider Programme as well as the project management framework applicable to each individual Project.

At the time of writing, the impact of the New Zealand Government's Three Waters Reform process on the Sub-regional Councils is unknown. As such, the DBC has been prepared on the basis of 'business as usual' and where relevant, the proposed structures aim to maintain optionality and flexibility to transition to a new structure if required.

1.2 Project Management Planning

1.2.1 Programme Management Arrangements

Given the Projects will be undertaken at different times, locations and by different parties, strong collaboration between the respective councils, iwi and mana whenua will be required to successfully deliver the strategic outcomes agreed in the DBC. A Memorandum of Understanding (MoU) is intended to be entered into shortly after the finalisation of the DBC to capture these requirements.

The MoU outlines the parties' continued commitment to cooperation, collaboration and delivery of the strategic outcomes. It is expected items agreed in the MoU could transition into a three waters entity given the potential for significant structural change to three waters services delivery in New Zealand as a result of the Three Water Reform Programme.

The key terms of the MoU are detailed below:

Table MC - 1: Memorandum of Understanding – Key terms

Item	Details
Minimum performance standards	The proposed treatment standards in the MoU are consistent with those used for the DBC (see Economic Case Section [5.2 Preferred Option Key Considerations]) including liquid stream, solids stream and atmospheric emissions standards.
Governance structure	Establishment of the PPG to provide Programme level oversight. The PPG will include representation from the Sub-regional Partners and will be formalised by a contractual agreement. The scope of the PPG will include direct oversight and the ability to make recommendations in relation to Programme integration, Programme consenting strategy and benefits management. Importantly, PPG members will still be required to seek endorsement for decisions at their home organisations (i.e., the PPG cannot make decisions that utilise the powers of Local Government).
Cost allocation, funding and financing	Cost allocation principles for: • Land acquisition for the Southern WWTP. • Reticulation / conveyance costs. • Plant costs (master planning, consenting and design costs, initial ground works, civil works, treatment systems etc). • Discharge and compliance monitoring systems These items are further detailed in the Financial Case Section [1.3.1 Cost Allocation].
Southern WWTP thresholds	The MoU will include the capacity thresholds and triggers to move to the next stage of development for the Southern WWTP.
Lead Council	The Projects within the wider Programme of works will be delivered by a Lead Council. The Lead Council will utilise its existing resources, policies and procedures to deliver the Project (see Section [1.2.2Project Management Arrangements]). The MoU will outline the Lead Council for each Project.
Cross-boundary servicing arrangements	The MoU will outline the intention for Lead Councils to enter into servicing agreements for servicing of any cross-boundary communities.

Ownership	The MoU will outline that joint ownership of wastewater assets is not preferred and that ownership will likely reflect the Council that provides the financing and has control of Project delivery and asset management.

1.2.2 Project Management Arrangements

The Projects within the wider Programme of works will be delivered by a single council (Lead Council) on behalf of the other Sub-regional Partners. The Lead Council will utilise its existing resources, policies and procedures to deliver the Project.

Project delivery through a Lead Council is preferred rather than establishing a new entity due to the lower establishment costs, lower ongoing costs, shorter establishment timeframes and greater flexibility to transition to a three waters entity if necessary, as a result of any sector reform. A number of other delivery structures were considered and assessed as part of the DBC. These included joint procurement, a partnership with principal council or principal CCO, a new entity that is fully council owned, an existing shared services organisation (WLASS), a new regional water entity, a new water entity with joint council and third-party ownership and a community trust[1].

The Lead Council for each Project is based on the territorial authority where the beneficiaries are located. This generally reflects the location of the Project, except for the new Southern WWTP, which is located within Waipā DC's territory. The Southern WWTP is proposed to be delivered by HCC[2] because it is expected to service demand in southern Hamilton over the long term (see Economic Case, Appendix [C], Preferred Option Report).

The Lead Councils for each Project are outlined below:

Table MC - 2: Lead Councils

Project	Lead Council
Southern WWTP	Hamilton City Council
Cambridge WWTP	Waipā District Council
Te Awamutu upgrades	Waipā District Council
Mātangi and Tauwhare Pā upgrades	Waikato District Council

[1] Shortlisting and detailed MCA analysis of the delivery structure options can be found in the Governance Group meeting content from 28 October 2020 and Control Group content from 30 November 2020 respectively.

[2] The specific arrangements between HCC and Waipā DC in relation to consent and designation processes outside HCC's territorial authority are to be further evaluated in relation to requirements under the Local Government Act and Resource Management Act.

1.2.3 Governance Structure

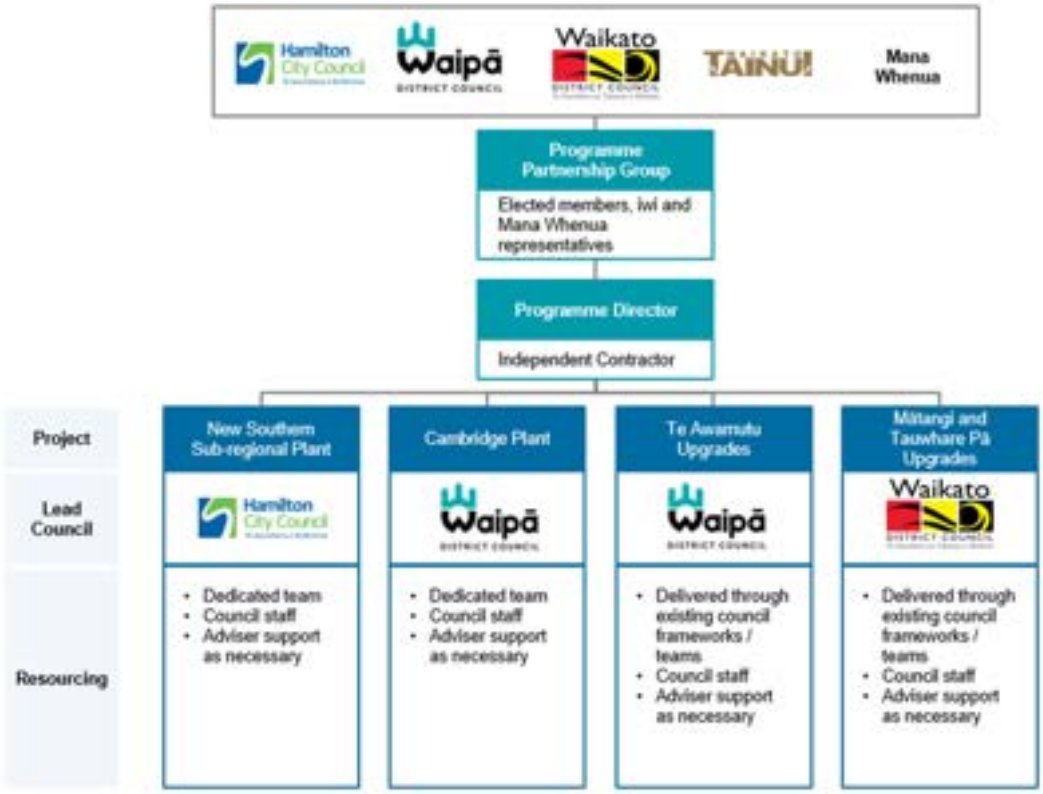
The governance structure comprises:

- Project level: Existing governance arrangements applicable to each Lead Council.
- Programme level: PPG and Programme Director.

The Project level governance arrangements reflect the Lead Council structure and are consistent with existing project delivery policies and decision-making frameworks. The Programme level governance is structured on a joint basis with representation from Waikato-Tainui, mana whenua, Waipā District Council (Waipā DC), Waikato District Council (Waikato DC) and HCC (the Sub-regional Partners). The purpose of the joint governance structure is to provide oversight to ensure the strategic objectives in the DBC/MoU are being followed by each Lead Council and opportunities for collaboration and integration are being captured.

The proposed governance structure is outlined below:

Figure MC - 1: Governance structure



These arrangements are anticipated to remain in place until at least the completion of the construction works for each Project. Consideration would need to be given as to whether or not to disband the governance arrangements at this point.

Programme Partnership Group:

The PPG is a senior level joint governance group will be established contractually between the Sub-regional Partners and will provide direct oversight of the areas relevant to the wider Programme.

Table MC - 3: Key features of the PPG

Key features	Description
Meeting frequency	Once every three months but frequency is dependent on the stage of the Programme and the underlying requirements.
Size and composition	Representatives include: • Up to two representatives appointed by Waipā DC; • Up to two representatives appointed by Waikato DC; • Up to two representatives appointed by HCC; • Up to six representatives of Taangata Whenua, including at least two representatives appointed by Waikato-Tainui. The remaining four Taangata Whenua Representatives will be appointed by the collective marae, hapuu and Iwi within the Metro Area through processes defined by Taangata Whenua; and • The PPG may appoint any further person or persons who will provide expertise and experience as may be required from time to time for the completion of the Projects. • Waikato Regional Council could potentially attend meetings in an observer capacity.
Decision making and voting	All decisions are expected to be made by consensus, however until such time as the PPG prepares and agrees its Terms of Reference, a decision of the PPG must be approved by a majority of the members. If voting is needed, all member organisations will have one vote each. The PPG members are still be required to seek endorsement for final decisions at their home organisations (i.e. the PPG cannot make decisions that utilise the powers of Local Government).
Appointment process	All members and alternates will be appointed by their respective organisation's governors. Mana whenua representatives will be appointed by the collective marae and hapū within the Metro Area through processes defined by mana whenua.
Skillset / expertise	Members should have sufficient influence within their organisations and be able to represent the respective views of their organisations.

The roles and responsibilities of the PPG aim to address items that are relevant to the wider Programme but are not addressed through the Lead Council governance arrangements. While having a single council lead delivery on behalf of the other Sub-regional Partners has a number of benefits, an overall collective approach can provide additional benefits in relation to Programme integration, Programme consenting strategy and benefits management. These are discussed in further detail below:

- Programme Integration: Councils and other stakeholders need confidence that decision-making on Projects considers the potential implications for other Projects (e.g. timetable, procurement, supply chain) to ensure the best value for money can be obtained.
- Consenting strategy: There may be the potential to save money or maximise synergies by taking a strategic approach to consenting for the individual Projects. While individual Lead Councils will

undertake the consenting applications themselves, the Programme must ensure that any cost savings or joint benefits from a global approach are considered and can be realised.

- Benefits management: There is potential that the disaggregated nature of the preferred option means it is more difficult to ensure accountability for the delivery of the strategic objectives and benefits that stakeholders have signed up to in the DBC and MoU (which have been guided by the 'Best for River' principle).

The roles and responsibilities of the PPG aim to address these items and are outlined below:

Table MC - 4: Roles and Responsibilities of the PPG

Oversight area	Responsibilities
General	• Represent the behaviours and strategic objectives agreed in the DBC and the MoU. • Actively contribute to group discussions and debate issues robustly. • Appoint and provide direction to the Programme Director in line with the methodology outlined in the terms of reference for the PPG.
Integration of the Programme	• Provide oversight, strategic direction and decision-making for the integration of the Programme on behalf of the Sub-regional Partners. • Receive regular updates from Lead Councils on the status of each of the Projects. • Make recommendations to Lead Councils on issues where there are potential benefits from applying an integrated approach across the sub-region. • Raise objections to Lead Councils should the Programme Director and PPG deem they are acting in a manner inconsistent with the delivery of an integrated Programme.
Consenting strategy	• Provide direct oversight of the Programme consenting strategy to ensure any cost benefits and other synergies available from an integrated approach can be achieved. • Make recommendations or raise objections to Lead Councils.
Benefits management	• Receive regular reporting on benefits realisation from Lead Councils. • Make recommendations to Lead Councils if there are opportunities to enhance the delivery of the strategic objectives. • Raise objections to Lead Councils if it deems they are failing to deliver the strategic objectives agreed to in the DBC.

Programme Director:

As part of the joint governance arrangements, a Programme Director is proposed to be established. The Programme Director will be independent of the Sub-regional Partners, sit across the whole Programme and report to the PPG. The Programme Director will be the key intermediary between the individual Projects and the PPG and have relevant experience in large-scale infrastructure project delivery.

