

1 February 2022

Craig Innes

fyi-request-17939-4945d8b9@requests.fyi.org.nz

Tēnā koe Craig

Request for Information – Local Government Official Information and Meetings Act (LGOIMA) 1987

We refer to your official information request dated 13 December 2021. You have requested Hutt City Council's application to the Infrastructure Acceleration Fund, for Wainuiomata, as was submitted to Kainga Ora.

The information you have requested is enclosed, excluding three attachments that accompanied the application as these are already publicly available. The Hutt City Capacity Assessment is already available publicly [here](#) and the Wainuiomata Development Framework is available publicly [here](#). The Wainuiomata North Development Framework attachment is available [here](#).

Accordingly, we refuse to supply these three attachments pursuant to section 17(d) of the LGOIMA.

You have the right to seek an investigation and review by the Ombudsman of this decision. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

Please note that this letter may be published on the Council's website.

Nāku noa, nā



Susan Sales
Senior Advisor, Official Information and Privacy
Hutt City Council

Encl:

IAF application

Wellington Water Growth Study

Wellington Water Growth Study Memo

Spreadsheet - Wainuiomata Cost Breakdown

EOI Response Form
Infrastructure Acceleration Fund

How to respond to the Expression of Interest Invitation

Applicants should complete this EOI Response Form to submit an EOI and Proposal in response to the EOI Invitation released on 30 June 2021. Applicants must also complete the Applicant Declaration and submit it with their EOI and Proposal.

Please complete this EOI Response Form in relation to one specific housing development and the infrastructure required to enable that housing development.

Applicants may submit a separate EOI and Proposal by completing a separate EOI Response Form for a distinctly different scenario if it involves materially different housing outcomes.

Applicants can contact IAF@kaingaora.govt.nz if there are any queries.

Content

The EOI Response Form has the following parts:

- Part A- General Information: seeking basic information about the Applicant
- Part B- Proposal Information: seeking high level information about the housing development and the infrastructure required to enable the housing development

Part B MUST BE COMPLETED IN NO MORE THAN 7 PAGES

- Part C- Criteria Responses: seeking high-level responses to the Eligibility and Evaluation Criteria.

Part C MUST BE COMPLETED IN NO MORE THAN 25 PAGES

Applicants should note that these page limits incorporate the table format of this EOI Response Form (including various check-boxes). Free text responses will make up only a fraction of the total pages in a completed EOI Response Form.

Applicants must complete this form **using size 10 font**. Capitalised terms in this EOI Response Form shall have their meaning as set out in the Appendix of the EOI Invitation.

Supporting Material

Where a particular question in this EOI Response Form indicates that further material and/or evidence (**Supporting Material**) may be uploaded (to the extent the Applicant has such information available), Applicants may refer to that Supporting Material in their responses.

The Supporting Material is in addition to the page limits specified above. It should be limited to information specific to the Proposal that will support its evaluation (do not submit generic marketing information for example).

Use the table below to outline what Supporting Material (if any) has been included in the Proposal in support of each question.

Question	Reference to supporting material? <i>[insert name of attachment]</i>
Part B question 1	1_ Wellington Water Growth Study (GHD) 2_ Wellington Water Growth Study - Memo
Part C Eligibility Criteria 2: Eligible Infrastructure Project/s – dwellings enabled and timeframes question (c)	3_ Wainuiomata Development Plan 4_ Wainuiomata North Development Framework 5_ Hutt City Capacity Assessment 6_ Spreadsheet: Wainuiomata cost breakdown
Part C Evaluation Criteria: 4.3	Click or tap here to enter text.



Part A- General Information

1. Enter the following details (if a Territorial Authority lead Applicant).

Territorial Authority name (including council controlled organisations)	Choose a Territorial Authority: Hutt City Council OR If council controlled organisation: Click or tap here to enter text.
Provide a contact person for this EOI: - Full name - Position - Contact number - Email address	Kara Puketapu-Dentice Director, Economy & Development 027 271 0280 Kara.Puketapu-Dentice@huttcity.govt.nz

2. Please list the names of each known housing developer expected to be involved in the housing development. [note: "housing development" is referring to the additional dwellings being enabled by the Eligible Infrastructure Project(s)]

Urban Plus Limited Friday Homes Williams Corporation Kāinga Ora
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3. Please enter the following details about the housing development:

Name:	Wainuiomata North							
Location (suburb and city):	Hutt City							
Territorial Authority region:	Hutt City Council							
Brownfield / Greenfield: [note, if the housing development is a mix or if the category is unclear, choose the type which best describes the housing development].	<table border="1"> <tr> <td>Category</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Greenfields OR</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Brownfields</td> <td><input type="checkbox"/></td> </tr> </table>	Category	<input checked="" type="checkbox"/>	Greenfields OR	<input checked="" type="checkbox"/>	Brownfields	<input type="checkbox"/>	
Category	<input checked="" type="checkbox"/>							
Greenfields OR	<input checked="" type="checkbox"/>							
Brownfields	<input type="checkbox"/>							

4. IAF Funding sought: \$6.5m is being requested to undertake a Structure Plan for Wainuiomata North, in consideration for the current size of the IAF fund, and Hutt City Council's (HCC) complementary Riverlink Application. However, \$84m* of the estimated \$340m project cost for critical Three Waters Infrastructure planned or recommended for years 11-30 in the LTP (currently unfunded) could also be brought forward into 2025-2029. This is anticipated to accelerate the development cycle by 5 - 10 years. However, this funding is not being requested. The total cost, including transport infrastructure and funding required for infrastructure to enable development in Wainuiomata North is \$546,500,000

*Not being requested through fund

5. Timing when IAF funding is expected to be drawn:

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031 – onwards
Amount (\$)	\$6.5m	\$	\$	\$21m*	21m*	21m*	21m*		\$	\$



1. Please describe:

(a) the housing development and associated housing outcomes;

Strategic context for the development of Wainuiomata North

The **Wellington Regional Growth Framework (WGRF 2021)** has identified the Lower Hutt- Masterton corridor as a key growth area that is expected to accommodate circa 30% of the region's future housing growth (27,000 units) over the next 30 years. Of this an estimated 10,000 new housing units will be required within Hutt City to accommodate population growth of circa 27,000 residents in the period 2021-2051. The requirement to accommodate this growth has been reflected in District Plan Change 43 which provides for intensification through two new zones - suburban mixed use and medium-density residential. The WGRF also acknowledges that not all housing growth can be provided for by intensification. Greenfield development will also be required. The Hutt City **Urban Growth Strategy (2012 -2032)** had previously established three priority greenfield areas for development- Kelson (currently under development), Wainuiomata North and Shaftesbury Grove, Stokes Valley (not considered feasible). The **Wellington Regional Investment Plan** also identifies Wainuiomata as an area that has the capacity to deliver housing growth of scale through both densification and greenfield.

The **Wainuiomata North Development Framework (WNDF 2018)** was developed to guide future work on the large-scale residential development opportunity. The current zoning is primarily rural residential with some general residential and hill residential zoning under the **HCC District Plan**. The Framework seeks to drive the comprehensive and integrated development of Wainuiomata North, specifically to increase housing supply, including affordable housing, and to leverage land-use and infrastructure investment by linking housing density to amenities, town and neighbourhood centres, community facilities, open-space, recreation and transport networks. This is in line with increasing diversity of housing being provided across Hutt City. It is consistent with subsequent direction provided by the NPS-UD and also consistent with the transition of the wider suburban residential context surrounding Wainuiomata North to include more compact housing typologies.

Housing Development Area

In completing the WNDF there were a range of study areas considered, centred around Upper Fitzherbert Road which is predominantly flat and surrounded by significant hills, lowland forest and bushland. In the process of refining the WNDF, a developable area of 27ha of Rural Residential and 37.7ha of General Residential and Hill Residential were considered for future development (figure 5, below). Including these land parcels is important because the integrated approach to the Framework ensures full consideration of future Transport, Three Waters and Block structure requirements and opportunities across Wainuiomata.



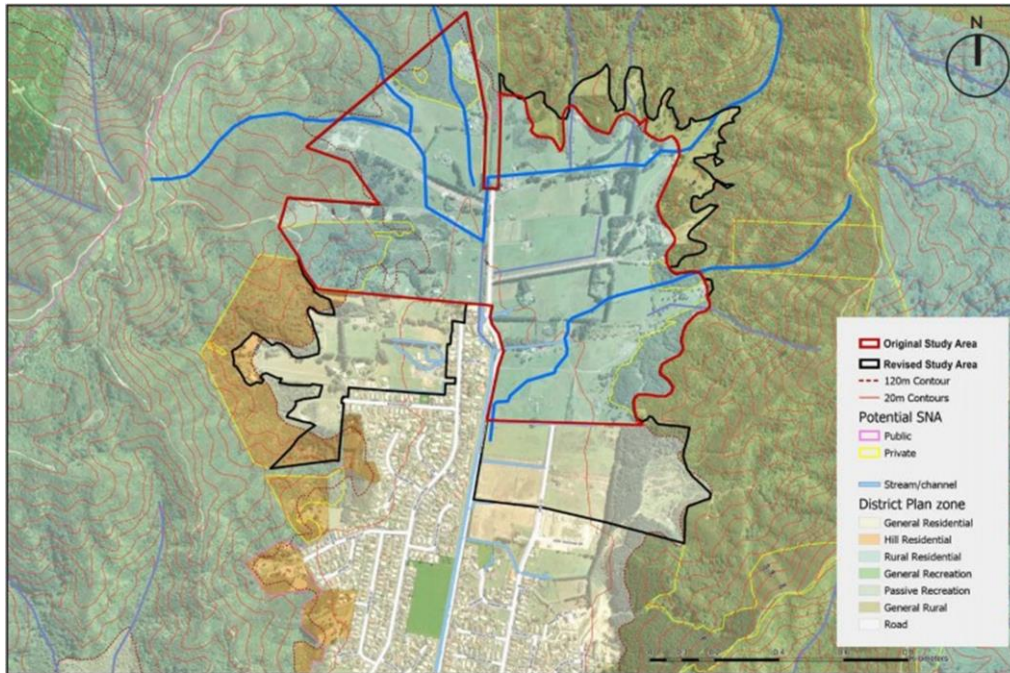


Figure 5: Original and expanded Wainuiomata North study area

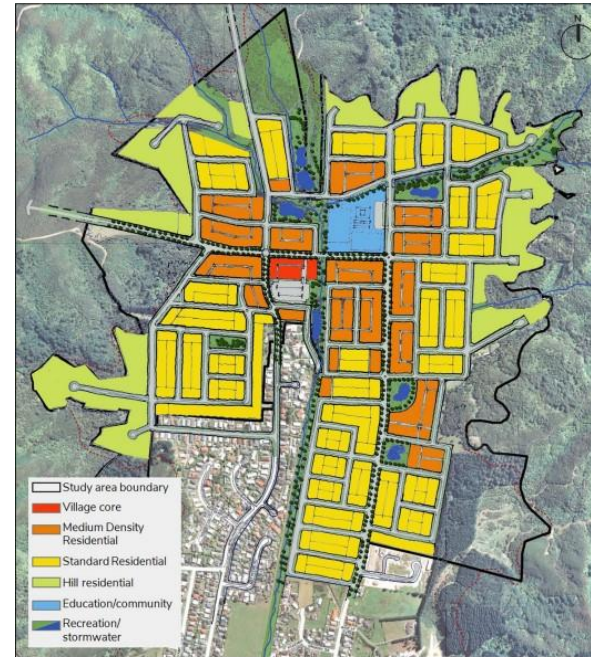


Figure 22: Wainuiomata North Concept Master Plan.
Source: DesignUrban Pty Ltd, 2017.

Two development approaches were considered for the expanded study area. In maintaining strategic alignment with the NPS-UD a maximum yield (Option 2) versus an incremental approach (Option 1) is preferred. It is important to note that an incremental approach would have an adverse impact on the level of service provided by existing Three Waters infrastructure. Option 2 will result in a total capacity of **1,841** new units (including 125 households from the existing Hill Residential zone) within the Wainuiomata North area (Figure 22, Concept Masterplan). Option 2 also provides for the development of neighbourhood village facilities and the potential location of a new primary school.



OPTION 1 – INCREMENTAL DEVELOPMENT DWELLING ESTIMATE					
Location	Density	Gross area (Ha)	Discount	Net area (Ha)	Number of units
Existing General Residential West	General residential average 500m2	18.3	60% net	11	220
Existing General Residential East	General residential average 500m2	19.4	60% net	11.5	230
Core growth area	General residential average 500m2	59.2	60% net	35.5	700
Proposed SNA additional area to north	Hill Residential average 1,500m2	10.3	75% net	7.7	51
Buffer allowance on fringe areas	Hill Residential average 1,500m2	15	75% net	11.25	75
GHD Hill Residential area	Hill Residential average 1,000m2	-	-	-	125
Proposed centre	Primary School	2	100%	2	-35
	Neighbourhood Centre	2	100%	2	-35
Across area	Stormwater detention ponds (5x @400m2)	2	100%	2	-35

TOTAL 1,296 units

Table 2: Option 1 (incremental development) dwelling estimate

OPTION 2 – MIXED-DENSITY DEVELOPMENT DWELLING ESTIMATE					
Location	Density	Gross area (Ha)	Discount	Net area (Ha)	Number of units
Existing General Residential West	General residential average 400m2	18.3	60% net	11	275
Existing General Residential East	General residential average 400m2	19.4	60% net	11.5	287
Core growth area	General residential average 400m2	54.2	60% net	32.5	812
	Medium density 300m2	20	60% net	12	396
Proposed SNA additional area to north	Hill Residential average 1,500m2	10.3	75% net	7.7	51
GHD Hill Residential area	Hill Residential average 1,000m2	-	-	-	125
Proposed centre	Primary School	2	100%	2	-35
	Neighbourhood Centre	2	100%	2	-35
Across area	Stormwater detention ponds (5x @400m2)	2	100%	2	-35

TOTAL 1,841 units

Housing and Neighbourhood Outcomes

The preferred development option identified in the WNDF represents a change in approach toward more compact settlement with a greater mix of densities and housing typologies, better connected streets, improved mobility and strengthens social sustainability through affordable, public and elderly housing options. In doing so it seeks to leverage what is a large parcel of relatively scarce greenfield land in the Hutt City area. This Mixed Density Development approach which maximises efficiencies, also leverages the surrounding hill areas for amenity, and offers greater potential for a new school and local village as part of a neighbourhood precinct. In addition there is the potential to add a new strategic road to strengthen the resilience of the transport network.

(b) all of the infrastructure required to enable the housing development; and current status and timing.

Enabling urban growth in Wainuiomata North requires both new infrastructure and increased capacity in existing infrastructure. In particular, Wellington Water has provided strong guidance that existing levels of service are already compromised by incremental development. Future growth will require both network upgrades and new infrastructure. HCC has funded some of this through the Long Term Plan (LTP) through development contributions and financial contributions. Greater Wellington Regional Council and Upper Hutt City Council will also be required to make contributions. However, significant Three Waters and Transport infrastructure works not yet funded and planned for Y11-30 could be brought forward with central government funding to accelerate growth.

Three Waters

According to the **Wainuiomata Growth Study 2020** commissioned by Wellington Water the existing key constraints and requirements in the three-waters networks are:



- Wastewater network - significant existing and future overflows and lack of network capacity for both dry weather and wet weather flows. In addition, there are key constraints in the ability to transfer wastewater over the Wainuiomata Hill, and restrictions to the outfall at the Seaview Wastewater Treatment Plant (WWTP). There are existing deficits in Levels of Service that also need to be addressed to support infill and growth developments.
- Stormwater - flooding has been an issue in Wainuiomata for a number of years. The major channels in the network, Black Creek and Parkway Drain, have insufficient capacity for large sections of the channels. The upstream piped network is also undersized in areas around Parkway Drain and upstream of Mary Crowther Park. Wainuiomata has a large stormwater catchment area given the 356 ha wider area which will generate stormwater down and across development areas which may need a comprehensive approach to detention, including ponds.
- Water Supply - in accordance with current levels of service, there is approximately 4ML of existing shortfall in drinking water storage. In addition, whilst not a HCC asset, the Greater Wellington Regional Council's bulk water main that services Wainuiomata, is due for renewal. The existing Reservoir would be overcommitted by the proposed development.

Transport

The major Transport project identified in the WDNF is the potential for a new Strategic Access Road between Wainuiomata North and Naenae. This road has been considered at various times since 1976 and is considered important to securing the long-term resilience of the transport network connecting Wainuiomata to Lower Hutt and the wider Wellington region. Unlike the required Three Waters Infrastructure investment the development of Wainuiomata North is not contingent on the Strategic Access Road. Rather it is expected that subsequent work undertaken in developing a Structure Plan for the Area would include detailed investigations of this option. The other major transport initiatives indicated include the Wise Street extension (\$1.2m to be funded by development contributions in LTP); Wainuiomata Hill Road shared path and safety seal; improved street connections; shared mode streets; improved walkability and permeability through residential blocks and dedicated cycleways.

Current Status and Timing

Next steps for progressing development in Wainuiomata North are to develop a Structure Plan to guide Council decisions, complete a plan change and obtain the required infrastructure investment detailed below. The IAF process provides an opportunity to accelerate the Structure Plan process, and if successful in unlocking accelerated infrastructure investment, bring forward the timing of the residential development cycle by circa 5 years.

The scope of the Structure Plan would confirm the land strategy and block structures; mix of housing densities and typologies; flood storage needs and mitigation; ecological and riparian areas required; water infrastructure requirements, upgrades, costs and timeframes; public realm and open space networks; neighbourhood village and community facilities; utility and transport networks.

2. Please complete the following tables showing the total cost for all infrastructure required to enable the housing development (broken down by type of cost and infrastructure category). The final table is requesting information from Applicants on their proposed funding sources for the total cost of the infrastructure.

2a. Total enabling infrastructure cost for the housing development (breakdown by type of cost)			
Type of cost	Estimated total cost of infrastructure	Comment on the degree of confidence the Applicant has in the estimate	Amount of IAF funding sought (\$) for the



	(excl GST) (\$)			Eligible Costs in the relevant category
Feasibility costs and other early-stage planning work	\$ 6,500,000	80 %	This estimate is consistent with MFE studies noting an average RMA Plan process cost of \$2m, rising to \$7m with large-scale projects and up to \$15 million if extensive hearings are required.	\$ 6,500,000
Costs of designing, consenting and tendering	\$ As above	80 %	Design, consenting and tendering for Structure Plan included in above figure (\$6,500,000)	\$ 0
Land acquisition	\$ tbc	n/a	The Wellington Water Growth Study (WWGS) has identified that land would need to be acquired for a new Reservoir and Upper Fitzherbert wetland and storage area.	\$ 0
Construction	\$ 340,000,000 (Three Waters*) \$ 200,000,000 (Major Transport**)	n/a	*Wellington Water Growth Study (2020) provided advice about overall cost estimates for Wainuiomata North growth infrastructure, including LTP funding advice. **The Structure Plan is required to refine the Three-Waters projects and develop options and costing for the new Strategic Access Road - \$200m nominal amount has been provisionally suggested.	\$ 0
Administrative costs for establishing complementary financing	\$ As Above	80 %	Administration costs for exploring fast-track consenting and alternative funding processes for the Structure Plan are included in overall \$6,500,000 figure above	\$
Other (non-Eligible Costs)	\$ n/a		HCC business as usual costs related to accelerating the Structure Plan would be covered through operating funding.	
Total	\$ 546,500,000		<i>Only the Structure Plan costs are being put forward for IAF funding. Discussion on using the IAF to bring forward \$84m of critical water infrastructure to accelerate the development cycle would be welcome.</i>	\$ 6,500,000

Please complete the table below by breaking down the estimated **total enabling infrastructure cost** for the housing development into the “infrastructure categories” below.



2b. Total enabling infrastructure cost for the housing development (breakdown by category of infrastructure, aggregating as appropriate)				
Infrastructure category	Estimated total cost of infrastructure (excl GST) (\$)	Comment on the degree of confidence the Applicant has in the estimate		Amount of IAF funding sought (\$)
Transport	\$ 200,000,000*	n/a	New Strategic Access Road. Provisional estimate only, but Structure Plan is crucial to developing a more accurate cost estimate, from design, CBA, and choice of best option / alignment. However it should be noted that this road is not critical to the development of Wainuiomata, like three waters infrastructure is.	\$ 0
Three Waters	\$ 340,000,000	95 % (High-Level Assessment)	Wellington Water Growth Study (2020) provided advice about overall cost estimates for Wainuiomata North growth infrastructure, including LTP funding advice. HCC has committed \$67.04m for LTP three waters projects in years 11-30 (see spreadsheet attached). Three Waters funding from GWRC is not yet committed, but estimates suggest bulk water main will require \$82.5m.	\$ 0
Flood Management	\$ tbc	n/a	To be clarified with GWRC and specialists through Structure Plan process	\$ 0
Other Eligible Costs ¹	\$ 6,500,000	n/a	The Proposed Structure Plan supports the infrastructure planning and delivery across Transport, Three Waters and Flood Management, (as well as Community facilities and amenities, parks etc.)	\$ 6,500,000
Other (non-Eligible Costs)	\$ tbc	n/a	New Primary School - to work with Ministry of Education HCC: New public Park, 4,000m ² - tbc	0
Total	\$ 546,500,000			\$ 6,500,000

2c. Funding sources for total infrastructure cost for the housing development

¹ These are Eligible Costs that enable Eligible Infrastructure Project(s) but are not directly attributable to one category of Eligible Infrastructure Project.



Source of funding	Estimated amount (\$)	Confirm status of the funding sources
Territorial Authority (not recovered from development contributions)	\$ 290,508,399 (three waters) \$ 34,000,000* (transport)	It is anticipated that the \$340m cost of growth for Wainuiomata North will be largely borne by Territorial authorities. HCC has currently planned to fund infrastructure in the LTP, a total of \$104.31m which is \$35.4m across years 1-10, and \$67.0m in years 11-30. \$54,821,966 or 52.55% of this total amount is not funded by Development Contributions. *This figure is a provisional estimate. The proposed new access road will require funding or co-funding with Waka Kotahi contributing 83% and HCC contributing 17% (for a major road).
Territorial Authority (anticipated to be recovered via development contributions)	\$ 49,491,601	HCC LTP 2021 HCC has currently planned to fund infrastructure in the LTP, a total of \$104.31m which is \$35.m across years 1-10, and \$67.0m in years 11-30. \$ 28,957,200 or 27.76% of this total amount is funded by Development Contributions.
Developer / landowner (other than from development contributions)	\$ tbc	
Waka Kotahi	\$ 166,000,000*	*This figure is a provisional estimate. The proposed new access road will require funding or co-funding with Waka Kotahi contributing 83% and HCC contributing 17% (for a major road).
DIA Three Waters funding	\$	The DIA have identified \$38m for Lower Hutt under their "Better Off" funding formula.
IFF funding	\$ n/a	Click or tap here to enter text.
Other central government funding (e.g., CIP shovel ready funding)	\$ tbc	New Primary School to be funded by MOE
Other non-government funding	\$ 0	
Sub-total (excluding IAF Funding)	\$ Not yet determined.	<i>There remains a high level of uncertainty about how the funding gaps will be closed.</i>



IAF Funding Sought	\$ \$6,500,000	\$6.5m is being requested given the size of the IAF fund, and the known quantum of funding sought from other projects in the Wellington Region. However, of the total estimated \$340m project cost for three waters and \$200m for new access road is highlighted. Of this, \$84m of medium-term infrastructure identified in the LTP and Growth Strategy for years 11-30 could also be brought forward to accelerate housing development.
Total including IAF Funding	\$ 546,500m total (Est Only)	

3. Other matters:

- (a) please describe any engagement/funding arrangements with central government on the infrastructure and/or housing development to date (including which agencies have been engaged and the status of those discussions); and**

HCC has had brief conversations with HUD and Kāinga Ora about capacity to deliver housing in Greater Wellington.
No engagement with Ministry of Education around potential future school required in Wainuiomata North

- (b) identify how non-financial powers of central government (e.g. Ministerial RMA powers, RMA fast-track, Urban Development Act powers) could complement funding to maximise the outcomes.**

It is possible that the Structure Plan process could identify the opportunity to use fast-tracking consenting processes and/or Kainga Ora's SDP process to deliver accelerated outcomes.



Part C – Eligibility and Evaluation Criteria Responses

Introduction

This Part C relates to (i) the Eligibility Criteria and (ii) the Evaluation Criteria, which will be considered to determine which Proposals are to proceed to the RFP stage.