The roles and responsibilities of the Programme Director largely mirror those of the PPG to reflect the intermediary nature of the role and are outlined below:

Table MC - 5: Roles and responsibilities of the Programme Director

Oversight area	Responsibilities
General	• Represent the behaviours and strategic objectives agreed in the DBC and the MoU.
Integration of the Programme	• Receive Project reporting from the Lead Councils, consolidate and report to the PPG as necessary. • Directly make recommendations to the PPG on issues where there is potential for sub-regional benefits from an integrated approach.
Consenting strategy	• Provide direct oversight of the Programme consenting strategy to ensure any cost benefits and other synergies available from an integrated approach can be achieved. Consolidate and report to the PPG as necessary.
Benefits management	• Provide direct oversight over benefits management and highlight any failures to deliver agreed minimum standards (as set out in the MoU) to the PPG. • Make recommendations to the PPG if there are opportunities to enhance the delivery of strategic outcomes.

Lead Council:

The Lead Council will retain oversight of core Project delivery functions through existing governance arrangements. The scope of the Lead Council will include the core Project delivery functions including consenting and planning, procurement, construction management and asset management.

The roles and responsibilities of the Lead Council are outlined below:

Table MC - 6: Roles and Responsibilities – Lead Council

Responsibilities	Description
General	• Represent the behaviours and strategic objectives agreed in the DBC and the MoU.
Project delivery and operations	• Oversee the Project delivery and management, including Project scope, schedule, land acquisition (if applicable) and budget as the Project progresses through the planning, procurement and implementation phases. • Manage resourcing and advisory support for respective Projects. • Identify risks and agree appropriate management plans. • Drive the Project to deliver the strategic outcomes and benefits. • Approve key contracts and any variations. • Approve operational decisions. • Address any emerging issues and act decisively to alleviate the impact to the Project.
Reporting	• Provide reporting to the Programme Director and PPG in relation to: — Risks

	— Consenting — Construction monitoring — Operational reporting — Project closure and post implementation reviews — Benefits realisation Reporting is further discussed in Section [1.4.3 Monitoring and Reporting]
Funding and financing	• Independently finance respective Projects. • Enter into service agreements for any cross-boundary arrangements with other territories.
Communications and engagement	• Approve media and stakeholder communication protocols in line with the protocols of the Programme.

1.2.4 Project Organisation Structure

Resourcing for each Project will be managed by the Lead Council. The two new WWTPs will require a mix of dedicated resourcing, existing council teams and advisory support. The two upgrades are expected to be managed through existing council resources given their smaller scale (supported by advisers as necessary).

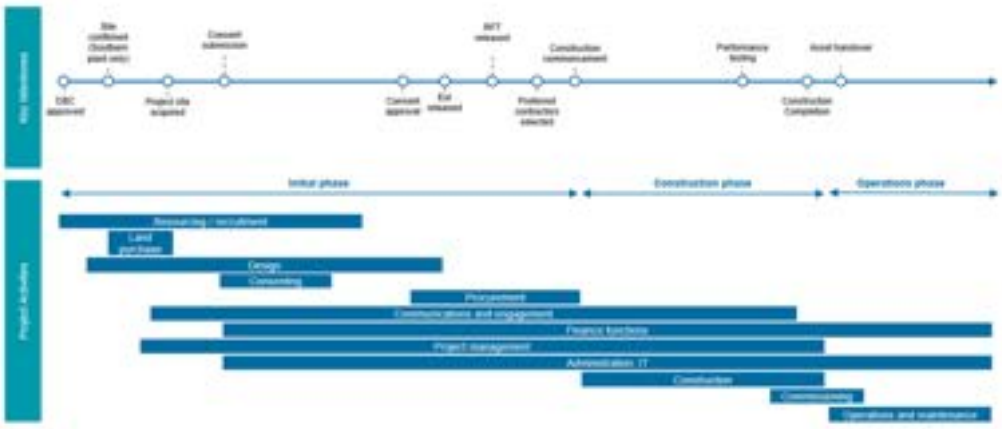
The proposed organisational structure for the two new WWTPs is based on Project activities to be undertaken at each stage. The organisational structure will evolve over time to ensure it remains fit-for-purpose.

The roles and responsibilities for the two new plants (Southern WWTP and Cambridge WWTP) have been broken down into three key stages:

- Initial phase (pre-implementation)
- Construction phase (implementation)
- Operations phase (post-implementation)

The underlying Project activities to be undertaken at each of these phases are detailed below:

Figure MC - 2: Project Activities



The ultimate composition of the teams will be dependent on the Lead Councils preferred organisational structure, however a suggested structure for each phase is detailed below:

Figure MC - 3: Organisational Structure – Initial phase

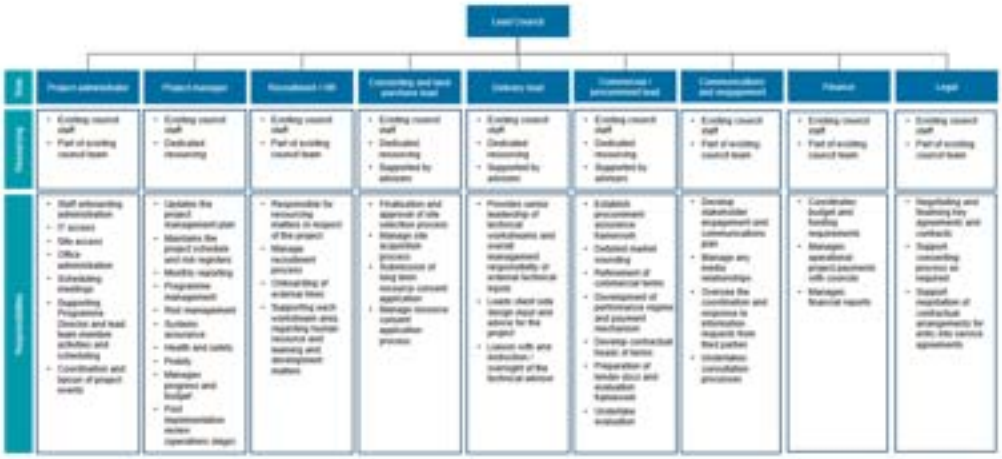


Figure MC - 4: Organisational Structure – Construction phase

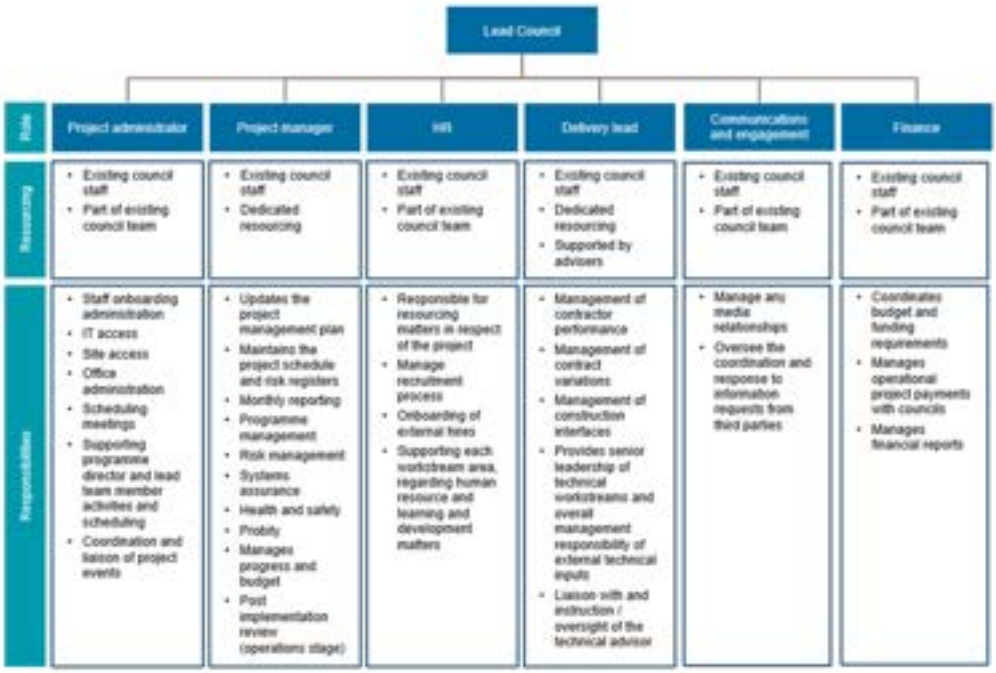
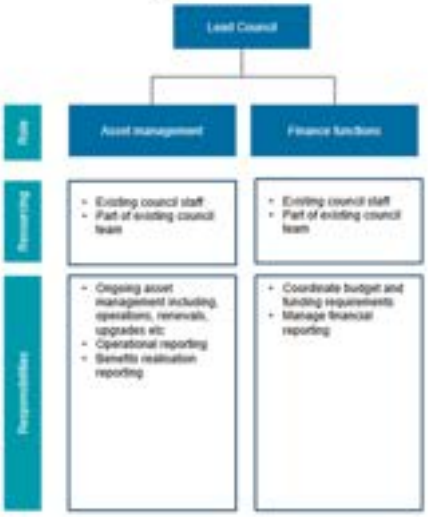


Figure MC - 5: Organisational Structure – Operations phase



1.2.5 Use of Special Advisors

Where capability does not exist or is not available in-house, some roles may be filled by external contractors. Where additional support is required to supplement existing council resources and expertise, specialist advisors will be used. At a high level, the requirements for contractors and specialist advisors have been outlined in figures [5], [6] and [7]: Organisational structure.

Each Project will require varying levels of specialist support expected to cover planning, engineering, commercial, financial and legal expertise. The potential advisory support is outlined below:

Table MC - 7: Advisory support

Advisory Support	Description
Planning	• Land purchase advice. • Planning and environmental advice.
Engineering	• Concept design. • Master planning. • Preliminary design. • Detailed design.
Commercial / financial	• Procurement advice including market sounding, preparation of tender documentation and evaluation framework, development of risk transfer and commercial terms. • Accounting advice.
Legal	• MoU establishment. • Construction contract review and negotiation. • Cross-boundary servicing agreements.

1.2.6 Personnel Implications

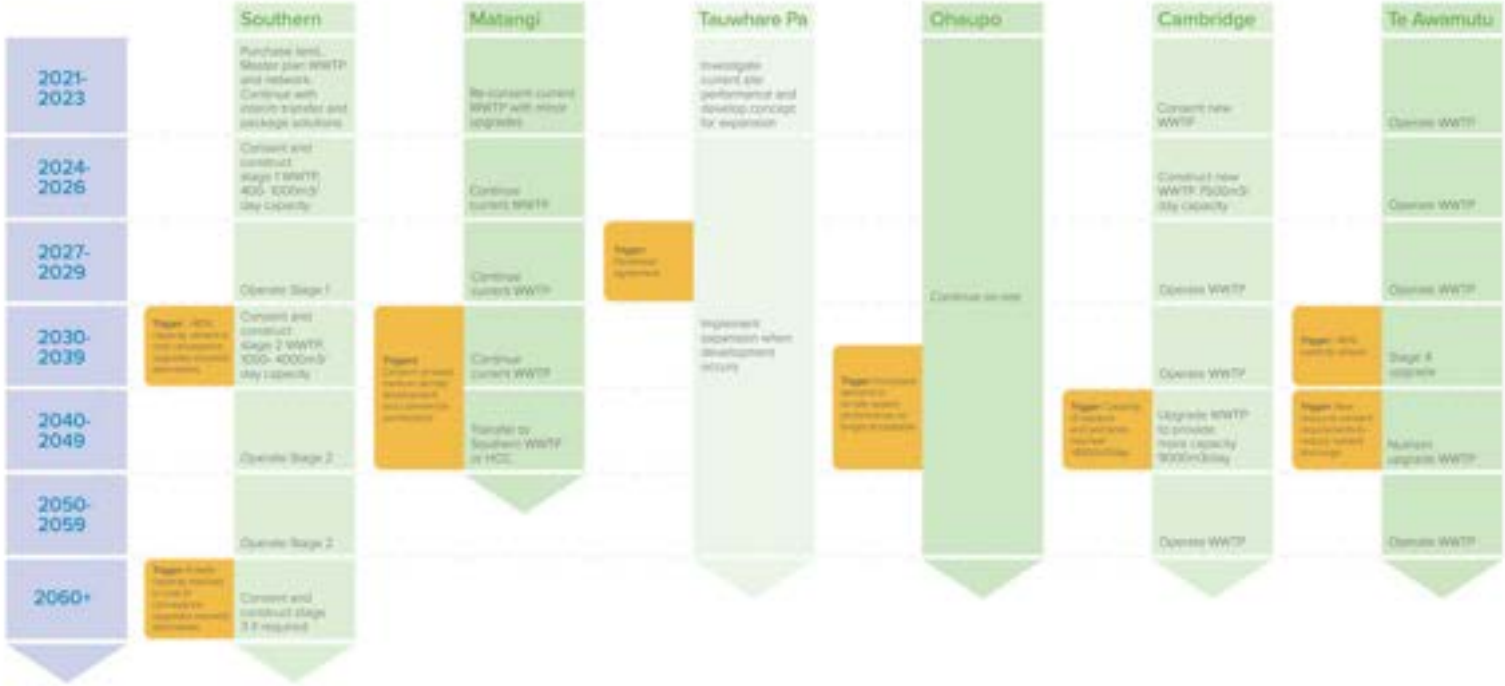
As discussed in Section [1.2.4 Organisation Structure], the two new WWTPs (Southern WWTP and Cambridge WWTP) will require dedicated resourcing of appropriate subject matter experts. This is expected to include council staff with expertise in consenting and planning, procurement and construction management. Where backfill requirements exist, these will be managed in line with the relevant human resources policies at each Lead Council.

Given their relatively small scale, the WWTP upgrades (Te Awamutu, Mātangi and Tauwhare Pā) are expected to be largely managed through existing Lead Council resources i.e. there will be no backfill requirements. The brownfield nature of the upgrades means sufficient expertise will be required to manage the interfaces with the existing operations.

1.2.7 Project Plan and Milestones

A summary of the key milestones for the Projects included within the preferred option is presented below:

Figure MC - 6: Key Milestones – Programme



Southern WWTP

The Southern WWTP is expected to be delivered in three key stages with the following staging triggers:

1. Stage one: 400 m3/day - 1,200m³/day capacity (2021-2025). The trigger to move to stage two will occur when >80% of capacity is utilised or the cost of conveyance upgrades within the Hamilton network exceeds the alternatives.

2. Stage two: 1,200m³/day - 15,000m³/day capacity (expected 2030-2039 but driven by growth and demand). The trigger to move to stage three will occur when Pukete WWTP capacity is reached (for existing southern Hamilton flows) or the cost of conveyance upgrades exceeds the alternatives.

3. Stage three: 15,000m³/day + capacity (expected 2060+ but driven by growth and demand in particular from Hamilton).

The high-level Project schedule for the Southern WWTP is provided below:

Table MC - 8: Key Milestones – Southern WWTP

Key Milestones (Stage 1 only)	Start Date	End Date
Pre-implementation activities: land acquisition, preliminary design, consenting and designation processes	November 2021	November 2023 *(24 months to complete)*
Detailed design includes preparation EOI/RFT	November 2023	May 2024 *(7 months to complete)*
EOI released (Main plant works and conveyancing)	April 2024 *(undertaken in parallel with detailed design)*	May 2024 *(2 months to complete)*
RFT and award – Main plant works	June 2024 *(8 months after consent issued – assuming consent issued in October 2023)*	September 2024 *(Preferred contractor selected 4 months after RFT is released)*
RFT and award – Conveyancing	June 2024 *(8 months after consent issued – assuming consent issued in October 2023)*	September 2024 *(Preferred contractor selected 4 months after RFT is released)*
Construction	November 2024 *(2 months after preferred contractor selected)*	November 2025 *(1-year construction period – excludes 2 months commissioning period)*

Figure MC - 7: Key Milestones – Southern WWTP

Cambridge WWTP

The Cambridge WWTP will be constructed during 2022-2026 and is expected to be upgraded during 2040-2049 to provide more capacity. Key stages are as follows:

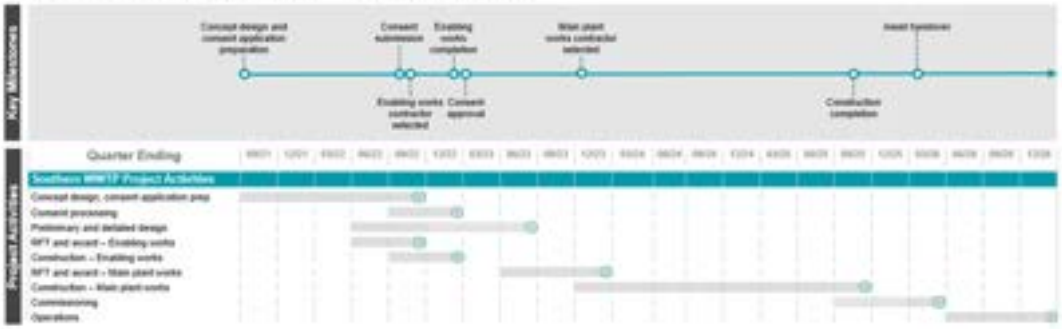
1. Initial construction works: Approximately 7,500 m³/day capacity (2024-2026)
2. Subsequent upgrades: Approximately 9,000 m³/day capacity (expected 2040-2049). Upgrade trigger when >80% of existing capacity is utilised.

The high-level Project schedule for the Cambridge WWTP is provided below:

Table MC - 9: Key Milestones – Cambridge WWTP

Key Project Milestone	Start Date	End Date
Concept design, consent application preparation	June 2021	July 2022
Consent processing	July 2022	December 2022 *(5 months)*
Preliminary and detailed design	June 2022 *(before consent sign off)*	May 2023 *(12 months to complete)*
RFT and award – Enabling works	June 2022	August 2022 *(2 -month procurement period)*
Construction - Enabling works	August 2022	December 2022 *(4-month construction period)*
RFT and award – Main plant works	June 2023	October 2023 *(4-month procurement period)*
Construction - Main plant works	October 2023	August 2025 *(22-month construction period)*
Commissioning	August 2025	January 2026 *(5-month commissioning period)*

Table MC - 10: Key Milestones – Cambridge WWTP



Mātangi Upgrades

Minor upgrades to the Mātangi WWTP will be undertaken during 2021-2023 with the plant expected to transfer to the Southern WWTP or the HCC network in 2040-2049. Should denser residential or commercial development occur in Matangi prior to 2040 (e.g. private plan change), the timing of the upgrades could be reviewed.