(i) Eligibility Criteria

The table below sets out the criteria which must be satisfied for a Proposal to be eligible for funding. Failure to satisfy any of these criteria will result in the Proposal being unsuccessful.

Eligibility Criteria	Applicant response
<p>1. Eligible Applicant</p> <p>The Applicant is either:</p> <p>(a) a Territorial Authority; or</p> <p>(b) Māori/ a developer with sufficient rights in, or access to, the land (or a material proportion of the land) upon which the housing development will be built.</p>	<p>Only developer and Māori Applicants are required to respond to this question.</p> <p>Please outline the nature and extent of the Applicant’s interests in the relevant land (being the land upon which the housing development will be built, not the infrastructure).</p> <div data-bbox="528 703 1854 778" style="border: 1px solid black; padding: 5px;">n/a</div>
<p>2. Eligible Infrastructure Project/s – (minimum housing outcomes)</p> <p>The Eligible Infrastructure Project(s) for which the Applicant is seeking funding must be expected to enable at least:</p> <p>(i) 200 additional dwellings in tier</p>	<p>Identify the number of additional dwellings that are expected to be enabled by the Eligible Infrastructure Project(s) referred to in the Proposal.</p> <div data-bbox="528 1054 1854 1276" style="border: 1px solid black; padding: 5px;"> <p>Hutt City is a Tier 1 urban environment. The eligible infrastructure projects outlined in Part B 1(b) are expected to enable the development of 1841 dwellings in Wainuiomata North, as per Option 2 of WNDP. This aligns with other estimates that Wainuiomata North could accommodate at least 1500 to 2000 new dwellings.</p> <p>Dwellings to be delivered by the private market, at an expected pace of 200 per year. It is also anticipated that the scale of Three Waters Infrastructure Investment identified would enable further intensification across Wainuiomata which would also be consistent with the requirement for 200 additional units.</p> </div>



<p>one urban environments²;</p> <p>(ii) 100 additional dwellings in tier two urban environments³; or</p> <p>(iii) 30 additional dwellings elsewhere.</p>							
<p>Eligible Infrastructure Project/s (type)</p> <p>The Eligible Infrastructure Project(s) for which the Applicant is seeking funding must be of the type traditionally paid for by local authorities and be for new or upgraded enabling infrastructure in the form of transport (including local roading, state highways, public transport infrastructure, footpaths and cycleways), three waters (water supply, wastewater and stormwater) and flood-management infrastructure.</p>	<p>With reference to your response to question 2 in Part B, confirm that the amount of IAF funding being sought will be applied to Eligible Infrastructure Project(s).</p> <table border="1"> <tr> <td>Response</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Yes</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>No</td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table> <p>The amount of funding sought from this application is \$6.5m to fund the development of the Structure Plan and related Plan Change process. This will build on existing work that HCC has funded in respect of the Wainuiomata Development Plan and Wainuiomata North Development Framework.</p> <p>As noted earlier, an additional unfunded amount of \$84m has been identified within the Wellington Water growth strategy and Hutt City LTP /Infrastructure Strategy which, if brought forward under the IAF process, would accelerate the development of Wainuiomata North. While the Structure Plan would be intended to refine these numbers, HCC is willing to engage on the potential to bring this funding forward should this current round of the IAF enable that.</p>	Response	✓	Yes	✓	No	<input type="checkbox"/>
Response	✓						
Yes	✓						
No	<input type="checkbox"/>						

² **Auckland** (Auckland Council), **Hamilton** (Waikato Regional Council, Hamilton City Council, Waikato District Council, Waipā District Council), **Tauranga** (Bay of Plenty Regional Council, Tauranga City Council, Western Bay of Plenty District Council), **Wellington** (Wellington Regional Council, Wellington City Council, Porirua City Council, Hutt City Council, Upper Hutt City Council, Kāpiti Coast District Council), **Christchurch** (Canterbury Regional Council, Christchurch City Council, Selwyn District Council, Waimakariri District Council).

³ **Whangārei** (Northland Regional Council, Whangarei District Council), **Rotorua** (Bay of Plenty Regional Council, Rotorua District Council), **New Plymouth** (Taranaki Regional Council, New Plymouth District Council), **Napier Hastings** (Hawke’s Bay Regional Council, Napier City Council, Hastings District Council), **Palmerston North** (Manawatū-Whanganui Regional Council, Palmerston North City Council), **Nelson Tasman** (Nelson City Council, Tasman District Council), **Queenstown** (Otago Regional Council, Queenstown Lakes District Council), **Dunedin** (Otago Regional Council, Dunedin City Council).



Eligible Infrastructure Project/s – (dwellings enabled and timeframes)

The Eligible Infrastructure Project(s) for which the Applicant is seeking funding must be wholly or primarily for the purpose of enabling the building of new or additional dwellings in the short to medium term.

Note: short to medium term in this context means, in most cases, that a material number of dwellings are built (to completion) by December 2029.

(a) Confirm the Eligible Infrastructure Project(s) for which funding is sought are **wholly or primarily for the purpose of enabling additional dwellings.**

Response	<input checked="" type="checkbox"/>
Yes	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>

(b) State the expected number of additional dwellings to be built (to completion) over each year:

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036 onward
No. Dwellings (within each period)	20	30	50	50	50	150	200	200	200	200	200	200	100	100	

(c) Comment on the basis for the figures above, the degree of risk around these housing outcomes, and provide any Supporting Material that you are relying on.

It is estimated that the Structure Plan and related Approvals/Plan change will occur through 2022-23 with infrastructure delivery for growth to proceed 2024-2027/28, potentially through ongoing engagement with Riverlink Alliance. Housing delivery can begin (staged) from 2027/28 in the area currently zoned rural residential. However, some incremental development may occur in existing general residential areas which is provided for in the numbers above. The scale of incremental development is consistent with existing developments underway in Wainuiomata while the greenfield development opportunity provides for larger scale, over time.



3. Eligible Costs

Funding requested under the Proposal relates to the following costs:

- (a) feasibility studies and other early-stage planning work;
- (b) designing, consenting, tendering and acquiring land (where it is wholly required for Eligible Infrastructure Project(s));
- (c) constructing Eligible Infrastructure Projects; and
- (d) in limited situations, non-capital administrative matters, where these are necessary to establishing complementary financing.

With reference to your response to question 2 in Part B, confirm that the amount of IAF funding being sought will be applied to Eligible Infrastructure Costs, being:

- (a) feasibility studies and other early-stage development work;
- (b) designing, consenting, tendering and acquiring land (where it is wholly required for Eligible Infrastructure Projects);
- (c) constructing Eligible Infrastructure Projects; and
- (d) in limited situations, non-capital administrative matters, where these are necessary to establishing complementary financing.

Response	
Yes	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>

The WNDF and WWGS both acknowledge the key dependency the future growth of Wainuiomata, and Wainuiomata North in particular, have on significant investment in Three Waters infrastructure. The WWGS has developed high-level estimates for water, wastewater and stormwater projects with a 95 % confidence interval.

The primary purpose of this funding request is to accelerate the Structure Plan process, in part reflecting the strong guidance that the current Three Waters infrastructure in Wainuiomata does not currently meet the required levels of service, with significant upgrades to existing networks along with new growth infrastructure also needed to accommodate growth in the undeveloped area of Wainuiomata North. The Structure Plan will provide the pathway to bringing forward the large-scale residential development opportunity by 5 years and provide greater clarity on the IAF funding likely required after 2025.

The proposed level of funding would also provide HCC with the capacity to explore alternative funding, delivery and development models to ensure the efficient phasing of future development.



The table below sets out the Evaluation Criteria to be applied to determine which Proposals are to proceed to the RFP Stage.

It is important to note that progression to the RFP stage does not mean that the Proposal will ultimately receive funding. Applicants themselves should therefore carefully consider their prospects of success before submitting an EOI in response to this EOI Invitation having regard to the Evaluation Criteria below (noting that more fulsome information about the Proposal will be requested, and due diligence undertaken, at RFP Stage).

Evaluation Criteria – Housing Outcomes 40%		Applicant response
1.1	The number of additional dwellings that the funding will enable relative to demand in that area.	<p>Please describe how the scale of the housing development will deliver a number of dwellings that is significant relative to demand in the area (being the region of the relevant Territorial Authority).</p> <p>The Wellington Regional Growth Framework (WRGF 2021) has identified the Lower Hutt- Masterton corridor as a key growth area that is expected to accommodate circa 30% of the region’s future housing growth (27,000 units) over the next 30 years. Of this an estimated 10,000 new housing units will be required within Hutt City to accommodate population growth of circa 27,000 residents in the period 2021-2051. These estimates are consistent with those presented in the Hutt City Capacity Assessment (HBA) which has established a range of <i>6100 - 11,000 new housing units required (median-high projections) with a projected deficit between 1631 - 6783 units.</i></p> <p>The requirement to accommodate this growth has been reflected in District Plan Change 43 which provides for intensification through two new zones - suburban mixed use and medium-density residential. This Plan Change is consistent with the direction of the NPS-UD in enabling greater intensification in areas across Hutt Central, Waterloo, Epuni, Woburn, Avalon/Naenae, Taita, Stokes Valley and Wainuiomata. These dynamics are also reflected in the accompanying EOI for Riverlink and the Valley Floor. Those areas, known as the Golden Triangle in a range of strategic Regional documents, represent the priority strategic commitment from HCC to unlock intensification opportunities.</p> <p>The WGRF also acknowledges that not all housing growth can be provided for by intensification. Greenfield development will also be required. The Hutt City Urban Growth Strategy (2012 -2032) had previously established three priority greenfield areas for development- Kelson (currently under development), Wainuiomata North and Shaftesbury Grove, Stokes Valley (not considered feasible). The Wellington Regional Investment Plan also identifies Wainuiomata as an area that has the capacity to deliver housing growth of scale through both densification and greenfield. That plan currently assumes a phasing of intensification occurring between 2021-2028 and greenfield development between 2029-2048 due to infrastructure constraints. The scale of housing development contemplated for Wainuiomata North of between 1500-2000 units, is consistent with related work undertaken by Hutt City Council (HCC) and Wellington Water (WW) in separate growth studies.</p> <p>The Wainuiomata North Development Framework (WNUF 2018) was developed to guide future work on the large-scale</p>



residential development opportunity. The current zoning is primarily rural residential with some general residential and hill residential zoning under the **HCC District Plan**. The Framework seeks to drive the comprehensive and integrated development of Wainuiomata North, specifically to increase housing supply, including affordable housing, and to leverage land-use and infrastructure investment by linking housing density to amenities, town and neighbourhood centres, community facilities, open-space, recreation and transport networks. This is in line with increasing diversity of housing being provided across Hutt City. It is consistent with subsequent direction provided by the NPS-UD and also consistent with the transition of the wider suburban residential context surrounding Wainuiomata North to include more compact housing typologies.

Housing Development Area

In completing the WNDF there were a range of study areas considered, centred around Upper Fitzherbert Road which is predominantly flat and surrounded by significant hills, lowland forest and bushland. In the process of refining the WNDF, a developable area of 27ha of Rural Residential and 37.7ha of General Residential and Hill Residential were considered for future development (figure 5, below). Including these land parcels is important because the integrated approach to the Framework ensures full consideration of future Transport, Three Waters and Block structure requirements and opportunities across Wainuiomata.

Two development approaches were considered for the expanded study area. In maintaining strategic alignment with the NPS-UD a maximum yield (Option 2) versus an incremental approach (Option 1) is preferred. It is important to note that an incremental approach would have an adverse impact on the level of service provided by existing Three Waters infrastructure. Option 2 will result in a total capacity of **1,841** new units (including 125 households from the existing Hill Residential zone) within the Wainuiomata North area (Figure 22, Concept Masterplan). Option 2 also provides for the development of neighbourhood village facilities and the potential location of a new primary school.

Housing Demand and Capacity

The **Wellington Regional Growth Study** projects Wainuiomata is expected to have an increase of 8,560 additional residents over next 30 years (approximately 3140 households). The number of owner-occupier households aged 65 and over in Hutt City are projected to increase by 54% over the next 20 years. This shift toward housing typologies that favour single person or couple only households is expected to dominate the growth in new housing supply across Hutt City. On a conservative basis, therefore, the scale of the Wainuiomata North greenfield development has the capacity to deliver 1841 new dwellings, or 58.6% of the anticipated growth. This reflects the significance this greenfield opportunity retains within a range of Strategic Regional growth documents.

Given the Public Housing Register for Hutt City increased from 77 to 584 in the 3 years to June 2020 there is also opportunity for Kāinga Ora to undertake development in Wainuiomata to help meet this demand.

Estimates of NPS-UD related growth projections will be available later in 2021 upon the release of the updated NPS-UD housing and business capacity assessments.



1.2	The proportion of lower-cost houses expected to be enabled by the Eligible Infrastructure Project(s) (primarily informed by typology of housing expected to be built).	<p>Please:</p> <p>(a) describe the expected typology of the proposed dwellings, such as the proportion of dwellings that are standalone, terraced, and/or apartments and section sizes;</p> <div data-bbox="589 408 1966 866" style="border: 1px solid black; padding: 5px;"> <p>The Wainuiomata North Development Framework (2018) establishes urban design priorities for the proposed development, including an increase in residential density, and supporting a mix of housing types. The future desired character and built form for areas within Wainuiomata North: this ranges from low density / general residential (1 to 2-storey detached housing), medium density (up to 3-storey semi-detached and attached housing) around the local centre, and hillside residential (larger lot lifestyle housing).</p> <p>In general, higher order roads are fronted by higher density housing (see figure below) due to their proximity to amenities and transport links. Hillside areas are proposed to remain as rural-residential areas, due to infrastructure constraints, high amenity values and flooding issues. This aligns with and continues the development trend across the city where more compact housing typologies are being developed.</p> <p>The future Structure Plan will confirm the mix of densities proposed for housing, and appropriate locations for each. However, the Wellington Greenfield Feasibility Development Model has also identified the potential development opportunity in Wainuiomata North. With an estimated price to cost ratio of 1.6:1 it positions the area as one of the more affordable development opportunities in Hutt City and across the Wellington area.</p> </div>



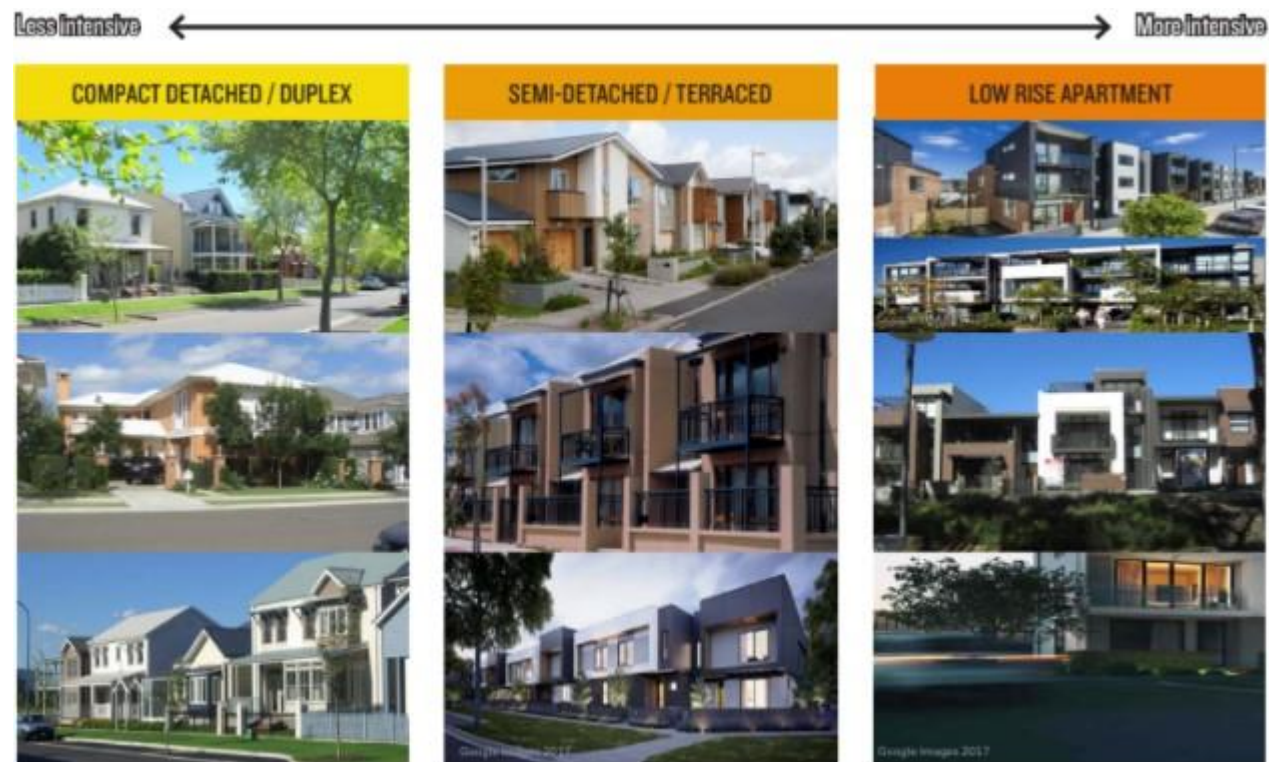


Figure 20: Indicative residential typologies under a mixed-density option

(b) outline the planned number of dwellings that will be within the First Home Grant price cap (by region)⁴; and

The development of the Wainuiomata North area will not only increase the supply of new housing across a range of typologies but is also expected to unlock more infill development within the existing Town Centre area for Wainuiomata. The price point for new homes will become clearer through the Structure Plan process. This will determine the opportunity to undertake a mixed tenure approach with a range of densities, typologies and ownership structures, to be delivered by the market and public sector. Current housing demand estimates suggest that demand for smaller homes (1-2 bedroom) will increase (see 1.3. (a)) as one person and couple only households dominate the growth. Delivery of smaller homes to meet the demand from these households will be more affordable than larger homes, however this view of affordability has limitations and specific

⁴ Check property criteria :: <https://kaingaora.govt.nz/home-ownership/first-home-grant/check-property-criteria/>



		<p>products and models should be considered to provide sustainable affordable housing options for Wainuiomata North.</p> <p>As a Council Controlled Organisation (CCO) of HCC, Urban Plus Limited (UPL) have provided, and are charged to continue to provide, a range of first home buyer products at well below market price levels in Hutt City. UPL has been mandated by its Shareholder to release as much housing as possible at affordable, discounted prices to enable first home buyers greater opportunity for home ownership.</p> <p>In addition, the partnership He Herenga Kura, He Herenga Tāngata, He Herenga Whenua between Hutt City Council, Kahungunu Whanau Services, Te Rūnanganui o Te Āti Awa, and UPL sets out a framework for building and delivering warm, safe and affordable homes to those Lower Hutt households in desperate need of a home. A key aim is to provide pathways for these families to permanent home-ownership over time.</p> <p>Finally, the Public Housing Register for Lower Hutt has increased from 77 people, to 584 over the last three years from June 2020. In 2018 there were also 5,530 stressed private renters and total need is projected to increase by 2,910 households (or 28%) by 2038. As such there is an opportunity for Kainga Ora, and other community housing providers, to both intensify their existing sites in the Valley Floor and help meet this growing demand within Wainuiomata</p> <p>(c) describe any level of commitment to the lower-cost outcomes referred to in paragraph (b) from a developer or other relevant party to the housing development.</p> <p>The Structure Plan process contemplates a comprehensive approach to development which will identify multiple pathways through which housing development could occur. The experience in current development adjacent to the Wainuiomata North area has been for more compact development relative to the wider Wainuiomata area.</p> <p>UPL is a wholly owned CCO who manages a rental portfolio of below market rentals, of 190 houses. UPL also delivers housing outcomes such as medium density housing to the market - releasing new homes at affordable prices to first home buyers to provide pathways to long term home ownership, as well as developing houses for Community Housing Providers.</p>	
1.3	The extent to which the location where housing will be enabled has unmet demand and provides	<p>(a) Please describe the extent of unmet demand in the particular location of the housing development.</p> <p>The Hutt City Housing Capacity Assessment (HBA) (required by the NPS-UDC) outlines strong growth in demand across almost all catchments within Hutt City, with latent demand likely to see further increases once development opportunities and new housing supply become more evident. The number of households living in Hutt City is expected to increase by 3,142</p>	



	<p>access to amenity and opportunity.</p>	<p>between 2018 and 2051 (see table below). A key finding of the HBA is that realisable development capacity is insufficient to meet projected demand in the 30 years to 2047. In the context of the Pencarrow catchment, which includes Wainuiomata, the HBA identifies demand of 1210- 2083 dwellings in that period. Greenfield development is currently expected to provide 1000 of those new dwellings which reinforces the significance of the opportunity to bring forward large-scale development of Wainuiomata North. In addition to this demand growth the number of owner occupier households aged 65 and over are projected to increase by 54 % over the next 20 years. This shift toward housing typologies that favour single person or couple only households is expected to dominate the growth in new housing supply across Hutt City. This is also reflected in demographics for Wainuiomata.</p> <p>The WNDP is also aligned with the Wainuiomata Development Plan, a community-led strategic initiative to guide growth and development of wider Wainuiomata to 2035 (with a major investment focus on renewal of the existing Town Centre). The 5 key aims are: a fun gateway, a connected neighbourhood, a vibrant town centre, a top destination and proud identity. Future development is expected to follow the Best Practice Design Guide with 5 priorities:</p> <ul style="list-style-type: none"> ● Walkable Neighbourhoods ● Maximise connectivity ● Improved Liveability ● Integrated Green and Blue Networks <p>In 2021, work has continued on the Town Centre Framework and streetscape plan to:</p> <ul style="list-style-type: none"> ● Upgrade Queen Street ● Redevelop the Wainuiomata Mall site ● Bring to life elements of the community’s vision for the Wainuiomata Town Centre <p>The proposed major upgrade of Queen Street aims to create a space that is vibrant, safe and attractive</p>	
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Projections by tenure, age and composition



Typology matrix by tenure, age, composition & typology

	Owner occupiers						Renters					
	Standalone dwellings			Multi-unit dwellings			Standalone dwellings			Multi-unit dwellings		
	2 Bdrm-	3 Bdrm+	Total	2 Bdrm-	3 Bdrm+	Total	2 Bdrm-	3 Bdrm+	Total	2 Bdrm-	3 Bdrm+	Total
2018	2,190	19,870	22,060	1,800	590	2,390	1,770	5,780	7,560	4,640	950	5,590
2023	2,260	19,800	22,060	1,890	600	2,490	1,880	6,100	7,980	4,920	1,000	5,920
2028	2,330	19,750	22,080	2,000	600	2,600	2,000	6,390	8,390	5,220	1,030	6,260
2033	2,390	19,760	22,140	2,080	600	2,680	2,120	6,680	8,810	5,520	1,070	6,590
2038	2,430	19,700	22,120	2,140	600	2,740	2,260	7,010	9,270	5,880	1,120	7,000
Change												
Total	+240	-170	+60	+340	+10	+350	+490	+1,230	1,710	+1,240	+170	+1,410
Per annum	+12 pa	-9 pa	+3 pa	+17 pa	+1 pa	+18 pa	+25 pa	+62 pa	+86 pa	+62 pa	+9 pa	+71 pa

Table 11: Five-yearly breakdown of population and household forecasts

	2013 Census	2021 (est)	2026	2031	2036	2041	2046	2051
WESTERN HILLS								
Population	10,423	10,586	10,966	11,296	11,499	11,668	11,857	12,042
Households	3,851	3,992	4,164	4,338	4,451	4,542	4,626	4,711
WAINUIOMATA								
Population	17,787	19,198	19,842	21,077	22,761	24,403	26,080	27,759
Households	6,331	6,801	7,067	7,544	8,147	8,743	9,343	9,943
EASTBOURNE								
Population	4,803	4,809	4,765	4,734	4,738	4,758	4,784	4,810
Households	2,017	2,041	2,067	2,082	2,097	2,112	2,127	2,142
STOKES VALLEY								
Population	9,805	10,245	10,861	11,189	11,284	11,356	11,473	11,589
Households	3,573	3,729	3,961	4,085	4,144	4,198	4,258	4,318
VALLEY FLOOR								
Population	58,378	61,509	63,308	64,977	66,870	69,083	7,1412	7,3742
Households	22,775	23,759	24,665	25,490	26,403	27,422	2,8437	2,9453
HUTT CITY TOTAL								
Population	101,196	106,347	109,742	113,273	117,152	121,268	125,606	129,942
Households	38,547	40,322	41,924	43,539	45,242	47,017	48,792	50,567

(b) Describe the proximity (including a description of the distance in kilometres) of the proposed dwellings to each of the types of amenity listed in the table below. Include a comment on the nature of the access to the amenity (e.g. via public transport and/or active transport).

Type of amenity and opportunity (both existing and planned)



		(b)	<p>(i) employment opportunities (i.e., local industry and employment bases);</p>	<p>The proposed Structure Plan will establish how residents of Wainuiomata will access employment in proximity to home, through the provision of education, commercial, community facilities and transport infrastructure.</p> <p>Employment</p> <p>The current Development Framework (2018) sets aside 2ha for employment land (future village centre), within 500m catchment of most residential areas. The proposed local centre will provide some employment to the local area, in a walkable area at the confluence of the Wellington Road to Wise Street loop.</p> <p>Existing local industry and employment bases for Wainuiomata residents are centred around Hutt City (~10km away) and Wellington City (~22km). In Hutt City, this includes Hutt Hospital, GNS Science and Callaghan Innovation, and 800+ research organisations in high-end manufacturing, research and technology. There are 10,000 businesses in Lower Hutt. Wellington city provides many jobs in the public sector, commercial etc.</p> <p>It is noted that the strategic access road from Hutt City to Wainuiomata North will improve access to employment bases for new residents. Also, the compact development of Wainuiomata North will support improved public transport services to Wainuiomata North and existing community (GWRC).</p>	
			<p>(ii) educational facilities (i.e., local primary schools and secondary schools); and</p>	<p>The proposed Structure Plan will establish how residents of Wainuiomata will access employment, education and other amenities in proximity to home, through the provision of education, commercial, community facilities and transport infrastructure.</p> <p>Education</p> <p>The projected residential growth in Wainuiomata North appears to justify one new Primary School of approximately 2 - 3ha in area. A new school should be positioned to provide convenient walkable access to new residential catchments, future bus routes and amenity spaces. It should also be designed to enable the potential cooperative use of a new public recreation reserve. The securing of future educational land is subject to Ministry of Education collaboration and approval.</p>	



				<p>The existing public primary schools within Wainuiomata have a total spare capacity of 300 student places. Arakura Primary, closest to Wainuiomata North has only 37 spare spaces. Among intermediate and secondary, Wainuiomata Intermediate has 150 spaces and Wainuiomata High School has 300 spare spaces. While the Ministry of Education preferences will form part of the Structure Plan process it is anticipated a new primary school will be required.</p> <p>The new school should be positioned to provide convenient walkable access to new residential catchments, future bus routes and amenity spaces. It should also be designed to enable the potential cooperative use of a new public recreation reserve (to expand public reserve area from 2,000m2 to 4,000m2).</p> <p>Secondary education is available at Wainuiomata High School, which is 3-5km from the proposed development area.</p>	
			<p>(iii) other amenities (i.e., social amenities such as recreation and cultural facilities and retail and shopping).</p>	<p>The proposed Structure Plan will establish how residents of Wainuiomata will access other amenities in proximity to home, through the provision of recreation spaces, retail, commercial, community facilities and transport infrastructure.</p> <p>Currently, other amenities are limited in Wainuiomata North. But the structure Plan will consider the need and demand for local amenities and community facilities in the community.</p> <p>Retail</p> <p>New residential development in Wainuiomata North will benefit from proximity to the Wainuiomata town centre (~2.5km), and Queensgate shopping area in Lower Hutt (10km). A local village centre is also proposed for Wainuiomata North, as per the Development Framework.</p> <p>The current Wainuiomata centre provides residents with a range of everyday amenities including a supermarket, health centre, library, and shops.</p> <p>Open Space and Recreation</p> <p>Future development in Wainuiomata North presents opportunities to enhance habitat values and improve ecological outcomes. In terms of natural character, the surrounding hills have a</p>	



				<p>high-level of natural character, landscape and visual amenity values. However, the majority of native vegetation has been cleared from the existing lowland floor of the Wainuiomata North area. While there have been some new plantings, what is left of indigenous vegetation is acutely threatened.</p> <p>New open space networks and Park Assets will be required to support the informal recreation needs of new residents. The Development Framework proposes open space and recreation along an upgraded Black Creek Corridor (fulfilling recreation and stormwater functions) along the spine of the development area. A provision of at least one flat neighbourhood reserve (to Council requirements) of approximately 4,000m² area in a central and well-accessible part of the area, within a 400-500m walkable catchment of the majority of houses. Also, there is an opportunity to extend the Upper Fitzherbert Track linkage, an off-road cycle and walkway through the area connecting it to the Upper Fitzherbert hill track in the north. (Currently this track is a walking and mountain-biking track maintained by Transpower, HCC is considering acquiring ridgeline land to extend the track network.)</p> <p>Currently, the natural landscape context of Wainuiomata North provides a ‘green edge’ that will be maintained through development due to an Significant Natural Resource. The surrounding Bush-clad hills in the Haywards Scenic Reserve and Fitzherbert Reserve provide significant landscape and visual amenity to future development in Wainuiomata North. The Upper Fitzherbert track is also accessible.</p> <p>In addition, Stream tributaries may also be used for recreation purposes as can grass areas on eastern bank of Black Creek – these currently provide open, informal access.</p> <p>Cultural amenity</p> <p>The Pukeatua Kōhanga Reo and Wainuiomata Marae are two key focal points for local whānau, hapū and iwi within Wainuiomata.</p> <p>In addition, environmental outcomes of sustainable development can support the ‘mana o te wai’. Future development can also support the sustainable management of taonga: recognition of mana whenua culture, traditions, tikanga, place names, wāhi tapu and taonga and the importance of hau (air), whenua (land), wai (water), and biodiversity. It is proposed to incorporate these elements into a future structure plan and plan change process in collaboration with Te Rūnanganui o Te Āti Awa and Taranaki Whānui ki Te Upoko o Te Ika (Port Nicholson Block Settlement Trust).</p>	
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		<p>Community Facilities A number of facilities are located in neighbouring suburbs. For a modest sized area wider Wainuiomata is relatively well serviced with early childhood centres, Kōhanga Reo, a toy library, Community Centre, Library, Pool, Theatre, Medical services, Churches and recreations, service, youth, senior citizen and sports clubs.</p>
1.4	The extent to which the Eligible Infrastructure Project(s) supports intensification, in particular that required to be enabled by councils under the National Policy Statement on Urban Development (i.e. typology and density).	<p>With regard to the typology of the housing development described in 1.2, and the location of the particular housing development described in 1.3, please outline the extent to which the housing enabled by the Eligible Infrastructure Project(s) supports intensification, in particular that required under the National Policy Statement on Urban Development.</p> <p>HCC have responded to the direction of the NPS-UD in enabling greater intensification in areas across Hutt Central, through District Plan Change 43 which provides for intensification through two new zones - suburban mixed use and medium-density residential. This is expected to unlock greater intensification across Waterloo, Epuni, Woburn, Avalon/Naenae, Taita, Stokes Valley and Wainuiomata.</p> <p>The current Development Framework for Wainuiomata North proposes a compact urban form, with medium and higher density housing typologies - a critical part of what will be large-scale residential development. The WNDF also identifies an opportunity to improve the viability of existing public transport networks that connect Wainuiomata to Hutt City and the wider Wellington region.</p> <p>The Eligible Infrastructure Project, the Structure Plan for the Wainuiomata North development, will be further informed by the requirements of the NPS-UD to support intensification close to local centres and rapid transit routes. This may result in a Structure Plan that enables more intensive housing and greater housing capacity than the WNDF prepared in 2018, due to these new planning requirements.</p>
1.5	The extent to which the Proposal supports housing development on land owned by Māori and to which mana whenua have been involved in	<p>(a) Please comment on the extent to which the proposal supports housing development on land owned by Māori.</p> <p>To our knowledge, there is no land in Wainuiomata North currently owned by Māori, whānau, iwi or hāpu entities and thus this proposal is not expected to support housing development in Māori owned land. However, near the Wainuiomata North area the former Wainuiomata College and Wainuiomata Intermediate sites were transferred to iwi who have complementary development plans in the form of Papakāinga housing and ancillary services.</p>



	developing the proposed solution.	<p>(b) Please comment on the extent to which mana whenua have been involved (or will be involved) in developing the proposed solution.</p> <div data-bbox="584 300 1890 560" style="border: 1px solid black; padding: 5px;"> <p>Council recognise Taranaki Whānui and Ngāti Toa Rangatira as Mana Whenua within Hutt City. Taranaki Whānui have a strong spiritual and cultural connection to the Wainuiomata North area and its surrounds. As mana whenua of the area they have kaitiaki and other responsibilities to the land and its cultural and natural resources. The importance of involving Mana Whenua as HCC's partner in the future development of the structure plan and any subsequent plan change process is established within the operative District Plan is critical. In particular, Mana Whenua engagement is focused on protection and enhancement of hau (air), whenua (land), wai (water) biodiversity, wahi tapu and taonga. Moreover, HCC will seek to partner with Mana Whenua on how their housing outcomes and objectives may be achieved through any future development of Wainuiomata North.</p> </div>
1.6	The extent to which the Proposal supports housing development that is environmentally sustainable including through reduced private vehicle use, lower risks from climate change (such as coastal inundation), and supporting water quality and biodiversity.	<p>(a) Describe the proximity of the housing development to public transport, both existing and planned (in kilometres).</p> <div data-bbox="584 695 1890 1382" style="border: 1px solid black; padding: 5px;"> <p>The reliance on one access road (Wainuiomata Hill Road) in and out of the suburb does dictate predominantly car-based transport. A public bus route currently services the Wainuiomata North area from the immediately adjacent road through to Queensgate in Lower Hutt. Buses run between 6.30am - 11pm at 30-minute intervals. Extending the bus network further north would be beneficial for the area. Six school bus routes also stop at Wainuiomata North. The nearest train station is Woburn station, approximately 10km from Wainuiomata North, and provides good access to all stops that service the Wairarapa and Wellington line.</p> <p>Development of the Wainuiomata North area will need to consider the provision of a Strategic Road access to connect Wainuiomata North to Naenae. While future development is not dependent on the provision of this road it would strengthen the resilience of the area. A broad calculation of vehicle kilometers travelled supports the case for a second strategic access road connection with the 1841 proposed units in Wainuiomata North benefitting from a 3.5km reduction in trips to the Hutt Motorway.</p> <p>This could equate to:</p> <ul style="list-style-type: none"> • 11km less driving per day per unit (assuming 3 return trips per household unit4) • 19,331km less driving per day for the development as a whole • up to 5,122,583km less driving per year for the development (assumes 265 days of trip-making per unit per year to exclude weekends and holiday periods) • up to 102,451,660km less driving over a 20-year period, the minimum timeframe taken into account in settlement growth planning • that 102,451,660km could equate to some \$57,697,920 saving by users on vehicle operating costs (VOC) (at \$0.80 VOC per km using AA's running costs for a medium sized petrol vehicle), and up to 23,564 less tonnes of CO2 equivalent emissions (using NZTA's Economic Evaluation Manual). </div>



		<p>It will also need to consider the provision of new roads, cycle, and pedestrian networks that provide for all modes of transport.</p>	
		<p>(b) Describe any complementary environmental benefits that will be realised by this Proposal (e.g., mitigation on flood risks, or protection of wetland areas).</p>	
		<p>As stated in (a), the proposed new access road will reduce the length of driving trips in and out of the Wainuiomata North area.</p> <p>Compared to the rest of Hutt City, Wainuiomata North is not subject to coastal hazards such as inundation or flood risks from the Hutt River. The current greenfield area is subject to flooding issues, however the development of Wainuiomata North is an opportunity to incorporate stormwater mitigation within recreation areas and manage flooding</p> <p>Wainuiomata North Development Framework anticipates stormwater management that is integrated throughout the development, including remediation of historically degraded watercourses, like Black Creek, to improve flood management and create a high quality green network. There is also the opportunity to create a series of parks with stormwater functionality connected by regional pathways.</p> <p>The provision of street trees and landscaping along key road will soften the impact of long roads and provide a leafy, green feel to the area.</p>	
		<p>(c) Describe any commitment from developers(s) and other relevant parties to the infrastructure and housing development regarding the complementary environmental benefits described in your response to (b).</p>	
		<p>The Structure Plan process is intended to refine the future plan change which would consider and specify public space interfaces with an emphasis on diversity. HCC proposes demonstration projects form part of the initial staging to demonstrate a commitment to design quality and sustainable urban outcomes.</p>	
		<p>(d) Describe any known material environmental compliance requirements (such as regulatory requirements) which apply to the infrastructure and housing delivery, and your approach to complying with these.</p>	
		<p>The largely contained and relatively flat nature of Wainuiomata North, surrounded by Reserves, means that the concept master-plan included in the WDNF has been relatively well-resolved. The Structure Plan process would seek to confirm flood storage needs and mitigation measures; ecological and riparian areas required; infrastructure upgrades, costs and timeframes and any specific engineering matters that need addressing.</p>	



Evaluation Criteria – Impact of funding 20%	Applicant response
<p>2.1 The impact that this funding will have on the housing development advancing, or on the pace and scale at which it will advance compared to what is currently expected.</p>	<p>(a) Describe how the Eligible Infrastructure Project(s) are critical to the housing development.</p> <div data-bbox="660 411 1966 488" style="border: 1px solid black; padding: 5px;">see c)</div> <p>(b) Describe how the IAF funding requested is critical to the delivery of that infrastructure.</p> <div data-bbox="660 560 1966 636" style="border: 1px solid black; padding: 5px;">see c)</div> <p>OR</p> <p>(c) To the extent that the housing development is set to be delivered without funding, then describe how the delivery of housing will be accelerated, with reference to the timeframes and scale for housing delivery with funding.</p> <div data-bbox="660 799 1966 1380" style="border: 1px solid black; padding: 10px;"> <p>Currently, the Wainuiomata North greenfield development is planned to be delivered after 2030. Given current strategic and funding priorities, HCC have planned to fund city-wide Structure Planning, including Wainuiomata North and the Valley Floor, incrementally over the next 10 years. At present, no new residential development can occur in Wainuiomata North without compromising the level of service in the three-waters networks. As a result, no significant development or growth can or will occur in this area without an area-based strategy in the next 10 years. This approach delays the development of the Wainuiomata North greenfield area and will slow housing delivery.</p> <p>As per this EOI, accelerating the development of the Wainuiomata North Structure Plan (the Eligible Infrastructure Project) with IAF funding (brought forward to circa 2022-2023), will bring forward the timeframes for infrastructure delivery (2023-2027) and housing delivery (2023/2032) by at least 5 years, providing more certainty about the demand for infrastructure that new development will incur. There is also an opportunity to bring forward medium-term infrastructure projects (\$84m) to support the accelerated delivery of housing.</p> <p>It is not expected that the accelerated timeframes will impact the spatial scale of housing delivery, as the planned growth area in Wainuiomata North will be unchanged. However, there is an opportunity for the Riverlink Alliance to transition to Wainuiomata North in 2025/2026 to provide capacity to deliver infrastructure. Also, the NPS-UD might impact the intensity of development, compared to initial studies in 2018 (WNDF)</p> </div>



2.2	<p>Demonstration that other means to fund the Eligible Infrastructure Project(s) without displacement of investment elsewhere (i.e. rate rises, prudent borrowing, or use of the IFF framework) have been exhausted.</p>	<p>(a) Describe how other means to fund the Eligible Infrastructure Project(s) have been explored, including rate rises, prudent borrowing, development agreements, and/or use of the IFF framework over the last 3 years.</p> <p>HCC has investigated a range of Development Contribution options in their policy and for Wainuiomata have capped DCs at \$26,000. This is higher than the DC policy for Hutt City (\$15k). Overall, higher DCs are not considered palatable in the Wainuiomata area or across Hutt City and so capacity to fund growth infrastructure beyond this level of DC may be constrained. A bespoke DC policy for the Wainuiomata North area would be considered by HCC. Likewise, HCC will consider other incentives to accelerating development, including HCC applying for resource consent itself to de-risk the development cycle.</p> <p>http://infocouncil.huttcity.govt.nz/Open/2020/11/LTPAP_30112020_AGN_2857_AT.PDF</p> <p>(b) Describe why IAF funding is a last option for bridging the gap for funding the Eligible Infrastructure Project(s), and does not displace those sources of funding. For instance, explain how these funding sources are already maximised, or why they are not feasible in the circumstances.</p> <p>As noted above Development contributions revenue is already maximised in Wainuiomata. HCC is also a partner in a number of co-funded projects, including GWRC and Upper Hutt Council. The approach to this EOI is not necessarily to close a funding gap, but rather use the opportunity IAF funding provides to accelerate the development of a large-scale greenfield area that will otherwise play out over a much longer period of time.</p> <p>(c) Provide a copy or link to the 2021 Long Term Plan (in its most recent form), and describe any funding in the Long Term Plan which relates to the Eligible Infrastructure Project(s).</p> <p>Link to LTP - http://www.huttcity.govt.nz/contentassets/f9d7320b20d34afeb84c2f85cd93090d/080721_10-year-plan.pdf</p> <p>The Eligible Infrastructure Project, a Structure Plan for Wainuiomata North, is not specifically funded in the LTP. Instead, Hutt City Council have committed \$1.1m in the LTP over the next ten years to deliver a structure plan for the city. This is staged as \$250k over the next 3 years, and then an additional \$50k every proceeding year. The structure plan is a key deliverable for HCC as a part our commitment to the Wellington Regional Growth Framework. However, to be clear, this funding allocation was intended more specifically for structure planning in what we call the 'golden triangle' (Waterloo, City Centre through to Naenae/Taita) and does not include Wainuiomata.</p> <p>In terms of three waters infrastructure required to support the development of Wainuiomata North, see attached spreadsheet outlining LTP funding for Wainuiomata for years 1-10 and years 11-30. It shows the level of funding committed for years 1-10 for Wainuiomata - \$35.4m, and planned projects to fund in years 11-30 - \$67.04m. Over these periods, 47.45% of funding is through development contributions.</p>



Evaluation Criteria – Cost and co-funding 20%		Applicant response
3.1	The average whole-of-government cost per dwelling expected to be enabled by the Eligible Infrastructure Project(s).	Response not required – Proposals will be evaluated on the basis of Applicants’ response to question 2 in Part B.
3.2	<p>Alignment with co-funding principles for the Fund.</p> <p>Note: Key principles of the IAF are:</p> <ul style="list-style-type: none"> • <i>developers and landowners should be paying a similar share of the costs of the infrastructure as would be the case if the Eligible Infrastructure Project(s) was funded by traditional means through the local authority, which is generally the reasonable ‘growth’ portion of the total infrastructure cost (in some cases this contribution can be non-financial (e.g. land or commitments to sub-market housing), but any such contribution should be similar in value to the foregone financial contribution); and</i> • <i>Territorial Authorities should be co-investing to the maximum extent possible.</i> <p>At this EOI Stage, Kāinga Ora is looking for:</p> <ul style="list-style-type: none"> • <i>in all Proposals, evidence of developers and landowners’ preparedness to make such a contribution; and</i> • <i>in most cases, co-investment from Territorial Authorities.</i> 	<p>Please outline your intentions in relation to:</p> <p>(a) the extent to which these principles are accepted by the relevant parties;</p> <div style="border: 1px solid black; padding: 5px;"> <p>This funding application is currently limited to funding for the Structure Plan process. HCC has identified limited funding to advance the Structure Plan as part of their commitments to the Wellington Regional Growth Framework. That includes \$1.1m broken up with \$250K over the next three years and then 50K every proceeding year.</p> <p>Should this funding application be successful HCC would be seeking to repurpose the \$1.1m in line with its commitments to the Regional Growth Framework.</p> </div> <p>(b) the expected quantum of such co-funding; and</p> <div style="border: 1px solid black; padding: 5px;"> <p>\$ n/a</p> </div> <p>(c) the method(s) by which this funding is proposed to be made (i.e., development agreements, IFAs, IFF levy, etc.).</p> <div style="border: 1px solid black; padding: 5px;"> <p>n/a</p> </div>



Evaluation Criteria – Capability and readiness 20%		Applicant response
4.1	The extent to which there are other barriers to the housing development that the Eligible Infrastructure Project(s) will serve (and how they will be removed if funding is approved).	<p>(a) Comment on any other key risks of (i) the Eligible Infrastructure Project(s) being constructed and (ii) the housing development proceeding. Identify any other barriers to housing development, and in the event that funding is approved, explain how these barriers will be removed so they don't constrain progress.</p> <p>Note such barriers could include inappropriate zoning, lack of other types of infrastructure (including infrastructure not fundable under IAF), restrictive bylaws and land use restrictions, and any other housing development constraints (i.e., partially contaminated sites).</p> <div style="border: 1px solid black; padding: 5px;"> <p>As noted earlier the critical path to unlocking this large-scale greenfield development opportunity includes a significant level of investment in upgrading existing and delivering new water infrastructure. There is no existing capacity to leverage off. The future resilience of the area would also be assisted by the delivery over a Strategic Access Road in time. A key point of focus for the Structure Plan will also be developing the land strategy, with the intention of enabling and facilitating multiple pathways for residential housing development.</p> </div> <p>(b) Please complete the milestone table below, regarding the Eligible Infrastructure Project(s) only, and not the housing development.</p>

Milestone	Status	✓	Expected Date	Comment
Procurement of construction contractors	<i>Suitable tender complete</i>	<input type="checkbox"/>	Click or tap to enter a date.	The potential to engage the Riverlink Alliance to deliver the Infrastructure Works Programme would be explored should the development of Wainuiomata North be accelerated.
	<i>Tender evaluation in progress</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>Request for Tender in the Market</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>About to put out a Request for Tender to the market</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a



Detailed Design	<i>Detailed Design Complete</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>Detailed Design Underway</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>Detailed Design to commence</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
Designations/Consents	<i>Approved</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>Lodged</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>In preparation</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
Land Acquired	<i>Yes</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a.
	<i>Being negotiated under PWA (please indicate stage below)</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>Has not commenced</i>	<input type="checkbox"/>	Click or tap to enter a date.	2022-23
Preliminary design and costing	<i>Approved</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a.
	<i>Draft</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>Underway</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>None</i>	<input type="checkbox"/>	Click or tap to enter a date.	2022-23
Business Case or Investment Case	<i>Approved</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>Draft</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>Underway</i>	<input type="checkbox"/>	Click or tap to enter a date.	n/a
	<i>None</i>	<input type="checkbox"/>	Click or tap to enter a date.	2022-23.
Other approvals	<i>(i.e. Council committee, Waka Kotahi approvals)</i>	<input type="checkbox"/>	Click or tap to enter a date.	2022-23

4.2	The degree of developer commitment or interest in building housing quickly.	<p>Please comment on the following based on your knowledge of the developer(s) expected to be involved in the housing development:</p> <p>(a) the anticipated sales plan and any evidence of commitment from the developer(s) to the (funded) timeframe for housing delivery; and</p>	<div style="border: 1px solid black; padding: 5px; min-height: 20px;">n/a</div>
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		<p>(b) what conditions would likely be applicable to the developer(s) commitment to delivering the additional dwellings within the timeframes indicated in your response to table (b) in Eligible Infrastructure Project/s – (dwellings enabled and timeframes) and the other housing outcomes referred to in this Response Form.</p> <div data-bbox="736 331 1915 408" style="border: 1px solid black; padding: 5px; margin-top: 10px;">n/a</div>
4.3	<p>Demonstrated alignment between all parties including Territorial Authorities, Regional Councils, mana whenua and developers needed to advance the housing development.</p>	<p>Please comment on the alignment of the following parties in advancing the housing development <i>[note your response should describe the level of support, input, or knowledge between the parties as they relate to the Proposal]</i>:</p> <p>(a) Territorial Authorities;</p> <div data-bbox="736 624 1915 986" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>The site is identified in the Wellington Regional Growth Framework (WRGF) as a Future Urban Area. The Wellington Regional Council (GWRC) were party to the preparation of the growth framework alongside the region’s territorial authorities, Horowhenua District Council, Waka Kotahi NZ Transport Agency, Ministry of Housing and Urban Development and Iwi partners. Development of Wainuiomata North is fully aligned with the WRGF. All ten councils including GWRC have formally endorsed the WRGF.</p> <p>The Wainuiomata North development area has been discussed at several CEO level meetings on the Infrastructure Acceleration Fund within the WRGF geographical area. The project aligns with the direction and timeframe of the WRGF. The Programme Director for the Wellington Regional Leadership Committee that oversees the WRGF has been part of these discussions and will continue to do so.</p> </div> <p>(b) Regional Councils;</p> <div data-bbox="736 1054 1915 1375" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>The site is identified in the Wellington Regional Growth Framework (WRGF) as a Future Urban Area. The Wellington Regional Council (GWRC) were party to the preparation of the growth framework alongside the region’s territorial authorities, Horowhenua District Council, Waka Kotahi NZ Transport Agency, Ministry of Housing and Urban Development and Iwi partners. Development of Wainuiomata North is fully aligned with the WRGF. All ten councils including GWRC have formally endorsed the WRGF.</p> <p>The Wainuiomata North development area has been discussed at several CEO level meetings on the Infrastructure Acceleration Fund within the WRGF geographical area. The project aligns with the direction and timeframe of the WRGF. The Programme Director for the Wellington Regional Leadership Committee that oversees the WRGF has been part of these discussions and will continue to do so.</p> </div>



		<div data-bbox="741 193 1921 233" style="border: 1px solid black; height: 25px; margin-bottom: 5px;"></div> <p>(c) mana whenua;</p> <div data-bbox="741 300 1921 400" style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">HCC has signed a partnership between Iwi, UPL, HCC and a Community Housing Provider to deliver more housing outcomes – the intent is that this partnership agreement will include Kainga Ora and conversations have been had with the Regional Director.</div> <p>(d) developers (to the extent possible); andClick</p> <div data-bbox="741 461 1921 541" style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">or tap here to enter text.</div> <p>(e) any others,</p> <div data-bbox="741 608 1921 683" style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Waka Kotahi NZ Transport Agency, Ministry of Housing and Urban Development with</div> <p>Supporting Material where necessary (e.g., letters of support or intent).</p>				
4.4	Confidence in the ability of all parties to deliver the Eligible Infrastructure Project(s) and housing development as proposed.	<p>(a) Describe the capability of the Applicant to deliver the Eligible Infrastructure Project(s) and/or housing development proposed.</p> <div data-bbox="741 855 1921 935" style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Click or tap here to enter text.</div> <p>(b) Provide prior examples for each of the relevant parties in delivering infrastructure and/or housing developments within an accelerated timeframe.</p> <p>Note: <i>Kāinga Ora understands that many Applicants do not themselves have experience in delivering infrastructure and/or housing developments.</i></p> <p><i>Proposals can still pass this criterion if Applicants can demonstrate that suitable parties have been engaged, and are willing to participate in the Proposal to deliver the infrastructure and/or housing (or sections).</i></p> <table border="1" data-bbox="741 1198 2002 1334" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th colspan="2" style="padding: 5px;">Infrastructure experience</th> </tr> </thead> <tbody> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;">Relevant party</td> <td style="width: 50%; padding: 5px; vertical-align: top;">Describe prior example <i>[insert name, location, number of dwellings]</i></td> </tr> </tbody> </table>	Infrastructure experience		Relevant party	Describe prior example <i>[insert name, location, number of dwellings]</i>
Infrastructure experience						
Relevant party	Describe prior example <i>[insert name, location, number of dwellings]</i>					



		Hutt City Council	Riverlink Alliance
		Click or tap here to enter text.	Click or tap here to enter text.
		Click or tap here to enter text.	Click or tap here to enter text.
		Housing development experience	
		Relevant party	Describe prior example <i>[insert name, location, number of dwellings]</i>
		Urban Plus Limited	Active across the Valley Floor as a CCO.
		Click or tap here to enter text.	Click or tap here to enter text.
		Click or tap here to enter text.	Click or tap here to enter text.