Tauwhare Pā Upgrades

The existing Tauwhare Pā WWTP will undergo a performance evaluation with concept for expansion developed over 2021-2023. The intention is to implement expansion when development occurs. The trigger for this will be a developer agreement or the need for improved system performance and reliability.

Ōhaupō

Ōhaupō is expected to continue with household treatment and disposal on site as per the existing arrangements. This will continue until on site environmental performance is no longer acceptable or additional demand dictates the need for centralised treatment.

1.3 Change Management Planning

1.3.1 Overview

Change management planning considers the potential impact on the culture, systems, processes and people from the Programme.

The delivery of the new WWTPs and upgrades that make up the Programme of works are not expected to have a significant change to the culture or systems of any particular council.

The key change will be the need for the Lead Council to provide reporting to the Programme Director and PPG. The purpose of this reporting is to ensure the Programme is delivered in a coordinated way with ongoing visibility provided through the joint governance structure (refer Section [1.2.3 Governance Structure]). The risk of poor integration across the Programme is further discussed in the risk register (refer Appendix D, risk reference 6). Specific reporting processes have been outlined to manage this change e.g. PPG reporting which captures project updates and integration (refer Section [1.4.3 Monitoring and Reporting]).

1.3.2 Project Delivery Change

Capital management and Project delivery will utilise the same policies and procedures in place at each Lead Council. These include funding and financing, procurement and project management policies.

It is proposed that Lead Councils employ internal staff to deliver the Projects. Where these resources are not available in-house, recruiting of specialist staff will be required.

1.3.3 Operational Change

Southern WWTP

Stage one of the new Southern WWTP is relatively small compared to HCC's existing plant at Pukete and operationally the scale and technology of the plant will be comparable or more straight forward than existing assets. There is expected to be opportunity for integration with existing resources (technology, staff, processes etc). However, for stage one, new staff will be required to manage the facility and discharge system as well as monitoring and compliance tasks. The proposed organisational structure for the Southern WWTP is discussed under Section [1.2.4 Organisational Structure].

Cambridge WWTP

Operationally, the new Cambridge WWTP will be more complex than existing wastewater assets managed by Waipā DC.

Training of staff will be undertaken as part of the commissioning and handover process. The design team is expected to be involved in this process alongside the contractor and process equipment supplier.

Once complete, Waipā DC staff at the existing Cambridge WWTP are assumed to transfer to the new Cambridge WWTP, noting increased resourcing is expected.

Further detail will be developed as part of Waipā DC's planning for the Cambridge WWTP.

WWTP Upgrades

The scale and technology of the upgrades is comparable to existing assets.

Once the WWTP upgrades are complete, the assets will be operated in the same way as they are currently by the Lead Councils.

1.3.4 Change Management Strategy

Table MC - 11: Change management strategy

Project	Anticipated change and management strategy
Southern WWTP	• Capital management and project delivery will utilise the same policies and procedures in place at HCC. Accordingly, minimal change from existing practices is anticipated. These include the Procurement Policy and Procedures Manual, Project Management Framework and Risk Management Policy. • Operations: There is expected to be opportunity for integration with existing resources (technology, staff, processes etc). However, for stage one, new staff will be required to manage the facility and discharge system as well as monitoring and compliance tasks.
Cambridge WWTP	• Capital management and Project delivery will utilise the same policies and procedures in place at Waipā DC. Accordingly, minimal change from existing practices is anticipated. These include Waipā DC's Procurement Strategy, Project Management Framework Policy and Procedural Policy Manual. • Operations: The proposed membrane plant is more sophisticated than the existing pond-based plant at Cambridge and the activated sludge plant at Te Awamutu. It is anticipated that staff will transition from the existing plant at Cambridge to the new plant. However additional resourcing is likely to be required. Training will be managed collectively by the contractor, process equipment supplier and design team.
Te Awamutu	• The scale and technology of the upgrades will not fundamentally change the nature of operations at Te Awamutu. The level of expertise required will be comparable to the existing plant. The upgrades are expected to be managed within council policies without material change.
Mātangi and Tauwhare Pā	• The scale and technology of the upgrades are comparable to existing Waikato DC wastewater assets. The upgrades are expected to be managed within council policies without material change.

1.4 Benefits Management Planning

1.4.1 Overview

Benefits management involves the identification, planning, monitoring and review of benefits delivered by the Programme. The strategy, framework and plan for dealing with the management and delivery of benefits are in the BRP attached to this business case as Appendix [A].

The proposed approach for managing benefits is for each Lead Council to provide Project reporting which is then consolidated at a Programme level. The BRP provides a framework for ongoing assessment against the Te Ture Whaimana objectives and the Project KPIs. The BRP structure is intended to be enduring and form part of the business-as-usual approach.

1.4.2 DBC Objectives

The DBC Objectives developed as part of the Strategic Case (Strategic Case Section [3.3.2 Project Objectives]) are outlined below:

1. Before 2050 municipal wastewater discharges are no longer impacting on the ability of people to swim and collect Kai from the river and connected waterways thereby contributing to the restoration and protection of the health and wellbeing of the river.
2. The quality and extent of aquatic and terrestrial habitat and biodiversity in and around water bodies is enhanced through the reduction of wastewater treatment and discharge impacts before 2050.
3. Wastewater treatment solutions contribute to restoring and enhancing cultural connectivity with the river so that, before, 2050 Marae, Hapū and iwi access to the river and other sites of significance for cultural and customary practice within the metro spatial area are no longer impeded by wastewater treatment solutions.
4. Maximise efficient use of resources and resource recovery to contribute to net zero greenhouse gas related emissions from wastewater treatment systems before 2050.
5. The wastewater solution provides sufficient capacity to ensure sustainable growth in the metro spatial area in accordance with growth projection assumptions for the next 100 years.

More specific KPIs were identified in the Strategic Case Section [3.3.3]) for each of the Objectives to measure performance. Measurement of the KPIs use the most up-to-date sources and real time data to ensure baselines and targets are accurate and quantifiable.

The DBC Objectives will be considered and embedded into the overall solution as each Project is progressed. This will involve a wider analysis than just implementation of high treatment standards. Consideration will be undertaken as part of implementation, consenting and planning processes for each of the Projects individually and collectively. As per the Waikato and Waipā Rivers Restoration Strategy, some of the potential initiatives to support the Objectives could focus on:

- Erosion and sedimentation
- Water quality
- Biodiversity
- Fish
- Access and recreation
- Cultural values.

The costs of any additional restorative investments have not been included in the DBC.

1.4.3 Monitoring and Reporting

Construction Monitoring:

Construction monitoring will depend on each Lead Council's preferred approach, however suggested monthly reporting requirements are outlined below.

During construction, monthly cost and progress reporting will be prepared for each of the Projects by the relevant Project Manager. The monthly reports will include:

- Progress against key milestones and any change to the Project schedule.
- Progress against budget.
- Key risks and mitigations.

- Utilisation of contingency.
- Variation history.

The reporting should provide timely sharing of information and ensure risks are escalated as soon as they are identified. The objective of the monthly reporting is to make sure the Lead Council has relevant, accurate and complete information to accurately fulfil its governance obligations.

PPG Reporting:

High level reporting will be prepared for the quarterly PPG meetings. This will summarise the key updates from each of the projects based on construction and / or BRP reporting. The reporting will be received from each of the Lead Councils for their relevant Projects and compiled by the Programme Director.

The reporting will provide updates on:

- Key project updates.
- Progress against schedule and budget.
- Project integration.
- Consenting strategy.
- Benefits management.

Project Closure Report and Post Implementation Review

On completion, a project closure report will be drafted by the Project Manager. A post-implementation review will also be undertaken by the respective Lead Council to assess the success of the Project, including the business case, planning and delivery phases. This will be undertaken within the first six months after asset acceptance is achieved, to confirm the new WWTPs are operating as intended and delivering the services proposed in the DBC.

Operational Reporting

The Local Government Act 2002 requires that all councils provide annual reporting on the performance of their wastewater systems. The reporting covers key performance metrics including compliance with resource consents, number of wastewater overflows and any public health incidents. This level of reporting will be provided by the Lead Council for each project.

BRP Reporting

The BRP outlines the specific KPIs for each objective and the data sources for monitoring of these KPIs. Many of these sources will be developed as part of the implementation of the Programme. The baseline and target measures will be further developed once the monitoring systems have been established.

Benefits management will be managed by the Lead Council at a Project Level and reported directly to the Programme Director and PPG. Benefit realisation reviews will be undertaken annually during the life of the assets by the asset management team.

The PPG will be an additional layer of oversight to ensure that the KPIs agreed as part of the DBC are being met across the Programme. The PPG and Project Director can make recommendations to Lead Councils if there are opportunities to enhance the delivery of strategic outcomes or raise objections if the strategic outcomes and 'Best for River' principle are not being followed. If it is deemed appropriate to disband the Governance structure following completion of construction (for all the Projects), consideration would need to be given to the appropriate body to oversee the BRP reporting.

1.5 Risk Management Planning

1.5.1 Risk Recording and Reporting

Risk recording and reporting is an integral part of the Project governance framework. It will enhance the quality of the dialogue amongst stakeholders and support the Lead Councils, the Programme Director and PPG in meeting their responsibilities.

HCC's risk management system has been used to capture Programme level and Project level risks identified during the DBC process. These risk registers will continue to be updated throughout the initial, construction and operations phases.

Project level risks will be managed by the Lead Council using their existing risk management framework. The risk management framework to be used for the Southern WWTP (HCC) is attached in Appendix [B]. The risk management framework to be used for Cambridge WWTP (Waipā DC) is attached in Appendix [C].

Monthly risk reporting will be received from each Lead Council for their relevant Projects and will be compiled by the Programme Director. The Programme Director will compile significant Project level risks, alongside risks that are relevant to the wider Programme to highlight the key Programme level risks. The existing risk register that has been developed as part of the DBC would be used for managing Programme level risks.

1.5.2 Risk Register

The register lists all current risks and the results of their analysis and evaluation. Information on the status of the risk is also included. The risk register will be updated monthly by the Programme Director.

Table MC - 12: Risk register: Top risks

Risk Description	Cause	Controls	Likelihood	Consequence	Residual Risk Rating	Risk Treatment	Action Plan
The recommended DBC projects cannot be funded leading to the projects being delayed, not proceeding or lower standards being adopted	- Competing priorities leading to unwillingness to fund the Projects. - Insufficient financial headroom for councils to fund the Projects. - Cost increases or affordability the ability to secure funding or financing - Lack of integration, coordination and planning at a sub-regional level.	- Staging for the Southern WWTP. - Traditional approach to financing. - Lead council structure agreed in principle and to be confirmed through MOU. - Funding to commence implementation of projects recommended in the DBC included in LTPs.	Likely (3)	Catastrophic (5)	Very High Risk (15)	Mitigate	- MoU signed by project partners which confirms principles agreed in the DBC including approach to ownership, funding and financing. - Establish governance and delivery structure recommended in the DBC for the Programme. - Ensure appropriate joint engagement between Councils/Partners occurring throughout project - For Southern Plant, HCC to enter into service agreement with Waipa DC to contribute toward funding the plant.
Costs to implement recommended DBC projects are significantly higher than estimates further impacting on affordability and leading to the project being delayed, not proceeding or lower standards being adopted.	Increasing land costs, high contractor demand, limited providers, increasing costs of key materials, supply chain disruption or poor risk allocation in the construction contracts.	- Monitor market conditions. - Procure works and services as early as possible to reduce impact and likelihood of escalation. -Undertake a procurement methodology that attracts multiple tenderers. - Sensitivity assessments completed as part of the DBC to assess the effect of changing inflation rates and operating and capital costs. -Recommended immediate initiation of key projects in the DBC.	Likely (3)	Catastrophic (5)	Very High Risk (15)	Accept	- Complete site selection, land acquisition, consenting and designation processes early as recommended in the DBC. - Early contractor engagement and identification of preferred procurement method. - Procure works and services as early as possible to reduce impact and likelihood of escalation - Undertake a procurement methodology that attracts multiple tenderers
The recommended DBC projects do not meet iwi / mana whenua expectations which may impact ability to implement the recommendations, consentability and adversely impact relationships	- Lack of meaningful engagement with relevant groups throughout project delivery. - Insufficient resourcing made available to enable meaningful iwi / mana whenua participation in project. - Mana whenua/iwi views not reflected in Governance discussions and decision making. - Differing priorities/points of view on level of treatment and discharge methods. - Insufficient budget available to deliver "best for river" outcomes in timeframes that are acceptable to iwi/mana whenua.	- Project has been co-designed and developed by mana whenua/iwi and council and this approach will be built on through the project pre-implementation and implementation phases. - Metro WW Project vision and objectives embed Te Tune Whaimana and incorporate iwi/mana whenua values and aspirations (e.g. Iwi Env Plans, Economic Aspirations) - Recommended governance and project delivery structure provides iwi/mana whenua representation at senior level.	Likely (3)	Major (4)	Very High Risk (12)	Mitigate	- MoU signed by project partners which confirms principles agreed in the DBC including minimum wastewater treatment standards and project governance structure. - Establish governance and delivery structure recommended in the DBC for the Programme. - Review & implement communications and engagement plan for each project including specific provision for iwi/mana whenua engagement and partner councils (at multiple levels). Project engagement and delivery approaches to incorporate co-design to solutions and seek mutual agreement.