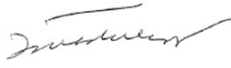





Wellington Water

Hutt City Three Waters Catchment Growth Study Including Plan Change 43 Phase One: Wainuiomata Catchment Final Summary Report - Rev 3

December 2020

Activity	Title	Name	Electronic signature	Date
Prepared by	Water Engineer GHD	Brittany Challis		11/12/2020
Checked by	Lead Engineer GHD	Kama Sliepen		11/12/2020
Approved by	Project Manager Wellington Water	Mariela Castillero		11/12/2020
Approved for release by	Programme Manager Wellington Water	Olena Chan		11/12/2020

Executive summary

HCC has identified Wainuiomata as a potential area for significant population increase over the next 30 years. The predicted growth will put additional strain on the three waters networks already known to have existing issues.

Plan Change 43 (PC 43) would enable intensified growth in existing urban areas. The large greenfield development areas in the north of Wainuiomata are expected to contribute to a significant amount of the forecast population growth. The existing three waters infrastructure in these areas service only a small number of properties. These areas will require significant infrastructure upgrades. Discussion on each of the three waters is provided below with all costs presented as high-level 95th percentile estimates.

Water Infrastructure

Water model development and optioneering for water infrastructure improvements has been completed by Stantec, with support by Wellington Water. By 2050 an additional 8.0 ML of storage volume is required to meet the seismic and operational (peak daily demand) levels of service. Based on the assessment work completed, the preferred location for a new 8.0 ML storage tank is adjacent to Fraser Street. The new reservoir will create a new lower-pressure zone, isolated from the rest of the Wainuiomata network with the high-level cost estimate (for budgeting purposes) being \$39.4 M.

Three planning horizons were assessed to calculate the required infrastructure to support levels of service and growth today, by 2033 and by 2050. The costs under these planning horizons include:

- 2020 Planning Horizon – Pipe Network Upgrades: \$5.6 M
- 2033 Planning Horizon – Pipe Network Upgrades: \$4.2 M
- 2050 Planning Horizon– Pipe Network Upgrades: \$13.6 M

In addition to the proposed pipeline upgrades, there is 5.2 kilometres of existing 750 mm bulk water main that is due for renewal. Based on the design completed by MWH (now Stantec) this pipeline is to be replaced with 914 mm OD CLS pipe over three separate sections. The GHD cost estimate for this upgrade is \$82.5 M.

The total estimated cost for the water infrastructure upgrades is: **\$145.3 M.**

Wastewater Infrastructure

The model development and optioneering for wastewater infrastructure improvements has been completed by Hydraulic Analysis Limited (HAL), with support by Wellington Water.

Two future growth scenarios were originally identified for assessing options, M2L (+20 years) for identifying the likely issues requiring resolution, and maximum probable development (MPD) (+50 years), for ensuring options were sized sufficiently for target levels of service to be met long term.

A longlist of solution sets was assessed using the hydraulic model to review improvements to the level of service. Following this initial analysis, the options were further refined to prioritise cost-effective network improvements which would provide an immediate benefit to the catchment and provide flexibility for accommodating future growth.

The assessment of required wastewater infrastructure improvement options through to 2033 include:

- Wise Park PS Upgrade - \$1.2 M (Stage 1)
- Wise Park PS Upgrade - \$15.8 M (Stage 2)
- I&I Programme - \$40.6 M
- Greenfield Servicing - \$4.4 M
- Fraser Storage Tank - \$3.2 M
- Main / Rowe Storage Tank - \$5.4 M
- Assessment and replacement of Laterals - \$19.5 M

For the 50 year growth horizon the additional wastewater infrastructure improvements include the duplication of the gravity line - \$5.2 M (from Wainuiomata to Gracefield), further I&I work (\$27.6 M) and the upgrade of Wellington Road Pump Station (\$0.7 M).

The total estimated cost for the wastewater infrastructure upgrades is: **\$123.7 M.**

Stormwater Infrastructure

Flooding has been an issue in Wainuiomata for a number of years. The major channels in the network, Black Creek and Parkway Drain, have insufficient capacity for large sections of the channels. The upstream piped network is undersized in numerous locations such as the area around Parkway Drain and upstream of Mary Crowther Park.

Work was undertaken by Stantec in 2019 and 2020 to investigate flooding issues in the existing catchment. Three large scale upgrade options were considered by Stantec:

- Increase channel capacity in Black Creek
- Large scale detention (five locations proposed)
- Large scale flow diversions parallel to Black Creek and Parkway Drain

A large scale flow diversion was considered less cost effective compared with channel widening and was not considered further.

GHD developed the stormwater hydraulic model to account for the predicted growth through to 2050 and assessed the proposed channel widening and storage options. Following a site visit, GHD considered three of Stantec's large scale detention options and two additional options.

A summary of the preferred options through to 2033 from this assessment (including costs) is listed below:

- New Detention / Wetland - \$20 M
- Black Creek Widening (Top Section) - \$2.1 M
- Black Creek Widening (Middle Section) - \$ 5.6 M
- Black Creek Widening (Lower Section) - \$6.8 M
- Parkway Widening - \$2.4 M
- Lees /Fraser Pipe Upgrade - \$19.3 M
- Upper Fitzherbert Pipe Infrastructure - \$7.3 M

In addition to the above options, there is a proposed Waiu Stormwater Upgrade for growth through to 2050, with the cost estimate being \$9.1 M.

The calculated increase in channel capacity as a result of the proposed channel improvements is between 52% and 84%

The total estimated cost for the stormwater infrastructure upgrades is: **\$72.6 M.**

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Appendices

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Appendix B – Water Zone Management Plan (Stantec)
Appendix C – Wainuiomata 750 CI Pipe Replacement Preliminary Design Report (MWH)
Appendix D – Wainuiomata Options Assessment (HAL)
Appendix E – Wainuiomata Optioneering Phase 1 – Memo and Presentation (Stantec)
Appendix F – Wainuiomata Stormwater Options Assessment (GHD)
Appendix G – GHD High Level Planning Assessment
Appendix H – GHD Cost Estimates

1. Introduction

1.1 Background

Hutt City Council (HCC) is responsible for providing three waters infrastructure to support its projected population growth. HCC has identified Wainuiomata as a potential area for significant population increase over the next 30 years. The predicted growth will put additional strain on the three waters networks already known to have existing issues.

Two types of population growth are predicted in Wainuiomata:

- Greenfield development, particularly in large rural areas in the north
- Infill development in existing residential areas

Plan change 43 (PC43) enables two new activity areas to increase urban density in Wainuiomata, which will drive some of the infill development. These include:

- Suburban mixed use activity area
- Medium density residential activity area

Wellington Water has engaged Stantec, HAL and GHD to assess the performance of the existing three waters network in Wainuiomata, the impacts the projected population growth will have on the networks and consider catchment scale options needed to meet the required levels of service and population growth to 2050. Cost estimates were prepared for the preferred three water network improvements to inform Council's Long Term Plan (LTP). Cost estimates have been prepared as follows:

- Level One estimates for significant built infrastructure or earthworks
- Level Two estimates for pipe upgrades or renewals

For further background information and original engagement brief, refer to the Activity Brief confirmed from Wellington Water in Appendix A.

1.2 Existing catchment

Wainuiomata is home to approximately 18,000 residents. The suburb is located east of Petone, and is managed by the Hutt City Council (refer to Figure 1-1).



Figure 1-1: Location of Wainuiomata catchment

The Wainuiomata catchment covers 1700 hectares, with areas varying from densely populated residential sections to the south, to large greenfield areas in the north (refer Figure 1-2).



Figure 1-2: Wainuiomata catchment extent

1.3 Purpose of this report

The purpose of this catchment study is to proactively identify upgrades to the three waters networks that are needed to accommodate predicted urban growth in Wainuiomata.

This report will summarise:

- The expected growth
- Key constraints to improving infrastructure
- Preferred options from the optioneering work undertaken by Stantec, HAL and GHD
- Cost estimates for the preferred options to understand the cost of the required infrastructure to meet levels of service and support growth.

This report provides a summary of the optioneering work undertaken by Stantec, HAL and GHD respectively. Full reports are attached in Appendices B – F.

Timing has allowed cost estimates from this study to be made available for input into the Long Term Plan, however this was not originally one of the goals of the study.

1.4 Scope and limitations

The scope of this report is to review the wastewater, stormwater and water supply networks within the Wainuiomata catchment in their current condition and against the forecasted growth. Based on the optioneering work undertaken by Stantec, HAL and GHD, upgrades have been recommended for each network to meet the specified levels of service in the existing scenario as well as allow for future growth. High level cost estimate for these recommendations have been prepared to aid in the decision making process when planning for future growth.

The networks have been assessed based on three planning horizons: 2019/2020 (existing demands scenario for level of service), 2033 and 2050 (as mid and long term growth scenarios).

1.5 Disclaimer

This report has been prepared by GHD for Wellington Water and may only be used and relied on by Wellington Water for the purpose agreed between GHD and the Wellington Water as set out in Section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than Wellington Water arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report (section 1.4).

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report and provided by third parties. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Wellington Water and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has prepared the cost estimates ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD under the guidelines of Wellington Water's cost estimation manual. The Cost Estimate has been prepared for the purpose of Wellington Water's HCC long term planning budget and must not be used for any other purpose.

2. Predicted Growth

To enable development in Wainuiomata the projected population forecasts need to be considered.

Plan Change 43 (PC 43) will enable intensified growth in existing urban areas. In addition to this, there are a number of existing greenfield sites in Wainuiomata which have already submitted development plans, or which Hutt City Council expects to be developed in the next 30 years.

Two types of population growth are predicted:

- Greenfield development, especially in large areas in the north which are currently zoned rural residential
- Infill development in existing residential areas, intensified by PC43

Growth data was provided by the Hutt City Council, estimated by their internal staff based on earlier data from Forecast ID. Wellington Water provided this data to GHD both as a spreadsheet and in ArcGIS online.

Both growth types are forecasted through to 2047, 30 years from when this study began, and have then been extrapolated through to 2050.

2.1 Infill development

Infill development refers to intensification of the existing developed areas of Wainuiomata. PC 43 will help to drive this as it enables additional intensification in the Wainuiomata town centre where land was previously zoned general residential and is now medium density residential (refer Figure 2-1).

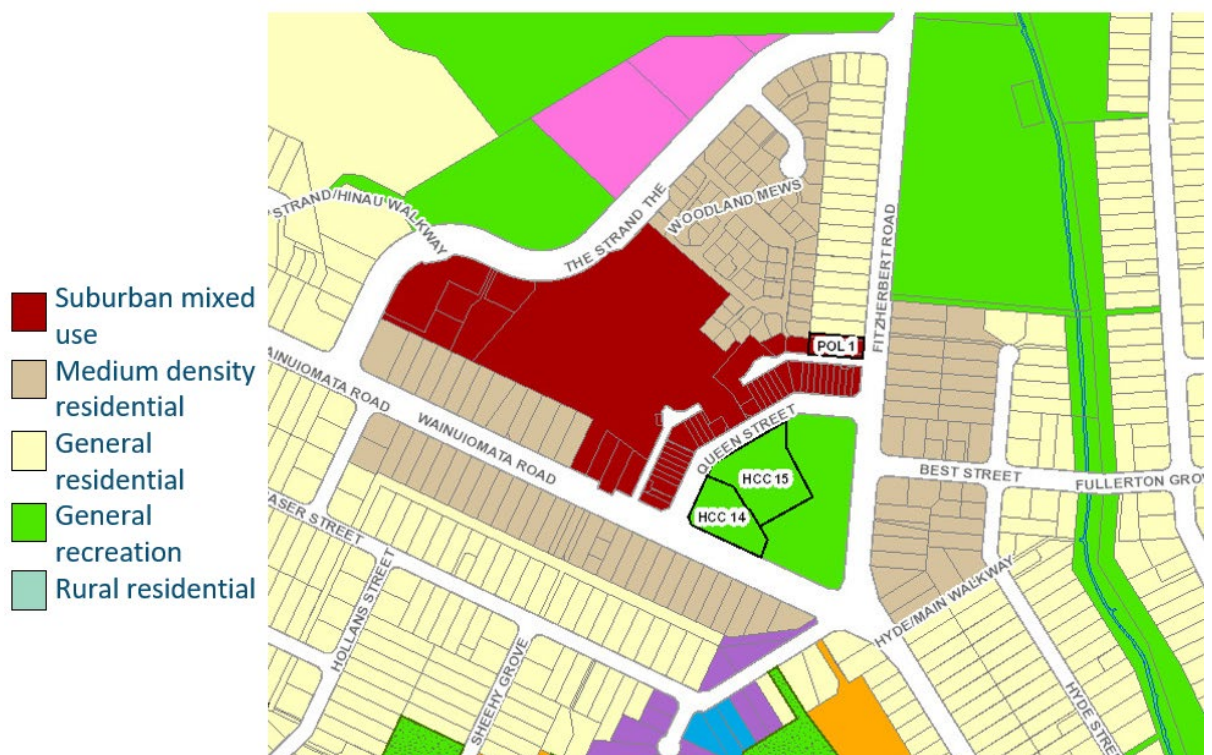


Figure 2-1 New HCC district plan zoning in PC43

Wainuiomata has been split into five population forecast catchments to forecast infill development. These five catchments include: Arakura, Glendale, Parkway, Fernlea and Homedale /Pencarrow (refer to Figure 2-2):

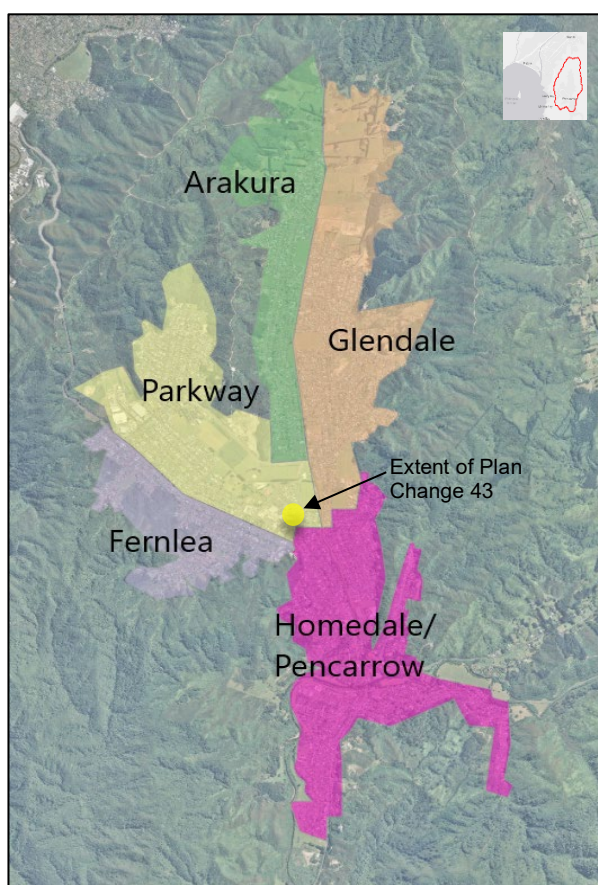


Figure 2-2: Population forecast catchments

Table 2-1 summarises the forecast population growth due to infill development for these five areas. The medium density residential zones created by PC 43 are within the Parkway population forecast catchments.

Table 2-1: Forecasted growth for infill development

Forecast Catchment	Forecast total population						
	2013	2020	2023	2033	2043	2047	2050*
Arakura	2,511	2,576	2,632	2,888	3,413	3,628	3,627
Fernlea	2,021	2,016	2,027	2,043	2,062	2,078	2,077
Glendale	3,921	4,116	4,603	5,358	6,689	7,280	7,380
Homedale - Pencarrow	6,103	6,282	6,647	6,651	6,743	6,827	6,923
Parkway	3,231	3,520	3,975	4,249	4,233	4,245	4,486
Total	17,787	18,510	19,883	21,190	23,140	24,058	24,494

**Linear extrapolation was used for year 2050 population forecast*

2.2 Greenfield development areas

Greenfield development areas are generally undeveloped catchments with the potential to see significant change in the next 30 years. Development in these areas will require the construction of new three waters infrastructure, as well as upgrades to existing networks.

The HCC identified eight potential greenfield development areas in Wainuiomata (refer to Figure 2-3). These areas are geographically located within the infill population forecast catchments, however greenfield population growth has been calculated separately.

Plan Change 43 is not expected to impact these greenfield developments.

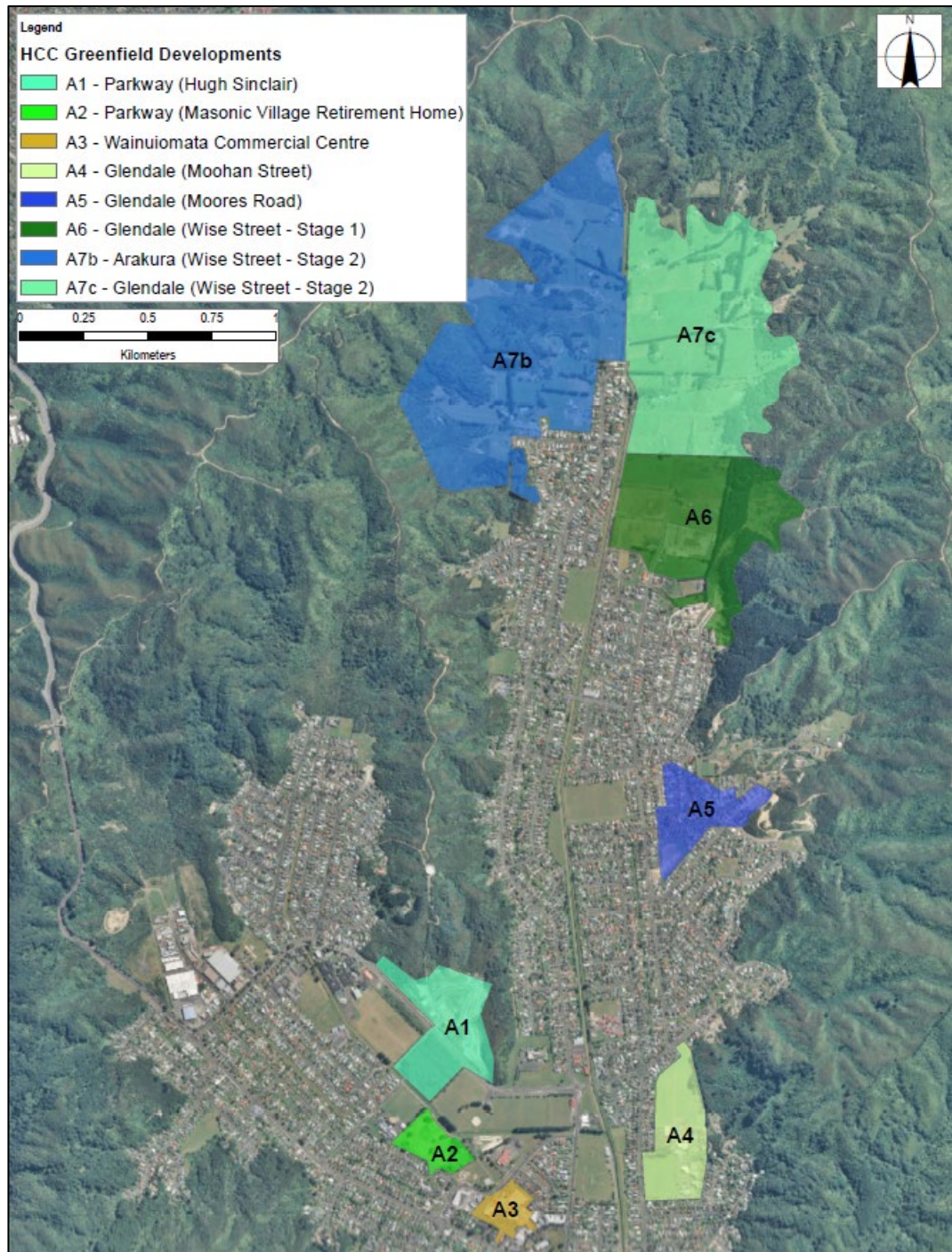


Figure 2-3: Greenfield development areas

Table 2-2 summarises the forecast population growth due to greenfield development.

Table 2-2: Forecasted number of additional dwellings for greenfield development areas

Area ID	Greenfield development area	2020	2033	2050	Total
A1	Parkway (Hugh Sinclair)	50	16	0	66
A2	Parkway (Masonic Village Retirement Home)	50	60	0	110
A3	Wainuiomata Commercial Centre	0	0	0	0
A4	Glendale (Moohan Street)	50	140	0	190
A5	Glendale (Moores Road)	18	0	0	18
A6	Glendale (Wise Street – Stage 1)	0	120	0	120
A7b	Arakura (Wise Street – Stage 2)	0	100	340	440
A7c	Glendale (Wise Street – Stage 2)	0	150	510	660

The area identified as Wise Street Stage 2 (A7b, A7c) has been proposed as a potential area of future greenfield development subject to HCC and community consultation. In these areas, the existing three waters infrastructure currently services only a small number of properties and significant upgrades would be required to allow for future growth.

A7b and A7c are currently zoned rural residential and approval for a change of land use would be required for significant development to occur.

3. Site Constraints

This section details existing site constraints that have a potential impact on the catchment scale options considered.

Geotechnical and contaminated land investigations were outside the scope of this report, however the following high level checks were undertaken.

3.1 Geotechnical

No geotechnical input was included as part of this three waters catchment study. In 2014, GHD conducted a geotechnical assessment of the northern areas designated for development within Wainuiomata as part of a separate project¹. This report stated that the proposed site was anticipated to be suitable for residential development, subject to the following constraints:

- Possibility of soft compressible and potentially liquefiable subsoils. Specific foundation design may be required in large areas.
- Elevated groundwater levels are considered likely
- Possibility of historical surficial filling
- Slope instability – GHD observed what appeared to be shallow seated slope instability combined with the presence of soil creep with remnants of historic land movement.
- High combined seismic hazard index – high ground shaking (moderate liquefaction), low slope failure
- Flat, low lying and potentially saturated soils. Stormwater design will be an important consideration.

Further geotechnical investigation will be required prior to further development of the options proposed in this report. It is expected that the high groundwater, soft soils and seismic risk will increase the costs of three waters infrastructure upgrades.

3.2 Contaminated land

No contaminated land investigation was included as part of this three waters catchment study, however GHD notes that the Selected Land Use Register (SLUR) identifies two potential areas for contaminated land. Both areas are categorised as having a 'Verified History of Hazardous Activity or Industry'. Figure 3-1 shows both areas, each is a collection of smaller sites.

¹ GHD (2014) [Hutt City Council Report for Urban Strategic Development Wainuiomata Area](#)

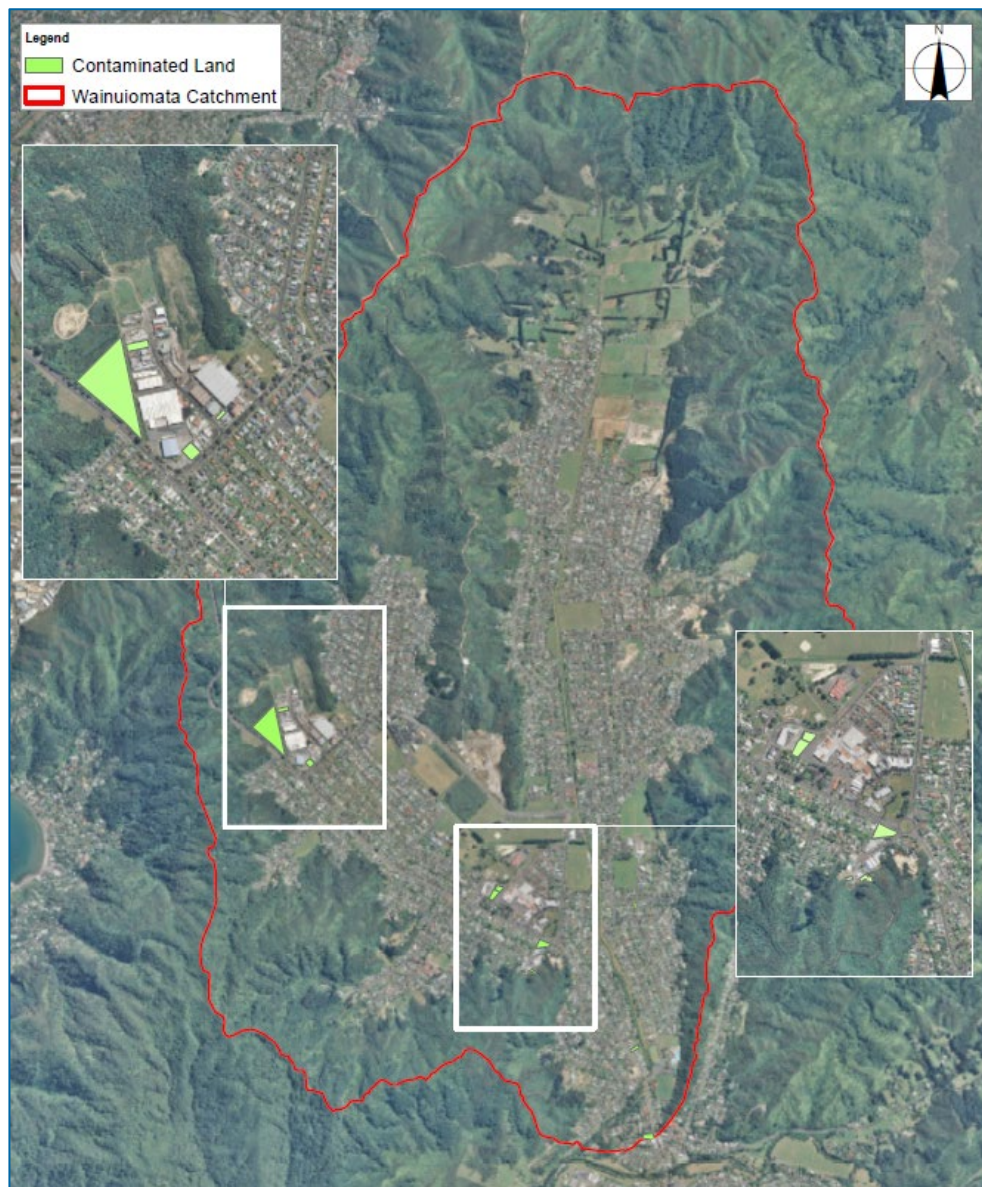


Figure 3-1: SLUR potential areas for contaminated land

These sites are located on private land. The contaminated sites are not expected to have any material effect the three waters upgrades presented in this report. There are no known contaminated sites in the greenfield development areas.

3.3 Freshwater quality and quantity

Wellington Water's goal for healthy urban waters ongoing improvement to the water quality of the region's beaches and coastlines. Community expectations for water quality are also increasing. Wellington Water, on behalf of HCC, needs to demonstrate an improvement to water quality from their networks in order to accommodate discharges from growth.

Black Creek at Moohan Street is a regional water quality site. Under the National Policy Statement for Freshwater Management, this site has an attribute state of E for risk to human health during recreation (measured as E. coli/100mL). E is the worst grade; the National Bottom Line is set at C. The wastewater infrastructure improvements presented in this report put measures in place to improve the water quality of Black Creek to acceptable levels.

Stormwater from this network flows untreated into the streams, rivers and the ocean. As stormwater picks up sediment, contaminants, petrochemicals and heavy metals such as zinc, copper and lead, it can result in harmful water quality where it discharges to streams or coastal

waters. Stormwater from greenfield development in particular, can result in excessive discharges of sediment due to the land use change from vegetation or grass to roads and other hardstand.

Land use and building restrictions that protect overland flow paths from being built over or blocked are also important for protecting people and property. Overland flow paths need to be identified in advance of land development so that they can be maintained when development occurs. Where development already exists there are fewer options for managing overland flow without affecting property.

The stormwater infrastructure improvements presented in this report address the water quality and quantity issues identified above.

3.4 Wetlands

There is a significant natural wetland listed in Schedule F3 of the Natural Resources Plan at the upper end of Waiu Street, named the Gracefield Scrub/Waiu Wetland (refer Figure 3-2).

The presence of this wetland has been assessed in the development of a potential storage option at this location.



Figure 3-2: Waiu significant natural wetland

3.5 Existing developments

The initial population forecasting was undertaken in 2017 by HCC staff using data from Forecast ID. Optioneering for the three waters networks was undertaken in 2020. In the intervening period, some of the greenfield development areas have already been developed and the local three waters infrastructure to support these developments has been constructed. These areas include:

- A1 – Parkway (Hugh Sinclair) has been developed and houses are currently under construction. This was previously proposed as a possible stormwater storage area.
- A5 – Glendale (Moores Road) is now largely constructed.
- A6 - Glendale (Wise Street – Stage 1) is approximately half developed with further development work in the design phase.

This report recommends a number of upgrades for water supply, wastewater and stormwater upgrades (refer section 9). It is important that the land required for each three water infrastructure improvement presented in this report be earmarked for future three water infrastructure use. This will ensure that opportunities are not lost and that future development does not compromise the catchment scale three waters infrastructure strategy.

3.6 Consent requirements

There are a number of activities associated with infrastructure upgrades, such as earthworks, that may require resource consent from Hutt City Council and/or Greater Wellington Regional Council. These are discussed in further detail in sections 5.6 and 6.5.

4. Cost Estimation Methodology

GHD prepared cost estimates for the proposed three waters upgrades based on the *Wellington Water Cost Estimation Manual (Rev0)* and guidance received from Wellington Water. Base cost estimates were built up using the Wellington Water costing process shown in Figure 4-1. The percentage uplifts for consultant and council costs are as shown in Figure 4-2:

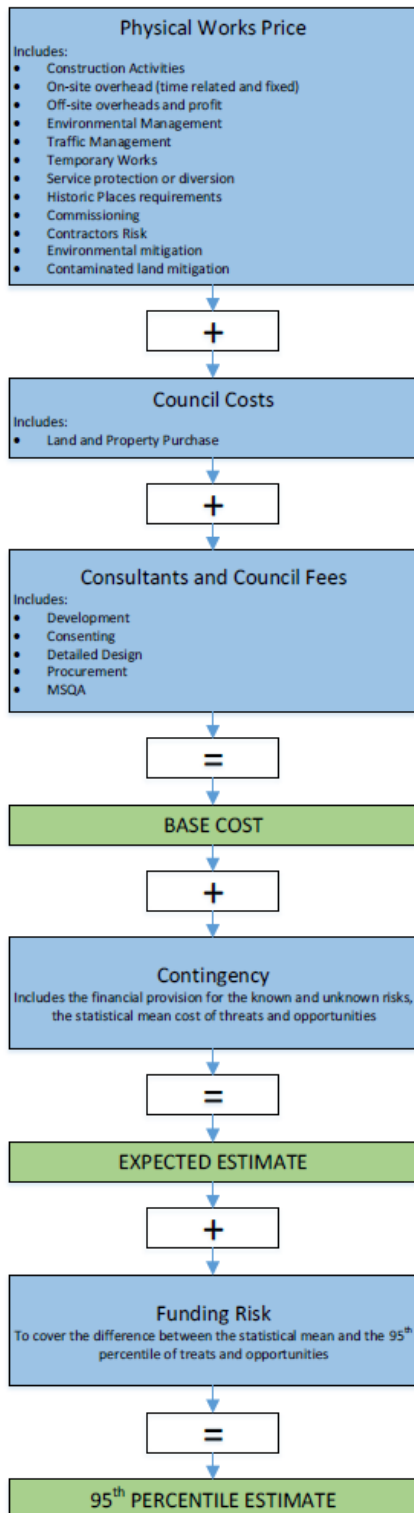


Figure 4-1 Wellington Water costing process

Phase & Task		%
Development		
Consultancy and Council Fees		3%
Site Investigations		
Other Costs (Legal, Land, etc...)		
Total Project Development		
Consenting		
Consultancy and Council Fees		3%
Site Investigations		
Other Costs (Legal, Land, etc...)		
Total Consenting		
Detailed Design		
Consultancy and Council Fees		6%
Site Investigations		
Other Costs (Legal, Land, etc...)		
Total Detailed Design		
Procurement		
Consultancy and Council Fees		1%
Other Costs (Legal, Land, etc...)		
Total Procurement		
Construction		
Consultancy and Council Fees		5%
Land Acquisition		
Other Costs (Legal, Land, etc...)		
Physical Works		
	Preliminary and General	
	Physical Works - Stormwater	
	Physical Works - Wastewater	
	Physical Works - Potable Water	
Total Construction		
Base Estimate		
	Base Estimate	
	Contingency	
	Expected Estimate	
95th Percentile Estimate		
	Funding Risk	
TOTAL VALUE	95th Percentile Estimate	

Figure 4-2 Cost Estimate by Project Phase

For all options that involve pipeline upgrades or renewals as a result of modelling, the estimate is considered a Level Two estimate. All options that included significant built infrastructure or earthworks (new and upgraded pump stations, reservoirs, storage units or stream improvements) are considered Level One estimates due to the potential design changes and higher degree of uncertainty involved.

The following sections detail the methodology and assumptions by project phase for all three waters infrastructure options. Methodology and assumptions specific to water infrastructure are detailed in Section 5.7 and wastewater infrastructure in Section 6.6 and stormwater in Section 7.6.

4.1 Development / Consenting / Detailed Design / Procurement Phases

In line with the *Cost Estimation Manual*, the following allowances for Council and Consultancy costs were applied to each project phase.

Table 4-1 Council and Consultancy Fees

Council and Consultancy Fees by Project Phase	Percentage of Physical Works
Development	3%
Consenting	3%
Detailed Design	6%
Procurement	1%

For options where it was assumed a Notifiable Consent would be required, an allowance of \$200,000 to \$300,000 was added to cover additional consenting costs.

4.2 Construction Phase

4.2.1 Construction - General

Land Acquisition

Land acquisition costs were determined using the current capital value as of July 31 2020 from the *Hutt City Council Public Viewer*. An additional allowance of 10% was added to the capital value to allow for the council costs and legal fees for property purchase.

Standard Construction Costs

Standard construction items were calculated as an additional percentage of the Physical Works cost, and are shown in Table 4-2.

Table 4-2 Standard Construction Costs

Item	Percentage of Physical Works
Consultancy and Council Fees (MSQA)	5%
Contractors Risk	2%
Preliminary and General (Site establishment, disestablishment, bonds, insurance, as-built drawings)	10%
On-Site and Off-Site Overheads and Profit (applied to pipeline rates only)	15%

On-Site and Off-site Overheads and Profits are applied to pipeline construction and rehabilitation unit rates in the *Wgtn Optimisation Unit Cost Data 2020-Rev11 Spreadsheet*, which was prepared by GHD and issued to Wellington Water on the 19th of May 2020. Within the Unit Cost Spreadsheet, these costs are referred to as On-Costs. For all other items, where rates are estimated from recent tenders (pump stations, reservoirs, CCTV investigation etc.), it is assumed that On-Site and Off-Site Overheads and Profit are included in the tendered rates and no additional allowance is required.

Variable Construction Costs

Variable constructions costs were evaluated based on the location of each proposed infrastructure upgrade. The web GIS application provided by Wellington Water for the Hutt City Three Water Catchment Plan was used to identify contaminated land sites, ecologically sensitive sites, adjacent waterways and liquefaction and geotechnical risks. No site visits or site investigations were undertaken to confirm these conditions. GHD considers the use of this desktop information as sufficient for estimates up to Level 2.

Based on this desktop review, uplifts were applied as an additional percentage of the total physical works, as shown in Table 4-3.

Table 4-3 Variable Construction Costs

Item	Low		Medium		High	
	Uplift	Description	Uplift	Description	Uplift	Description
Traffic Management	3%	Outside Road Reserve	6%	Local Road	10%	Main Road
Environmental Management	1%	Clear of waterways, low geotechnical risk	3%	Adjacent to waterways, moderate geotechnical conditions	4%	Adjacent to sensitive waterways, complex geotechnical conditions
Contaminated Land	0%	None	10%	Moderate Contaminated Area	15%	Extensive Contaminated Area

4.2.2 Physical Works

Physical Works costs are calculated using unit rates from the *Wgtn Optimisation Unit Cost Data 2020-Rev11 Spreadsheet*. The spreadsheet was altered to remove Preliminary and General and Traffic Management uplifts as they have been captured in the cost estimate for each option.

For items not included in the Spreadsheet, rates from recently tendered projects of similar scope were applied.

GHD and Wellington Water considered the use of historical rates and the *Wgtn Optimisation Unit Cost Data 2020-Rev11 Spreadsheet* to be appropriate for estimates up to Level 2.

4.3 95th Percentile Estimates

In line with the Cost Estimation Manual, the 95th Percentile Estimate was calculated by applying the allowances for contingency and funding risk in Table 4-4.

Table 4-4 Contingency and Funding Risk

Estimate Type	Project Contingency	Funding Risk	Other
Level One	40%	60%	
Level Two	20%	30%	

Wellington Water Management Fees are not included in the cost estimates.

4.4 Risks

Level 1 and 2 cost estimates are subject to variation due to a number of risks. Significant risks that could affect the accuracy include:

- The assumed uplift percentages either over or under estimate the actual costs
- Construction cost escalation
- Unexpected land acquisition issues
- Property values do not reflect the actual purchase cost.
- Site constraints that have been overlooked due to option development being on a catchment scale
- Unforeseen ground obstructions
- Unforeseen contaminated land
- Unforeseen geotechnical issues
- The proposed infrastructure sites not available at time of construction requiring new sites and re-design
- Design alterations resulting from new survey information
- Underground infrastructure information resulting in significant design changes
- Inflation and economic factors affecting labour and material costs
- Significant changes over and above the predicted growth figures resulting in a need to upsize the planned infrastructure.

5. Water Infrastructure

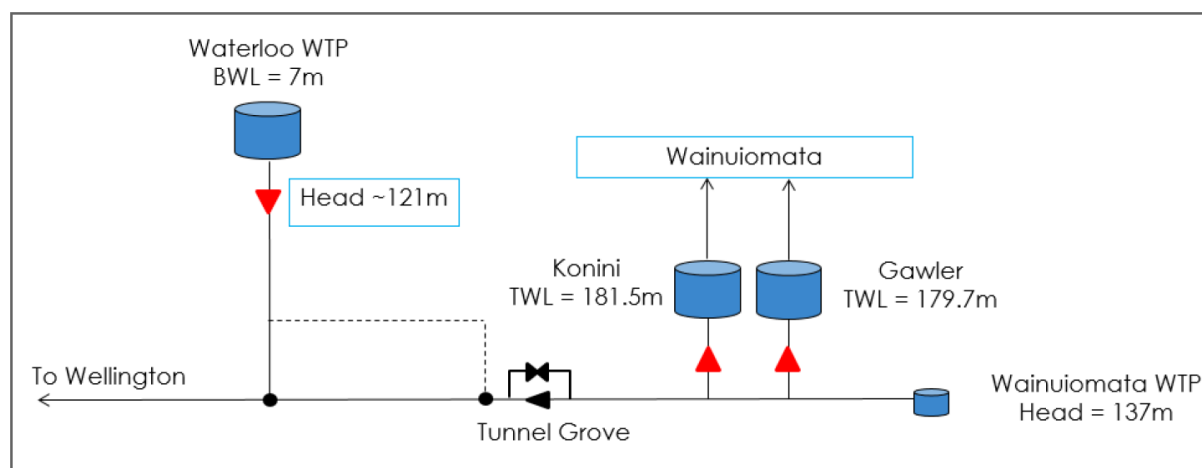
The model development and optioneering for water infrastructure improvements has been completed by Stantec, with support by Wellington Water.

This section is a summary of GHD interpretation of Stantec's findings. For the complete Stantec report refer to Appendix B. Note that this report is at draft status, however Wellington Water has indicated to GHD that it should be considered as if it were final.

5.1 Network configuration

There are two main sources of water in the Wainuiomata network (refer to Figure 5-1):

- Bores in the Lower Hutt CBD pump water from the Waiwhetu Aquifer into the Waterloo Water Treatment Plant (WTP). After treatment, water is conveyed via the bulk network into Wainuiomata.
- Water is conveyed from the Wainuiomata and Orongorongo rivers and three smaller creeks to the Wainuiomata WTP. Water then goes from the treatment plant via the bulk network into the Wainuiomata network.

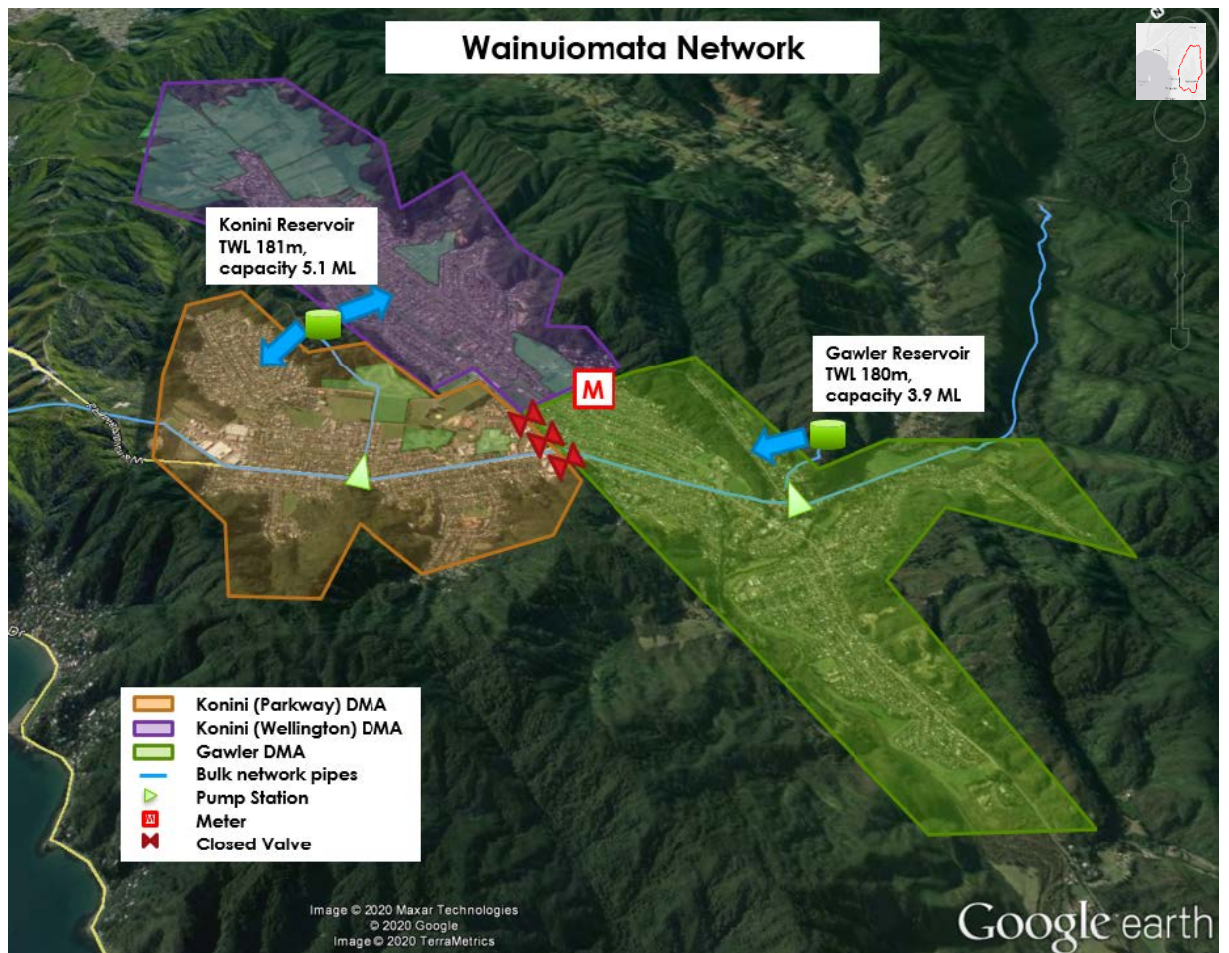


Source: Stantec (2020) Wainuiomata Zone Management Plan

Figure 5-1: Bulk water schematic

Konini reservoir has a capacity of 5.1 ML and Gawler reservoir has a capacity of 3.9 ML. Combined, the reservoirs serve 6,312 customers. 5,974 are residential and the remainder are commercial or industrial customers.

Wainuiomata is composed of three district metering areas (DMA) as shown in Figure 5-2. However, assessing each DMA independently yielded unrealistic demand results, likely due to the interaction of meters and bidirectional water movement. For the purposes of modelling these areas were therefore assessed together.



Source: Stantec (2020) Wainuiomata Zone Management Plan

Figure 5-2: Water network district metering areas

5.2 Levels of service

The Regional Standard for Water Services sets out the specifications used in the Zone Management Plan:

- Minimum pressure at point of supply = 25 m
- Maximum pressure at point of supply = 90 m
- Allowable head losses for a pipeline at design peak demand ≤ 5 m/km
- Reservoirs replenish to at least their starting level over 24 hours
- Reservoirs do not drop below 70% full under normal operating conditions.

Firefighting

Firefighting requirements were taken from the Fire Code SNZ PAS 4509:2008.