Risk Description	Cause	Controls	Likelihood	Consequence	Residual Risk Rating	Risk Treatment	Action Plan
Resource consents and designations for recommended wastewater projects cannot be secured or the costs to deliver a consentable solution are prohibitive.	- New activity and discharge to the Waikato River (considered in isolation) is not consistent with the Te Ture Whaimana, NPS FM, and other policy (incl. current NES for Sources of Human Drinking Water and land application requirements). - Other WWTPs consent renewal timeframes do not align. - Legislative change Vision and Strategy and legislative change	- Collaborative approach to delivering the project that involves equal iwi / TLA representation. Project Governance Group. - Having regulator involved in the project to offer advice. - Utilise the technical teams involved in Cambridge WW Consenting, PC1 Healthy Rivers Processes and Pukekohe WW consenting and leveraging off of that work - Consenting Strategy - consistent with the current Vision & Strategy for the river. Identification of alternative consenting pathways to link to other discharges	Likely (3)	Catastrophic (5)	Very High Risk (15)	Mitigate	- Secure the site for new Southern WWTP. - Thoroughly explore beneficial re-use opportunities to avoid or reduce the need for water based wastewater discharges. - Look for mechanisms to link discharge activities across the broader catchment in order to clearly demonstrate betterment despite a new WW discharge. - Ensuring appropriate treatment standards are adopted including WRP, TTWM, Iwi Mgmt. Plans etc. - Develop and implement appropriate engagement strategies and plans, including project governance. Ensure consistent messaging across related projects and workshops.
Reform of the Three Waters sector impacts the ability or commitment to implement the DBC programme recommendations.	-Potential views that all work should be deferred until clear decisions on sector reform resulting in slowing down of critical infrastructure investment. - If reform occurs, the 'actors' involved in project delivery may change and impact on project prioritisation and delivery. - Principles and obligations agreed in the MoU are not carried over to a new water entity that is set up as a result of the planned sector reform.	-The preferred options were prepared on the basis of 'business as usual' -The recommended programme and project delivery structures aim to maintain optionality and flexibility to transition to a new structure if required. - Agreements clearly documented in the MoU and DBC so knowledge transfer can occur to the new water entity.	Likely (3)	Major (4)	Very High Risk (12)	Mitigate	- Continue to implement recommendations in the DBC and MoU in line with proposed implementation schedule. - Accelerate implementation of the recommended projects.
In ability for councils to move to integrated delivery of programme results in uncoordinated delivery of the overall programme results in misalignment of objectives and 'Best for River' principles.	Misalignment of objectives and commitment of resources from Sub-regional Partners.	- MoU to include agreement on minimum performance standards and project governance and delivery structures. - Benefit Management reporting and monitoring processes recommended in the DBC. - Compliance with consent requirements.	Likely (3)	Major (4)	Very High Risk (12)	Mitigate	- Include agreement upfront in the MoU - Ongoing joint visibility through the governance structure and reporting processes recommended in the MoU

The mitigations for these top risks demonstrate that the Programme is reliant on the partners continuing to work together constructively, implementing the recommendations in the DBC and entering into the MoU in good faith. Failure to do so would likely result in materialisation of a number of these risks.

The risk register is included as Appendix [D] to this document. The full document includes the complete list of risks and further information in relation to categorisation, responsible parties, target dates and post action plan target risk ratings.

1.6 Chief Executive's Letters

The Chief Executives at each Lead Council have provided a letter (see Appendix [E]) that:

- Demonstrates they have been actively involved in the development of the DBC through its various stages.
- Confirms their acceptance of the strategic aims and investment objectives of the DBC, its functional content, size and services.
- Confirms the indicative cost and benefit estimates of the proposal are sound and based on best available information
- Confirms an MoU will be entered into by the project partners which will address the funding and financing needed to support the preferred solution.

1.7 Next Steps

This DBC seeks formal approval from the Sub-regional Partners to progress the implementation of the preferred option.

The immediate next steps are outlined below:

4. Finalise and enter into the MoU.
5. Establish the proposed governance structure, including the PPG and the Programme Director.
6. Progress with the Project Plans. The initial activities are outlined below:
    c) Southern WWTP:
        v. Continue discussions with the Waikato Regional Airport regarding interim arrangements.
        vi. Finalise the preferred site (October 2021).
        vii. Acquire the land for the WWTP (April 2022).
        viii. Begin concept design / master plan / consent application preparation (May 2022).
    d) Cambridge WWTP:
        iii. Finalise preliminary work including the Procurement Plan and Risk Register (September 2021).
        iv. Continue progressing the activities that are already underway:
            4) Consenting.
            5) Technical investigations.
            6) Concept engineering.

7. Progress with the proposed project plans. The initial activities are outlined below:
    e) Southern WWTP:
        ix. Continue discussions with the Waikato Regional Airport regarding interim arrangements.
        x. Finalise the preferred site.
        xi. Acquire the land for the WWTP.
        xii. Complete plant and discharge master plan and design and consent applications.
    f) Cambridge WWTP:
        v. Continue progressing the activities that are already underway:
            7) Consenting.
            8) Technical investigations.
            9) Engineering design and construction.

Appendix A: Benefits Realisation Plan

Appendix B: HCC Risk Management Framework

Appendix C: Waipā DC Project Risk Management Policy

Appendix D: Risk Register

Appendix E: Chief Executive's Letters