A methodology was developed to assign the fire water (FW) classification of the buildings in Wainuiomata. This is outlined below:

- The 'Regional Fire Classification' shapefiles provided by Wellington Water include the fire hazard category (FHC) value of the buildings and the building footprint.
- The fire cell size is conservatively assumed to be the entire footprint of the building.
- With the FHC value and the derived area of the fire cell, the FW class is obtained using Table 1 – Method for determining required water supply classification from the Fire Code.

In summary, for the purpose of outlining network upgrades as part of this master plan:

- The shopping mall and all schools in Wainuiomata should be assumed to require a FW4 flow.
- The highest hazard area is located on Waiu Street and should be considered FW6.

These requirements were assumed to remain valid throughout all planning horizons.

Storage Volume

For operational resilience, 100% of the storage volume should be at least equal to the greater of:

- Peak Day Demand + 20% + Fire Fighting Storage.
- 2 x Average Day Demand, assuming current per-capita consumption.

For seismic resilience, 70% of the storage volume should be sufficient to supply:

- Day 8 to Day 30 (23 days)
 - Public distribution points (20 l/person/day)
 - Category 1 critical users (civil defence centres, major hospitals, lifelines)
- Day 14 to Day 30 (17 days)
 - Category 2 critical users (aged care facilities, medical centres)
- Day 21 to Day 30 (10 days)
 - Category 3 critical users (education)

Storage requirements increase with population and therefore vary across growth models.

5.3 Existing constraints

5.3.1 Pressure

The pressure across the Wainuiomata network is generally high (up to 100m), particularly along the valley floor. According to the hydraulic model, the pressure in the network remains above 45m under current demand conditions. In some areas, the pressure is above 90 m, which is outside the target level of service.

The proposed developments at the northern end of Wainuiomata will generate a significant water flow. The existing water distribution network has insufficient capacity for proposed developments and upgrades will be required to meet the target level of service for pressure.

5.3.2 Storage

Stantec's calculations indicate that there is currently a storage shortfall in Wainuiomata and the shortfall increases as population growth occurs. By 2050 an additional 8.0 ML of storage volume is required to meet the seismic and operational (peak daily demand) levels of service (refer Table 5-1).

Table 5-1: Water storage calculations

		2019	2020	2033	2050
	Sum of Peak Day, m^3/day	6.4	7.9	9.7	13.1
	Sum of total population	18,407	18,510	21,190	24,494
ADD	ADD, m^3/day	5,122	5,139	5,588	6,141
	Required volume 2 x ADD, m^3	10,244	10,278	11,176	12,283
PDD	PDD, m^3/day	6,512	7,305	8,905	12,074
	Max fire class	FW6	FW6	FW6	FW6
	Required volume for fire, m^3	2,160	2,160	2,160	2,160
	Required volume 1.2 x PDD + fire, m^3	9,975	10,926	12,846	16,648
Seismic	Public volume required, m^3/day	368	370	424	490
	Critical user category 1, m^3/day	25.7	25.7	25.7	25.7
	Critical user category 2, m^3/day	0.0	0.0	0.0	0.0
	Critical user category 3, m^3/day	7.8	7.8	7.8	7.8
	Required volume seismic, m^3	13,052	13,120	14,881	17,052
Max required volume, m^3		13,052	13,120	14,881	17,052
Driver		Seismic	Seismic	Seismic	Seismic
Existing Storage, m^3		9,022	9,022	9,022	9,022
Storage Shortfall, m^3		4,029	4,097	5,858	8,029
ML		4.1	4.1	5.9	8.0

Source: Stantec (2020) Wainuiomata Zone Management Plan

5.4 Option assessment

Stantec modelled the water network for three planning horizons: 2020, 2033 and 2050. 2020 was modelled to include dwellings constructed in some greenfield sites or recently consented but there was no substantial change from 2019. In addition, it was assumed that the new reservoir would be constructed prior to 2033. The options assessed are discussed in more detail below.

5.4.1 Reservoir Option 1 (PW3)

The main strategic upgrades required are the construction of a new reservoir and reticulation upgrades to supply the greenfield development areas.

Stantec identified eight options for a new reservoir location and discussed these with the Wellington Water Modelling, Operations and Network Engineering Teams.

The new reservoir for Option 1 is referred to as Wainui 3 and its location is shown in Figure 5-3. The reservoir would have a top water level of 160 m, 20 m lower than the existing reservoirs. This will create a new lower-pressure zone, isolated from the rest of the Wainuiomata network. Two emergency PRVs – one on Fitzherbert Road and one on Meremere Street – would be constructed to allow water back into the zone to improve firefighting and add resilience to the network. The main reason for constructing the new reservoir at a lower head is to reduce the existing high pressures in the distribution, reduce leakage, demand, bursts and increase asset life.

Option 1 is the preferred option based on access, slopes and land ownership and this was used by GHD for costing purposes. However, when the design of the new reservoir commences, the proposed reservoir location would need to be assessed further.

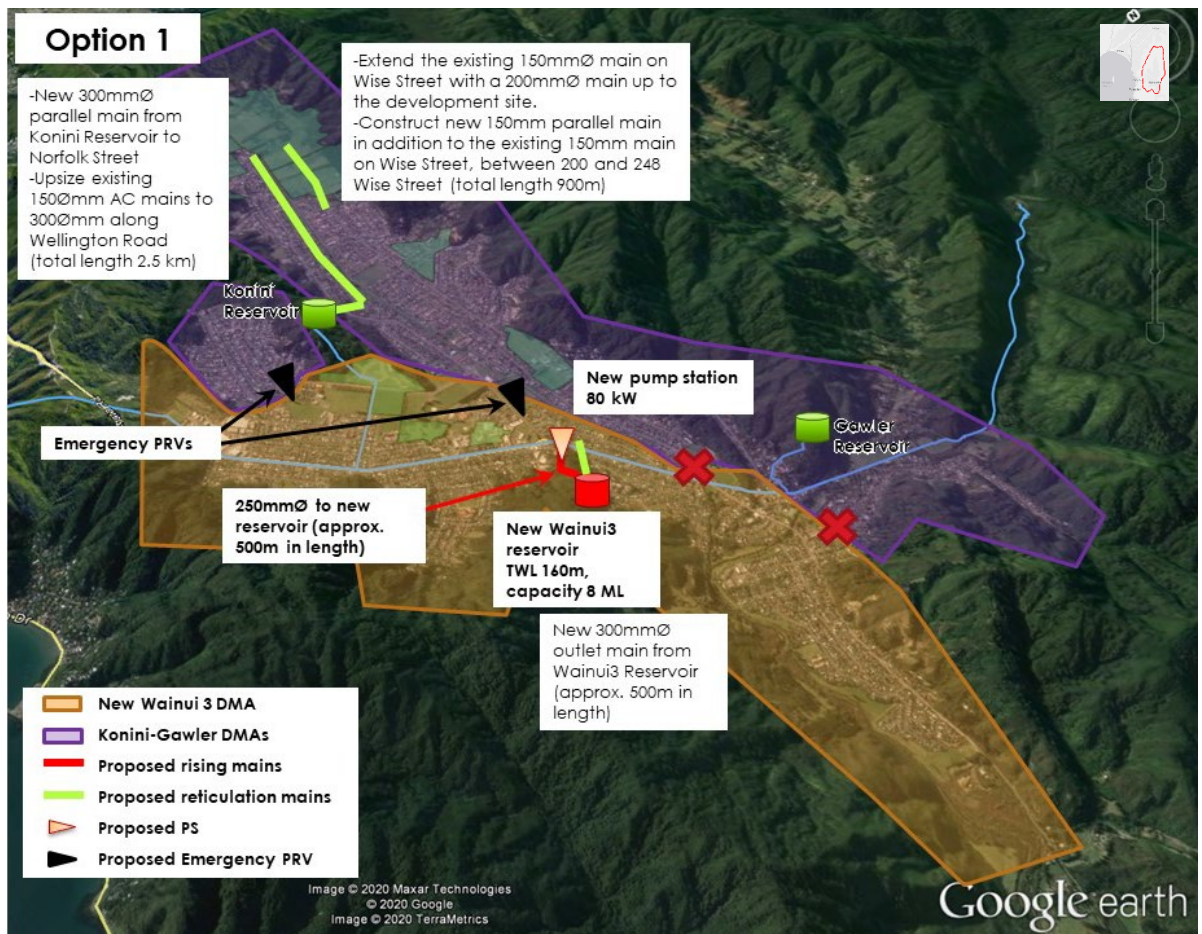


Figure 5-3 Option 1 reservoir site

The new Wainui 3 Reservoir will be supplied from the bulk network via a new dedicated pump station. A new 300 mm diameter discharge main from the reservoir will connect into the reticulation. The new reservoir will mainly supply the central area of Wainuiomata and the existing Konini reservoir will mainly supply the new greenfield areas to the north.

For the purposes of modelling, Stantec assumed that the reservoir would be built to its full capacity of 8 ML by 2033. However, the reservoir could be built in stages as an opportunity to defer the cost and minimise the risk of oversizing it.

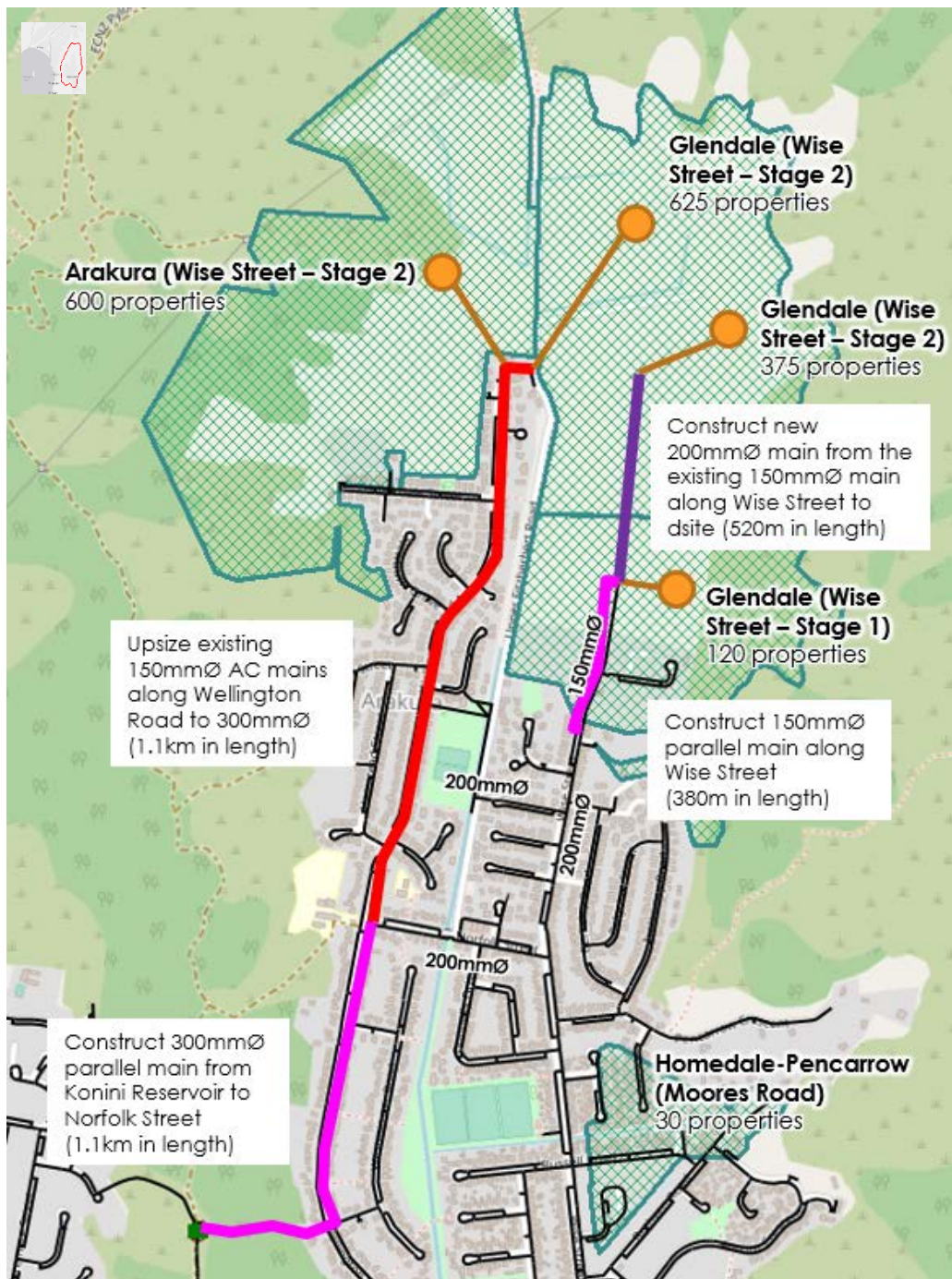
A section of reticulation mains along Wellington Road will need to be upgraded as the existing asset does not have the capacity to accommodate the significant increase in demand in the northern end of the network due to the development sites. A new parallel outlet main from the Konini Reservoir to Wellington Road is also required. These upgrades are shown in Figure 5-4.



Source: Stantec (2020) Wainuiomata Zone Management Plan

Figure 5-4: Option 1 Strategic and local upgrades

Additional upgrades are also required along Wise Street (see Figure 5-5) and described below as part of the local upgrades for each planning horizon. These will need to be constructed between 2033 and 2050.

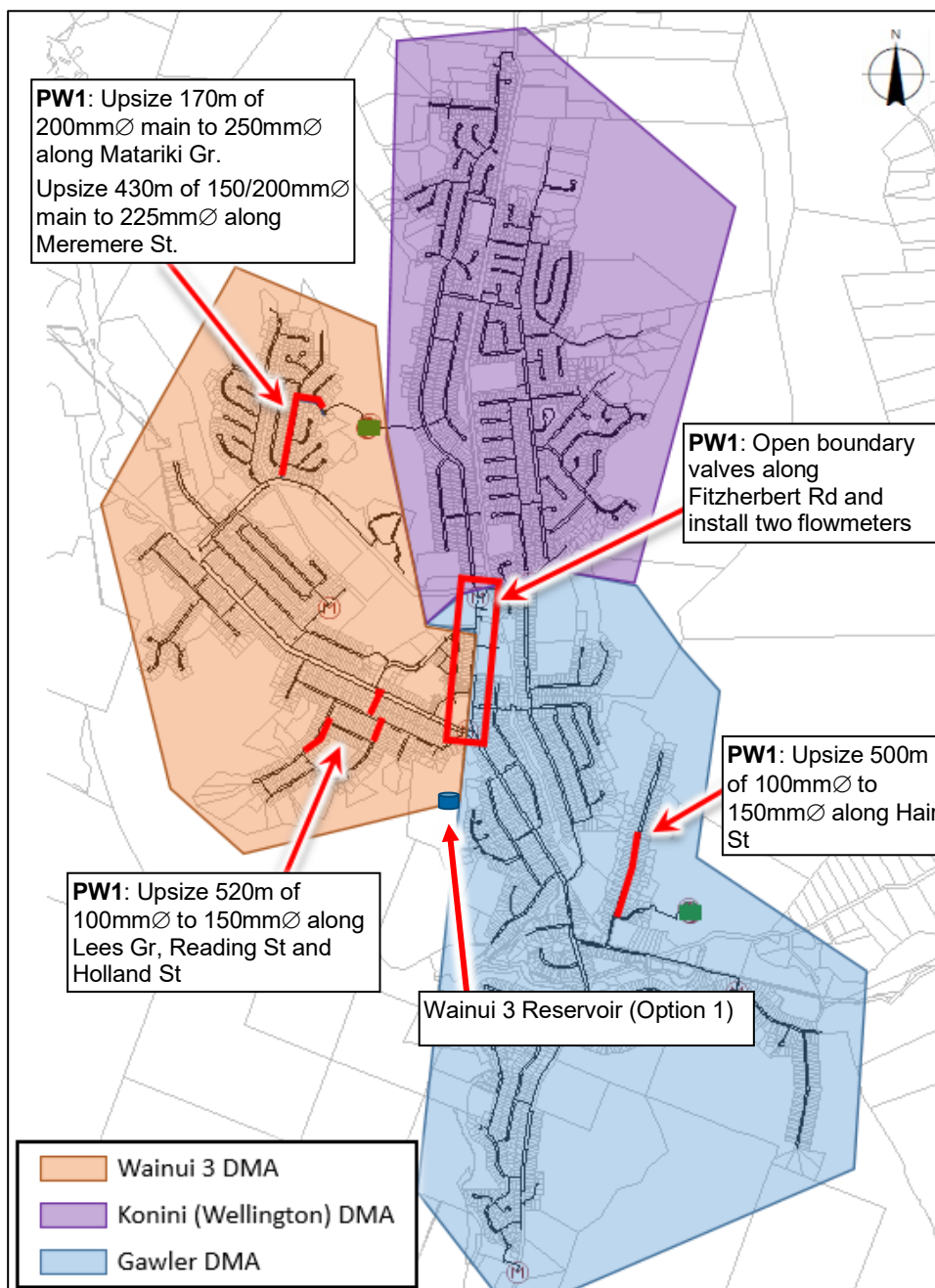


Source: Stantec (2020) Wainuiomata Zone Management Plan

Figure 5-5: Option 1 reservoir reticulation mains upgrade

5.4.2 2019/2020 Planning Horizon (PW1)

The 2020 planning horizon considers the existing network with no growth. The network currently meets the levels of service required for pressure at the point of supply to properties. However, there are some locations where the firefighting flows are insufficient so four local upgrades have been proposed to address this. These are shown in Figure 5-6.



Source: Stantec (2020) Wainuiomata Zone Management Plan

Figure 5-6: 2019 Planning horizon upgrades

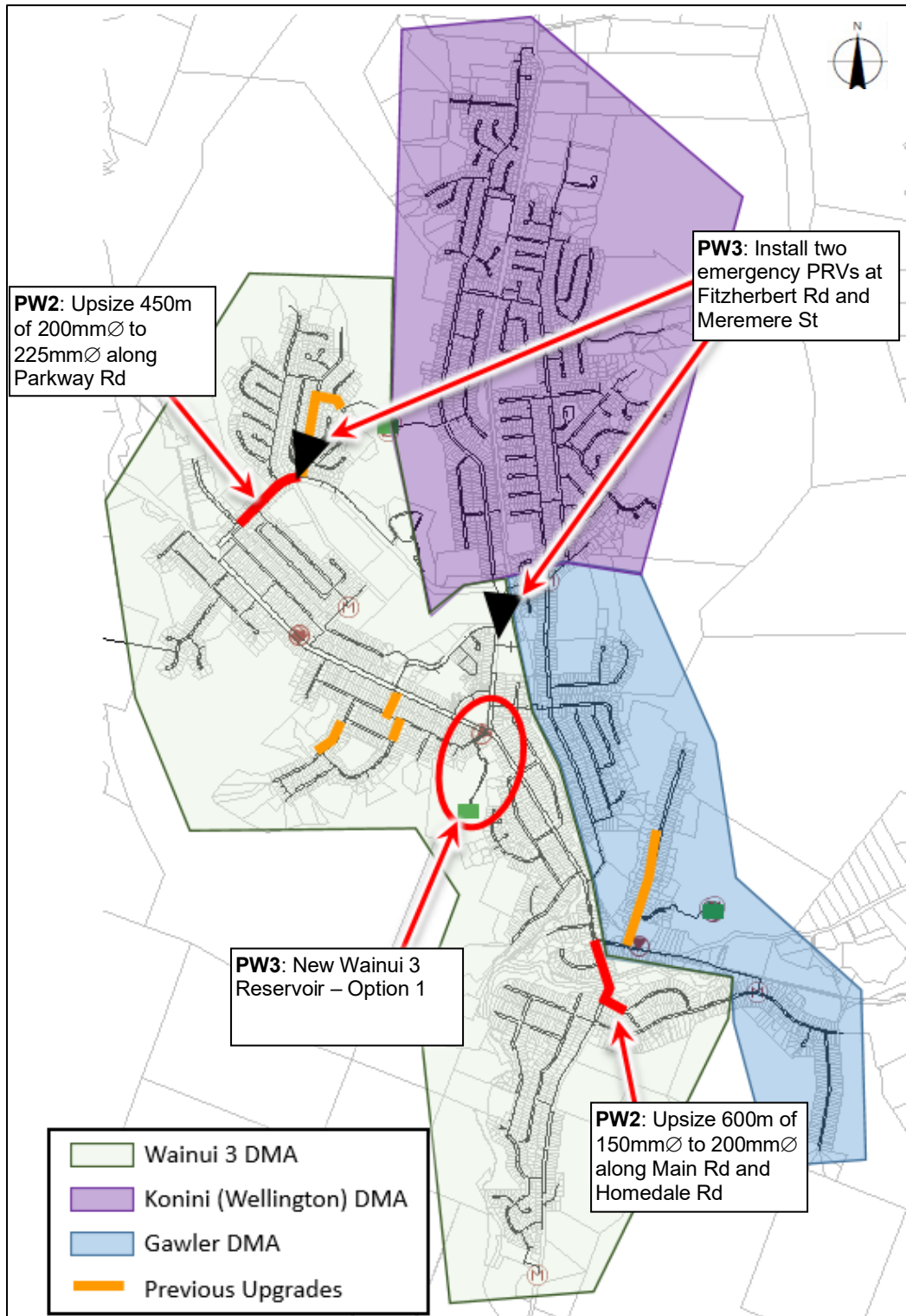
5.4.3 2033 Planning Horizon (PW2 and PW3)

The 2033 planning horizon considers the infrastructure required for growth up to 2033. As growth is continuous between 2020 and 2033, infrastructure may be required earlier than 2033. For this planning horizon, it is assumed that the Wainui 3 reservoir has been constructed.

Modelling results show that the pressures across the network in the 2033 horizon still meet the level of service requirements for minimum pressure. The new lower-pressure zone created by the Wainui 3 reservoir reduces the overall demand on each existing reservoir.

Although the minimum pressure at the point of supply in this new pressure zone is above 25 metres, the pressure in some properties where the floor level is higher than their point of supply drops can be as low as 22 metres. There is no minimum pressure requirement for pressure at properties in the Regional Standard for Water Services so no pipe upgrades have been proposed to correct this.

The lower-pressure zone affects the firefighting capacity in the zone. Two upgrades have been proposed to address firefighting capacity for Waiu Street and Wainuiomata Primary School. These are shown in Figure 5-7 below.



Source: Stantec (2020) Wainuiomata Zone Management Plan

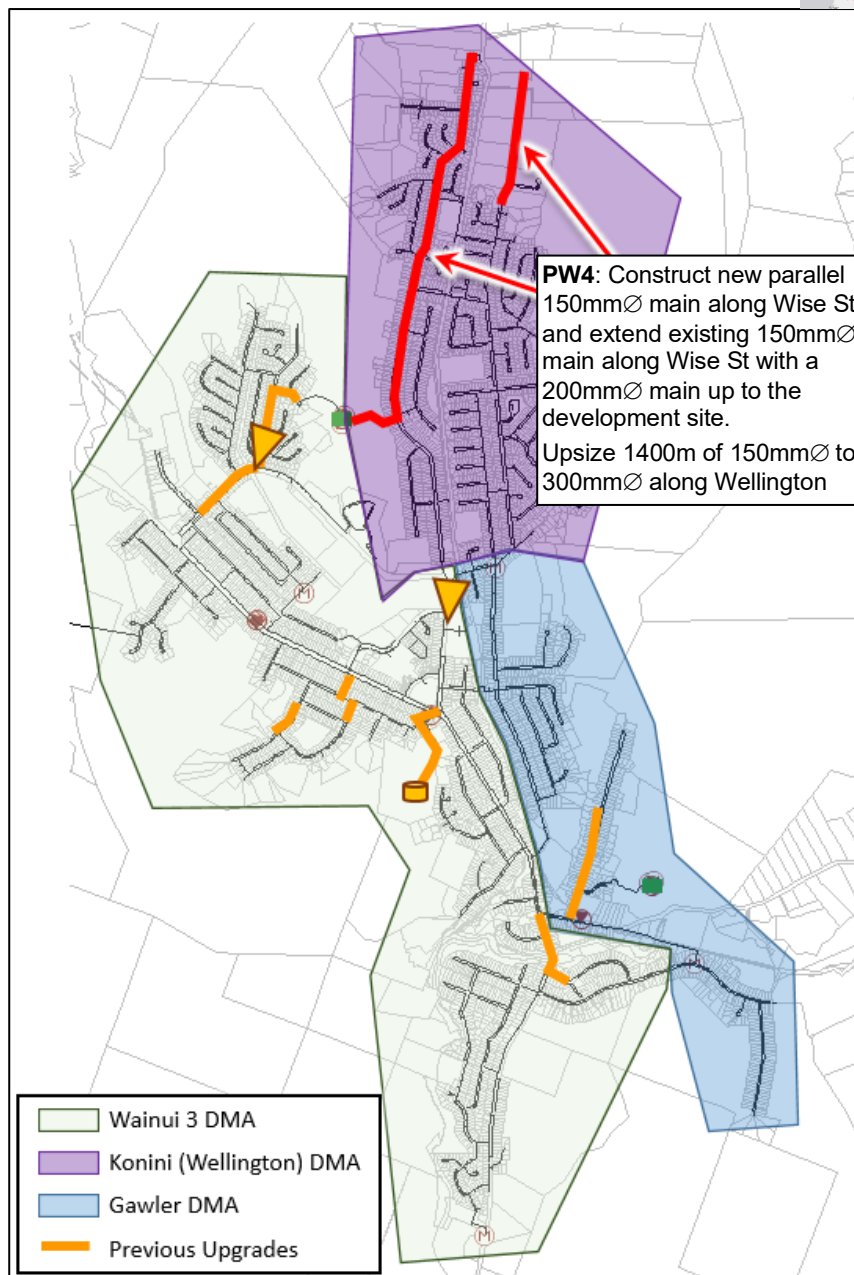
Figure 5-7: 2033 Planning horizon upgrades

5.4.4 2050 Planning Horizon (PW4)

The 2050 planning horizon considers the infrastructure required for growth up to 2050. As growth is continuous between 2033 and 2050, infrastructure may be required earlier than 2050. In the 2050 planning horizon, all proposed greenfield sites under this study are assumed to be developed to their maximum capacity. Modelling shows that the pressure in the northern end of Wainuiomata drops to below 25 m due to a significant increase in demand.

Four upgrades have been proposed to meet the levels of service, these are shown in Figure 5-8.

Note that it is recommended to create a loop between the end of Wellington Road and the north of Wise Street but this has not been included in the recommendations as there are still unknowns regarding easements or a service plan for the proposed developme



Source: Stantec (2020) Wainuiomata Zone Management Plan

Figure 5-8: 2050 Planning horizon upgrades

5.5 Additional considerations

Following the completion of the Wainuiomata Zone Management Plan by Stantec, GHD has held discussions with Wellington Water and Stantec regarding the potential construction of the 8 ML new reservoir as a two-tank solution (4 ML per tank). Each of the tanks would not be constructed at the same time and instead, could be constructed as needed based on network demand. The main disadvantages with this approach are the higher overall construction costs and the space limitations with two smaller tanks having a much larger footprint compared with one tank. For these reasons, the preference is to construct the new reservoir as a single 8 ML new tank.

5.6 Consent Considerations

GHD's Planning Team has completed a high-level planning assessment of the proposed water infrastructure options. This assessment is included as Appendix G, and is summarised below.

Each option was assessed against the relevant provisions of the following plans:

- Hutt City Council District Plan
- Greater Wellington Regional Council (GWRC) Proposed Natural Resources Plan (PNRP)(Decisions Version)
- GWRC Regional Air Quality Management Plan for the Wellington Region (Air plan)
- GWRC Regional Soil Plan for the Wellington Region (Soil plan)
- GWRC Regional Plan for Discharge to Land for the Wellington Region (Discharges to land plan)
- GWRC Regional Freshwater Plan for the Wellington Region (Water plan).

This assessment was completed based on a new 8ML water reservoir placed in the East Harbour Regional Park on the hill above Fraser Street with new rising main. Access path from Simmons Grove to site of new reservoir.

HCC: New pipe for rising main and main pipe is a permitted activity from HCC subject to complying with earthworks conditions. However due to high likelihood of exceeding HCC conditions for earthworks during new pipelines construction, it is expected that these works will fall under a separate discretionary activity (HCC Rule 13.3.1.15)

GWRC: No rules limiting network utilities as trenching for pipeline placement is specifically excluded from earthworks definitions.

Earthworks are of an unknown quantity and location. Earthworks would be permitted under R99 if they are less than 3,000 m², but if they cannot comply with this standard would default to a discretionary activity under R101.

5.7 Costing

A cost estimate has been prepared in accordance with the Wellington Water Cost Estimation Manual, as shown in Table 5-2. Refer to Appendix H for a full cost breakdown. In addition to the assumptions detailed in Section 4, the following assumptions were made for the Network Upgrades and New Reservoir and Pump Station:

5.7.1 Network Upgrades

Network Upgrades (PW1, PW2 and PW4) were calculated as Level 2 estimates. PE100 PN16 was assumed as the default material with an average depth to invert of 1.5 metres installed with trench and lay methodology. An allowance for reinstatement of driveways, footpaths and

carriageways was included in the unit rate. For costing purposes, it was assumed that upsizing of existing mains was equivalent to the construction of new mains.

Other ancillary items (PRVs and flowmeters) were estimated at \$150,000 each based on previous projects.

5.7.2 New Reservoir and Pump Station (PW3)

Option PW3 (referred to in Stantec report as Option 1) was calculated as a Level 1 estimate. As the preferred location may not be suitable or available in the future, a provisional item was added within the Physical Works costs to allow for additional pipework and network upgrades which may be required at another location.

For reservoir costing purposes, Three Waters Ltd. Consulting have developed a formula for construction costs based on volume. The formula was developed from historical reservoir projects. GHD have reviewed the formula and out-turn rates to historical rates and consider it appropriate for this Level 1 cost estimate. The formula is:

$$\text{Contractor Cost Estimate (\$million)} = 2.37 \times \text{capacity (MLD)}^{0.55}$$

For costing of the new pump station, the Stantec report *Wainuiomata Zone Management Plan* used the *2010 Watercare Update of Unit Rate Cost Model* to derive an estimate of \$600,000 for the physical works cost for a new pump station with an 80 kw pump. GHD have reviewed this cost against other historical projects and consider it to be a valid estimate.

Cost estimation for the reservoir access track is based on the assumption of a 160 m long, 4.5m wide chipseal road.

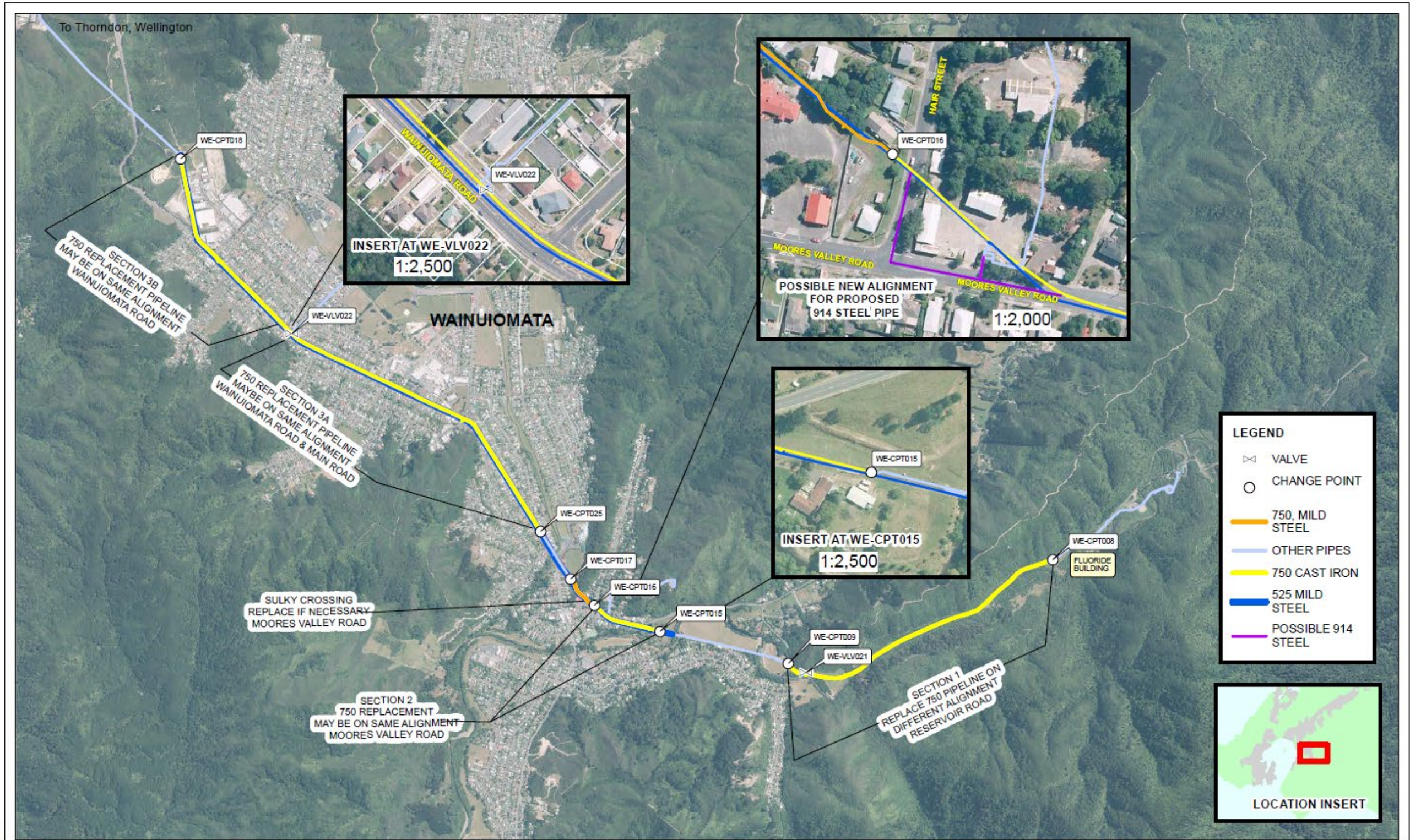
5.8 Further upgrades considered

In 2016, MWH (now Stantec) was engaged by Wellington Water to complete a design for the replacement of the Wainuiomata 750 cast iron (CI) pipe (see Appendix C). The design comprised replacement of the existing 750 CI bulk main with approximately 5,195 m of 914 mm OD CLS pipe over three separate sections (refer to Figure 5-9).

Following a meeting with Wellington Water on 14 September 2020, Wellington Water requested that GHD prepare a cost estimate for this pipe replacement. The three separate sections are described as PW5, PW6 and PW7 as follows:

- PW5: Offline replacement of Section 1 (along Reservoir Road).
- PW6: Offline / online replacement of Section 2 (Moores Valley Road / Hair Street). This includes a new alignment at the Moores Valley Rd / Hair Street intersection to remove the pipe from private land and facilitate relocation of the motorised line valve. A section of the Orongorongo - Karori (OK) main is to be abandoned.
- PW7: Online replacement of Section 3a (Main Road / Wainuiomata Road). The existing steel connection pipework to Wainuiomata PS No. 1 is to be retained. Online / offline replacement of Section 3b (Wainuiomata Road).

Note that the cost of upgrading the bulk water main is not a direct cost for HCC as it is owned by Greater Wellington Regional Council (GWRC).



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DATA STATEMENT
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WELLINGTON WATER LIMITED INFORMATION DIRECTORATE		
DESIGN	COMPILED	05/10/15
DRAWN	MICHELLE MAWSON	06/10/15
CHECKED		
RECOMMENDED		
APPROVED	JOHN DUGGAN	09/10/15



WAINUIOMATA TO THORNDON PIPELINE

**WAINUIOMATA 750mm CAST IRON PIPELINE
PROPOSED REPLACEMENT
SITE LOCATION LAYOUT AND ENLARGED INSET**

AMENDMENTS			
Amendment Detail	DWN	CHK	Date

N

SCALE
1:20,000

File: B/40/19/01

NOTE:
+/- 20m

Drawing Number
A3-10640/02-BS

0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 Kilometers

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Figure 5-9 Proposed Wainuiomata 750 mm CI pipeline replacement

A summary of the cost estimates for each option is presented below.

Table 5-2: Water infrastructure upgrades cost estimate

Project Estimate - Potable Water

Project Name: Hutt City Catchment Plan - 3Waters Assessment for PC43 Phase 1 - Wainuiomata
 Project Phase: Study/Report
 Base Date of Estimate: Sep-20

Phase & Task	%	2020 Planning Horizon	2033 Planning Horizon	2033 Planning Horizon	2050 Planning Horizon			
		PW1-Local Upgrade-Fire	PW2-Local Upgrade-Fire	PW3-Strategic Upgrade-Option 1	PW4-Local Upgrade-Pressure	PW5-Section 1 Bulk Watermain - Reservoir Road	PW6-Section 2 Bulk Watermain - Moores Valley	PW7-Section 3 Bulk Watermain - Wainuiomata
Development								
Consultancy and Council Fees	3%	\$79,000	\$60,000	\$382,000	\$196,000	\$373,000	\$92,000	\$650,000
Site Investigations								
Other Costs (Legal, Land, etc...)								
Total Project Development		\$79,000	\$60,000	\$382,000	\$196,000	\$373,000	\$92,000	\$650,000
Consenting								
Consultancy and Council Fees	3%	\$79,000	\$60,000	\$382,000	\$196,000	\$373,000	\$92,000	\$650,000
Site Investigations								
Other Costs (Legal, Land, etc...)								
Total Consenting		\$79,000	\$60,000	\$382,000	\$196,000	\$373,000	\$92,000	\$650,000
Detailed Design								
Consultancy and Council Fees	6%	\$157,000	\$120,000	\$764,000	\$391,000	\$745,000	\$184,000	\$1,300,000
Site Investigations								
Other Costs (Legal, Land, etc...)								
Total Detailed Design		\$157,000	\$120,000	\$764,000	\$391,000	\$745,000	\$184,000	\$1,300,000
Procurement								
Consultancy and Council Fees	1%	\$26,000	\$20,000	\$127,000	\$65,000	\$124,000	\$31,000	\$217,000
Other Costs (Legal, Land, etc...)								
Total Procurement		\$26,000	\$20,000	\$127,000	\$65,000	\$124,000	\$31,000	\$217,000
Construction								
Consultancy and Council Fees	5%	\$131,000	\$100,000	\$636,000	\$326,000	\$621,000	\$154,000	\$1,083,000
Land Acquisition				\$534,000				
Other Costs (Legal, Land, etc...)								
Physical Works								
Preliminary and General		\$471,000	\$360,000	\$2,036,000	\$1,044,000	\$2,609,000	\$768,000	\$5,632,000
Physical Works - Stormwater								
Physical Works - Wastewater								
Physical Works - Potable Water		\$2,618,000	\$1,999,000	\$12,727,000	\$6,524,000	\$12,422,000	\$3,072,000	\$21,663,000
Total Construction		\$3,220,000	\$2,459,000	\$15,934,000	\$7,894,000	\$15,651,000	\$3,993,000	\$28,378,000
Base Estimate								
Base Estimate		\$3,561,000	\$2,719,000	\$17,588,000	\$8,742,000	\$17,266,000	\$4,393,000	\$31,194,000
Contingency		\$712,000	\$544,000	\$7,035,000	\$1,748,000	\$3,453,000	\$879,000	\$6,239,000
Expected Estimate		\$4,273,000	\$3,263,000	\$24,623,000	\$10,490,000	\$20,719,000	\$5,271,000	\$37,433,000
95th Percentile Estimate								
Funding Risk		\$1,282,000	\$979,000	\$14,774,000	\$3,147,000	\$6,216,000	\$1,581,000	\$11,230,000
TOTAL VALUE	95th Percentile Estimate	\$5,555,000	\$4,241,000	\$39,397,000	\$13,637,000	\$26,935,000	\$6,853,000	\$48,663,000

5.9 Preferred options

The recommended upgrades, including the strategic reservoir upgrade, are summarised in Table 5-3.

Table 5-3 Summary of water infrastructure preferred options

Note: Option Reference uses GHD naming conventions. Option Reference from Stantec is listed in brackets.

Planning Horizon	Option Ref	Upgrade Type	Upgrade Name	Description
2020	PW1 (W_UPG-F1)	Local - Fire	Boundary valves along Fitzherbert Road.	Open boundary valves along Fitzherbert Road. Install 2 flowmeters: on the 200mmØ along Fitzherbert Road and on the 300mmØ along Main Road.
2020	PW1 (W_UPG-F2)	Local - Fire	Waiu Street	Upsize existing 200mmØ main to 250mmØ along Matariki Grove between Meremere Street and 18 Matariki Grove (170m in length). Upsize existing 150/200mmØ along Meremere Street between Matariki Grove and Parkway Road to 225mmØ (430m in length)
2020	PW1 (W_UPG-F3)	Local - Fire	Fernlea School and Community Emergency Hub	Upsize existing 100mmØ to 150mmØ: -along Lees Grove between Hay Street and Holland Street (230m in length), -along Reading Street between Wainuiomata Road and Fraser Street (160m in length), and -along Holland Street between Fraser Street and Hay Street (130m in length)
2020	PW1 (W_UPG-F4)	Local - Fire	Hair Street	Upsize existing 100mmØ to 150mmØ from Gawler Grove to 77 Hair Street (500m in length)
2033	PW2 (W_UPG-F5)	Local - Fire	Waiu Street	Upsize existing 200mmØ along Parkway Road between Meremere Street and Waiu Street to 225mmØ (450m in length)
2033	PW2 (W_UPG-F6)	Local - Fire	Wainuiomata Primary School	Upsize existing 150mmØ along Main Road and Homedale Road from Moores Valley Road to Poole Crescent to 200mmØ (600m in length)
2033	PW3 (W_UPG-S1)	Strategic	New Wainui 3 Reservoir - Option 1	Construct new Wainui 3 Reservoir (Fernlea Site), 8 ML, 160m TWL
2033	PW3 (W_UPG-S2)	Strategic		Construct pump station from bulk network to Wainui 3 Reservoir, 80 kW
2033	PW3 (W_UPG-S3)	Strategic		Construct rising main along Fraser Street from Main Road to Wainui 3 Reservoir (500m in length)
2033	PW3 (W_UPG-S4)	Strategic		Construct discharge main from Wainui 3 Reservoir to reticulation along Main Road (500m in length)
2033	PW3 (W_UPG-S5)	Strategic		Install emergency PRV on the 200mmØ along Fitzherbert Road Install emergency PRV on the proposed 225mmØ upsized main along Meremere Street
2050	PW4 (W_UPG-P1)	Local - Pressure		Construct 300mmØ parallel main from Konini Reservoir to Dublin Street (330m in length). Construct 300mmØ parallel main along Wellington Road from Dublin Street to Norfolk Street (730m in length)
2050	PW4 (W_UPG-P1)	Local - Pressure		Extend the existing 150mmØ main on Wise Street with a 200mmØ main up to the development site. (520m in length)
2050	PW4 (W_UPG-P1)	Local - Pressure		Construct new 150mm parallel main in addition to the existing 150mm main on Wise Street, between 200 and 248 Wise Street. (380m in length)
2050	PW4 (W_UPG-P2)	Local - Pressure		Upsize existing 150mmØ mains to 300mmØ along Wellington Road from Norfolk Street to 355 Wellington Road (1400m in length)

Source: Stantec (2020) Wainuiomata Zone Management Plan (modified).

6. Wastewater Infrastructure

The model development and optioneering for wastewater infrastructure improvements has been completed by Hydraulic Analysis Limited (HAL), with support by Wellington Water.

This section is a summary of GHD interpretation of HAL's findings with cost estimation provided by GHD. For the complete report by HAL refer to Appendix D.

6.1 Network configuration

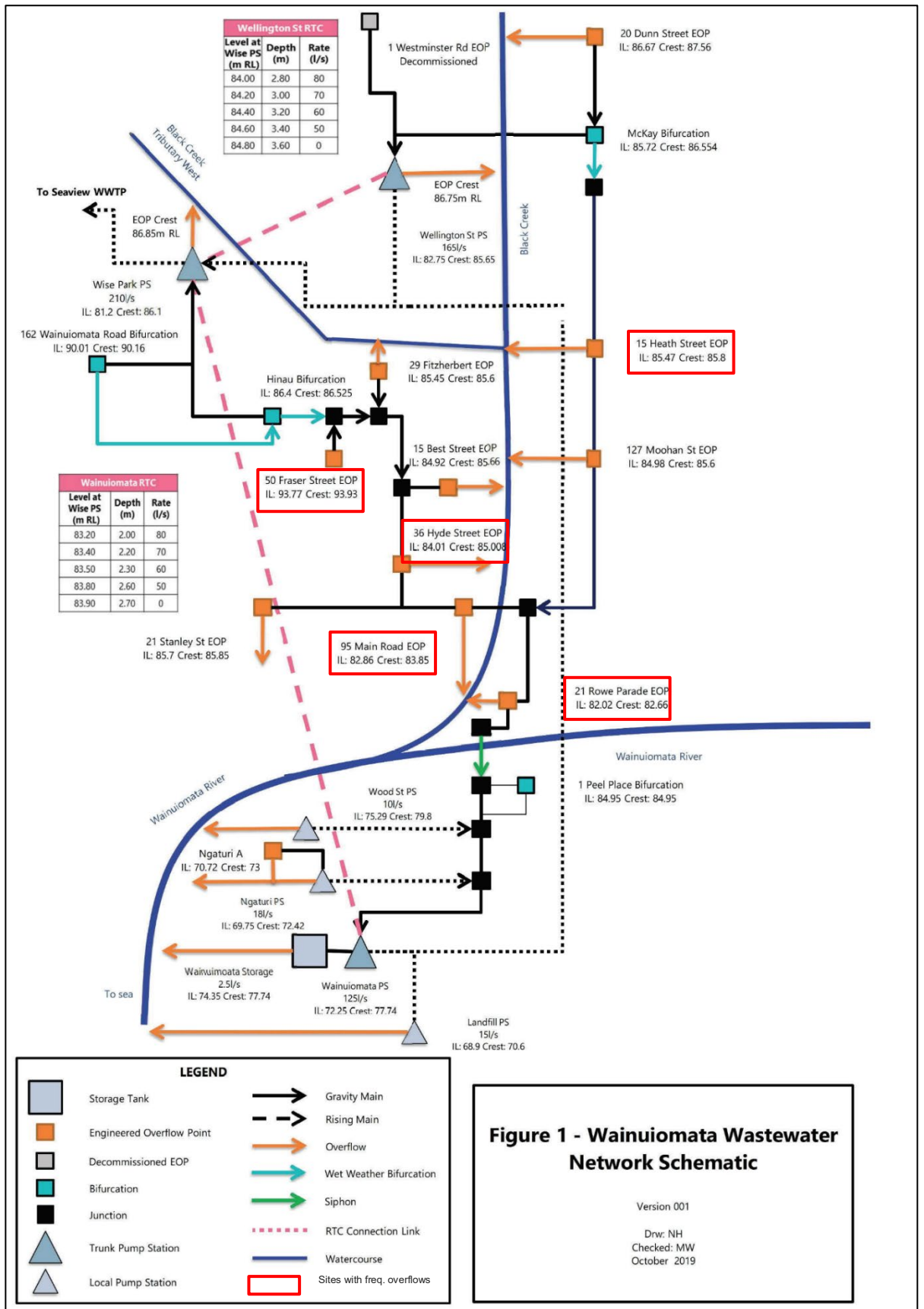
The existing Wainuiomata wastewater catchment covers approximately 600 ha of predominantly residential land use. The network consists of six pump stations (with associated constructed overflow points), ten network Engineered Overflow Points (EOPs), and four bifurcations.

Within this catchment, there are three key Pump Stations (PS), which form the 'Wainuiomata Triangle':

- Wise Park
- Wellington Rd
- Wainuiomata

Two northern areas drain directly to the Wise Park and Wellington Rd pump stations, however, these both have wet weather flows diversions to the south and the remainder of the catchment drains directly to the Wainuiomata Pump Station. Both the Wellington Rd and Wainuiomata pump stations convey flows to the Wise Park PS.

The Wise Park PS is the terminal point, from which the entire Wainuiomata catchment is pumped to the Seaview Wastewater Treatment Plant.



Source: HAL (2020) Wainuiomata Options Assessment

Figure 6-1: Wastewater network schematic

6.2 Levels of service

As advised by Wellington Water, the target Levels of Service to be initially applied to this study are:

- Uncontrolled overflows to not exceed a one spill per year wet weather overflow frequency
- Overflows at constructed locations to not exceed an average of two spills per year wet weather overflow frequency.

It should be noted that wastewater overflows result in not meeting the healthy urban water outcomes that Wellington Water is working towards. These Levels of Service are minimums and may change in future.

6.3 Existing constraints

Wise Park has a current pass forward capacity of 210 l/s, and it operates as a significant constraint upon the network. Whilst it is not predicted to spill, this is because as water levels at the pump station rise, the Wainuiomata and Wellington Road pump stations progressively shut down through the RTC operation to minimise the risk of wet weather overflows at this location.

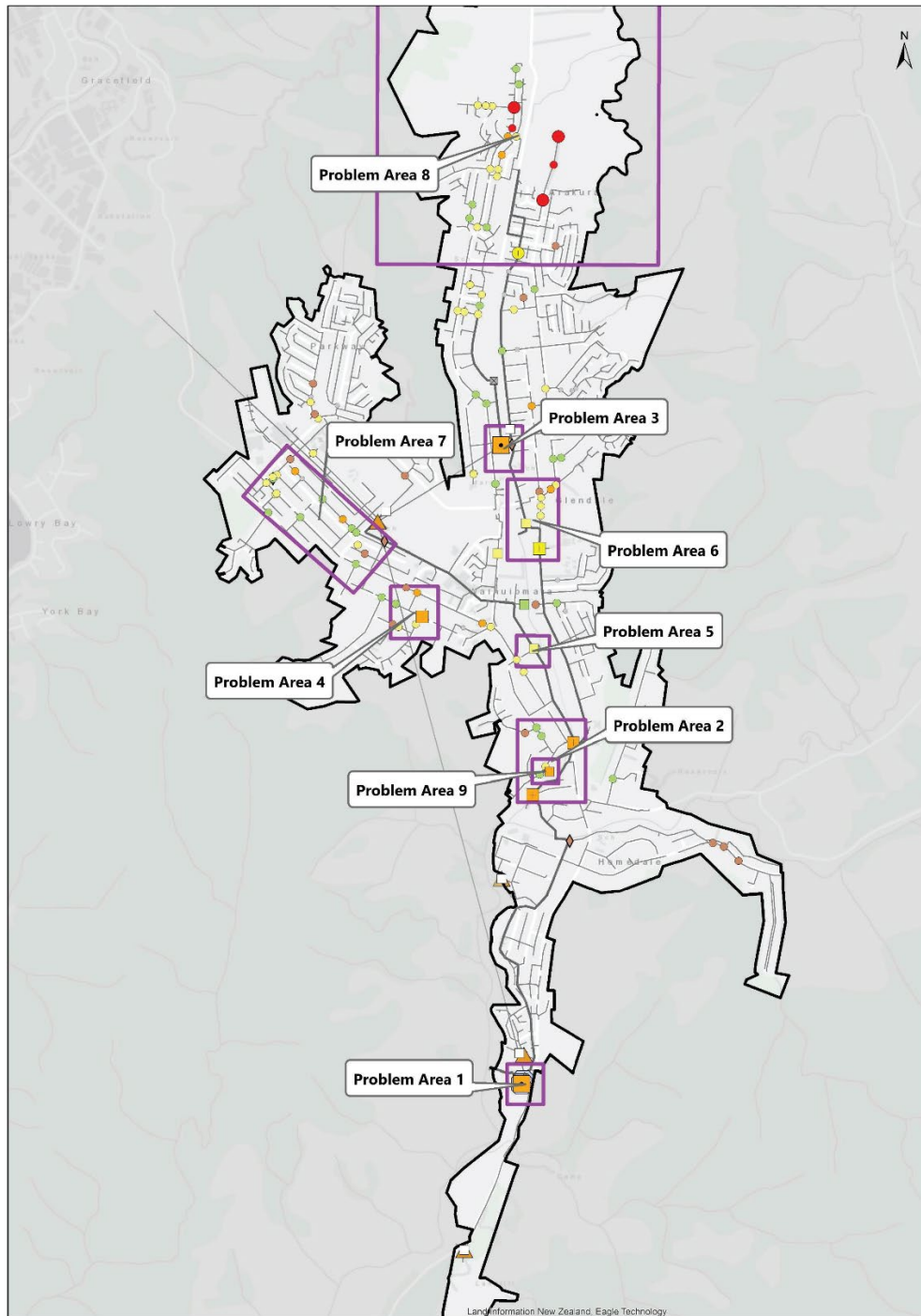
This section below shows the identified problem areas from the various analyses of the Wainuiomata wastewater network, note these are for reference and do not indicate priority. This figure represents the MPD scenario (+50 year) without deterioration. For further information about the problem areas, refer to the full HAL report.

The two main types of issues are:

- Engineered overflow point not meeting the level of service
- Frequent, uncontrolled wet weather overflows

The Seaview Wastewater Treatment Plant (WWTP) receives flow from Upper and Lower Hutt as well as Wainuiomata. Passing forward additional flows from Wainuiomata will increase the frequency and volume of wet weather overflows from the plant. However, these overflows are fully treated prior to discharge into the inner harbour.

A strategic wastewater model for the Seaview WWTP and its catchment is currently under development.



Source: HAL (2020) Wainuiomata Options Assessment

Figure 6-2 Wastewater problem areas (maximum probable development scenario)

6.4 Option assessment

HAL identified two future growth scenarios for assessing options:

- M2L (+20 years) for identifying the likely issues requiring resolution (assessed as part of the 2033 growth scenario)
- Maximum probable development (MPD) (+50 years), for ensuring options were sized sufficiently for target levels of service to be met long term (assessed as part of the 2050 growth scenario)

The results indicated that the development in the northern greenfield area was the primary difference in the number of issue locations between the M2L and MPD scenarios. Therefore the MPD scenario was used to assess the performance of different options considered.

To assess the performance of the existing network, the M2L scenario was adapted with no allowance for population growth. This was also used to isolate the cost of growth.

The following classes of mitigation were considered:

- System optimisation
- Conveyance
- Storage
- Treatment and discharge
- Inflow and infiltration

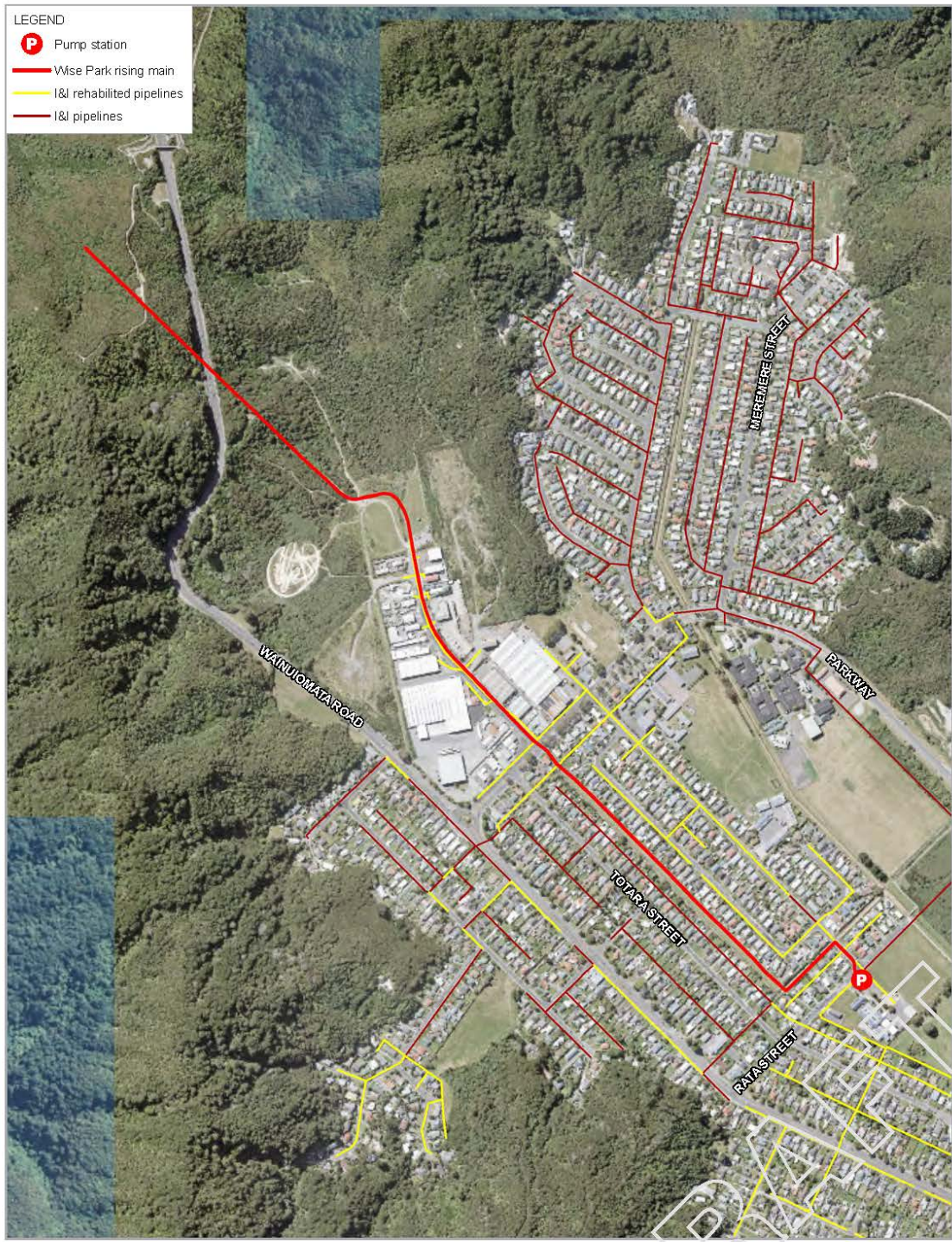
A longlist of solution sets was assessed using the hydraulic model to review improvements to the level of service. Following this initial analysis, the options were further refined by HAL to prioritise cost-effective network improvements which would provide an immediate benefit to the catchment and provide flexibility for accommodating future growth.

6.4.1 Wise Park PS (WW1 and WW2)

The initial screening of options assumed a pass forward of 300 L/s for the Wise Park PS. The 10-yr Option Performance Results indicate that this is just achieving the target LoS at Wainuiomata PS in the MPD scenario but with average annual volumes spilled in the order of 9 ML / year, whilst Wellington Rd PS is spilling more than two times per year on average. In practice, the uncertainty associated with the future performance is considerable, especially with respect to I&I and future growth.

Increasing the capacity of Wise Park Pump Station is considered to provide significant improvement in the network however until upgrades to the gravity network in Gracefield and the Seaview Treatment plant are completed, the upgrades to the Wise Park pump stations are not recommended.

Figure 6-3 shows the location of the proposed rising main upgrade (completed after capacity improvements at Seaview Treatment Plant).



<p>Paper Size ISO A4</p> <p>0 130 260 Metres</p> <p>Map Projection: Transverse Mercator Horizontal Datum: NZGD 2000 Grid: NZGD 2000 New Zealand Transverse Mercator</p>			<p>Wellington Water Ltd Hutt City Catchment Plan Waiuomata</p> <p>Wastewater Wise Park pump station and rising main</p>	<p>Project No. 12521533 Revision No. - Date 09 Jul 2020</p>
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FIGURE 1

Figure 6-3 Wise Park Pump Station and Rising Main

6.4.2 Inflow and Infiltration (WW3, WW4, WW5 and WW9)

It is not considered that I&I remediation work is cost effective across the entire Wainuiomata catchment. HAL identified three areas where I&I remediation is not the preferred solution:

1. I&I has not been recommended for the Parenga subcatchments draining to the Wainuiomata Pump Station. The existing calibrated model had relatively low levels of I&I in this area, and releasing the throttle at Wise Park WWPS is a preferred option for mitigating wet weather overflows. However, this area was not directly gauged, so there is inherently less confidence in the accuracy of the calibration. It is possible that I&I in the catchment may be required to supplement other options.
2. I&I is not preferred upstream of Wellington Rd, as providing additional conveyance capacity is the preferred alternative.
3. Areas where I&I programmes have already been completed (10,768 m)

Instead, a targeted I&I programme is recommended (refer Figure 6-4), covering a total of 40,460 m.

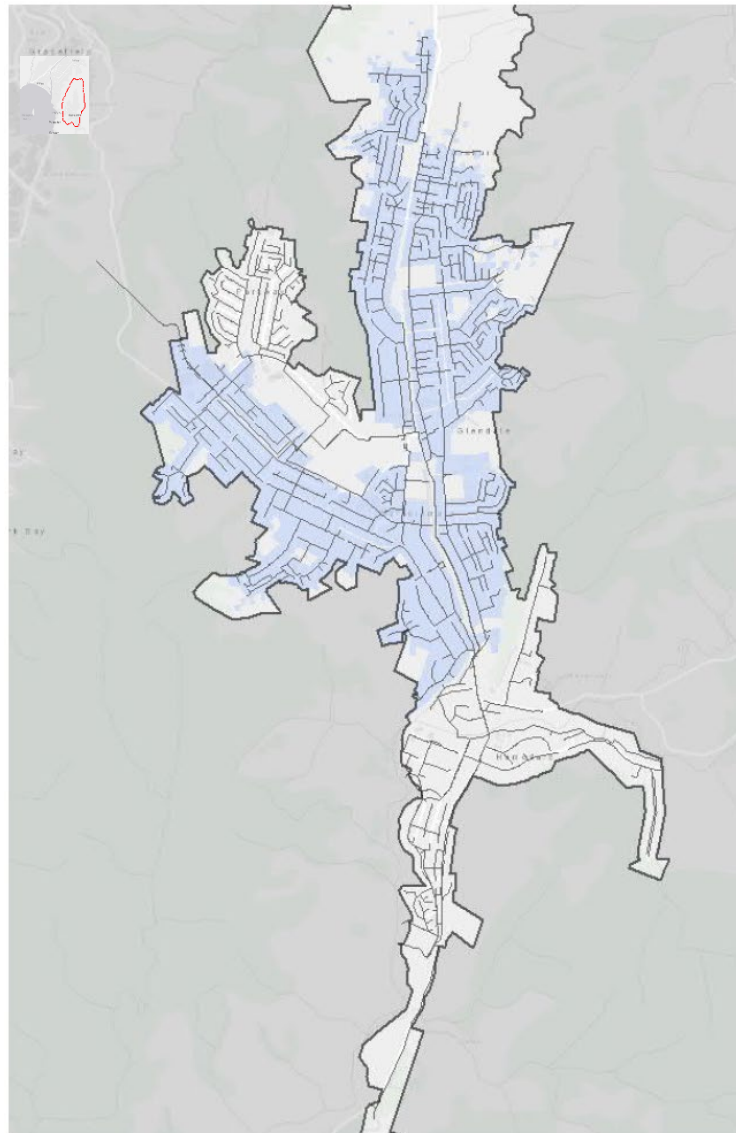


Figure 6-4 Targeted I&I extents

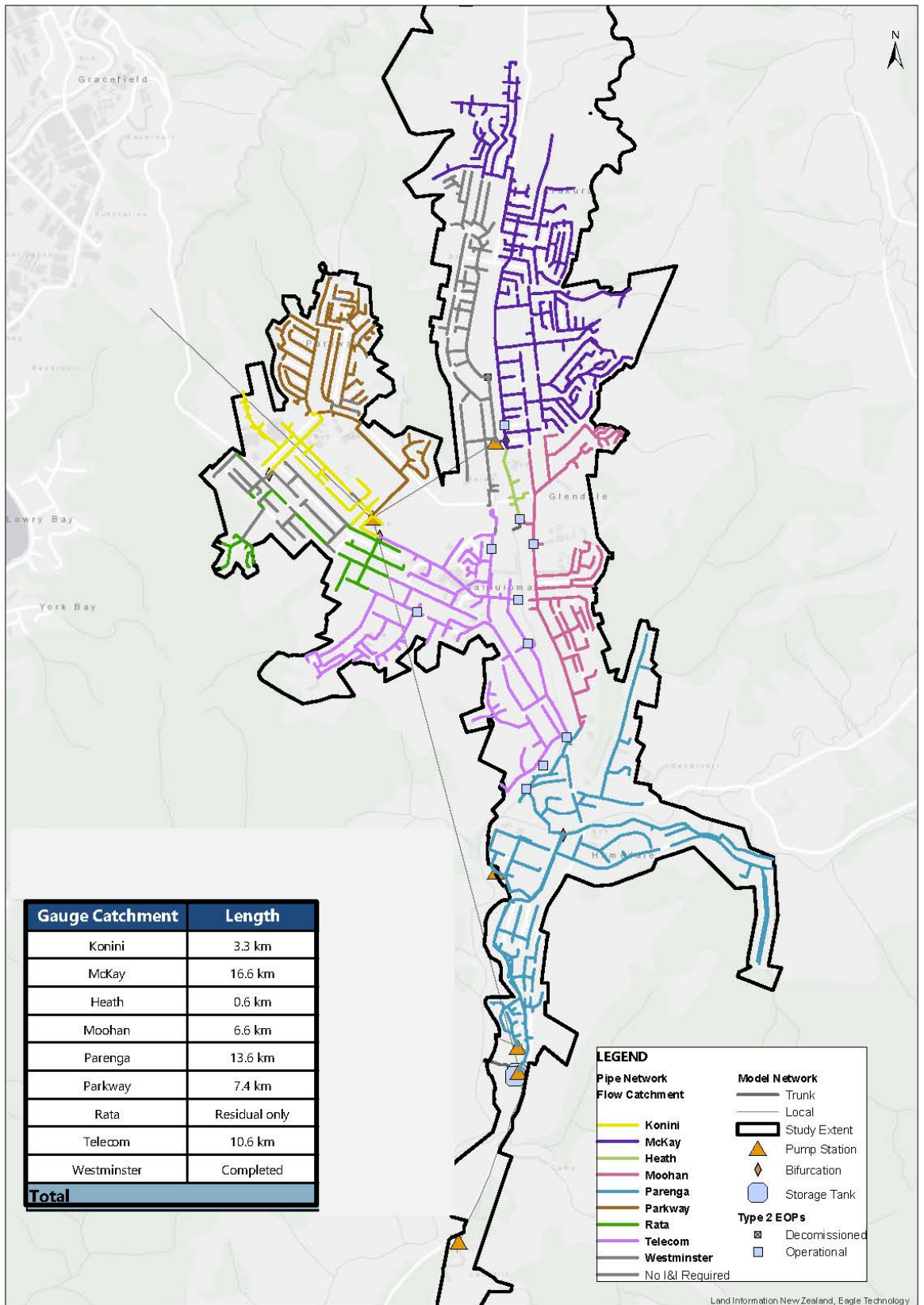


Figure 6-5 Wainuiomata inflow and infiltration catchments

Within the targeted programme, it is recommended that I&I is prioritised as follows (refer to Figure 6-5 for I&I catchment locations):

1. Upstream of Heath and Moohan EOPs to address wet weather overflows at these EOPs and confirmed uncontrolled overflows in the local network.
2. Within the Telecom catchment for addressing the Hyde St EOP (and mitigating overflows risks at other EOP locations). This will also reduce wet weather flows at the Main Rd and Rowe Pde EOPs.
3. Konini catchment I&I to reduce load to the Wise Park PS and risk of uncontrolled overflows.
4. Completion of the Rata catchment (partially completed prior to this study) to reduce load to the Wise Park PS and risk of uncontrolled overflows.
5. Remainder of the Moohan catchment (areas of Moohan catchment not completed as part of priority area 1) to mitigate inflows into the Main Rd and Rowe Parade EOPs. Staging is to be confirmed with success of the upstream I&I within this catchment and Main Rd and Rowe Pde storage programming / sizing, and may need to be re-prioritised.

These areas form the extents of the prioritised I&I works, covering a total of 23,990 m. Figure 6-6 shows the prioritised I&I areas.

Cost estimates have been prepared for three I&I scenarios:

- WW3 - Prioritised (23,887m) – to be completed first, a subset of the targeted areas
- WW4 - Targeted (16,573m) – Remainder of targeted areas, after prioritised subset (23,887m) has been completed. Full targeted area is 40,460m.
- WW5 - Entire catchment (61,170 m) – not a recommended option but presented for comparison. 61,170m is 80% of the full catchment area (76,458m). This does not include the 10,768m that has been rehabilitated prior to 2020.

In addition, inflow and infiltration rehabilitation of the private network was requested by Wellington Water. This is costed in Option WW9. The total length of private laterals was calculated from the total number of properties within Wainuiomata (6673 according to the LINZ database) and an average lateral length of 20 metres (based on distance from the centre of the road to the building footprint). Note that the cost of I&I work on private laterals is not a direct cost for HCC as they are privately owned.

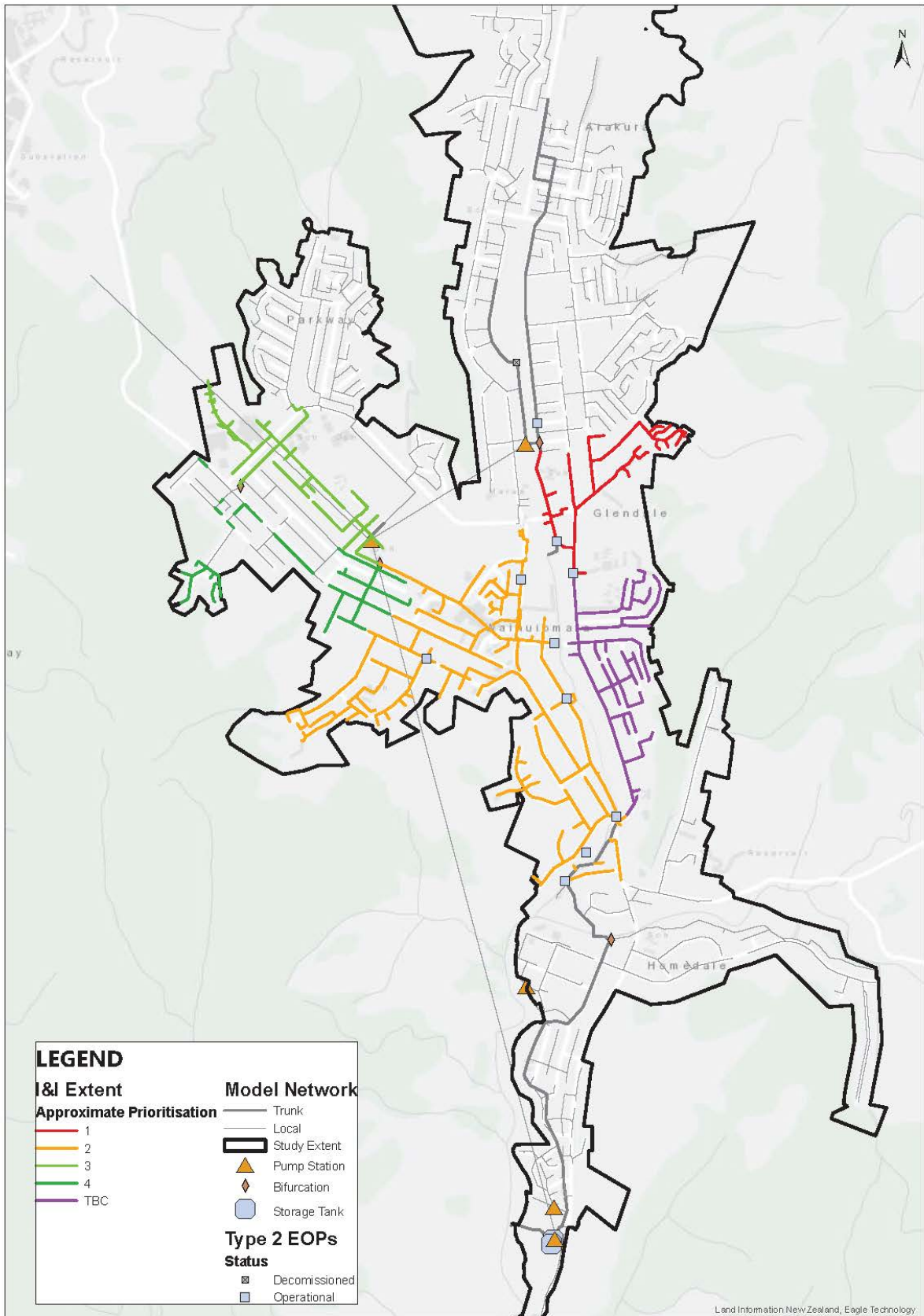


Figure 6-6 Prioritised I&I extents

6.4.3 Northern Greenfield Servicing (WW6)

The proposed new pump station and rising main to service the northern greenfield development is shown in Figure 6-7.

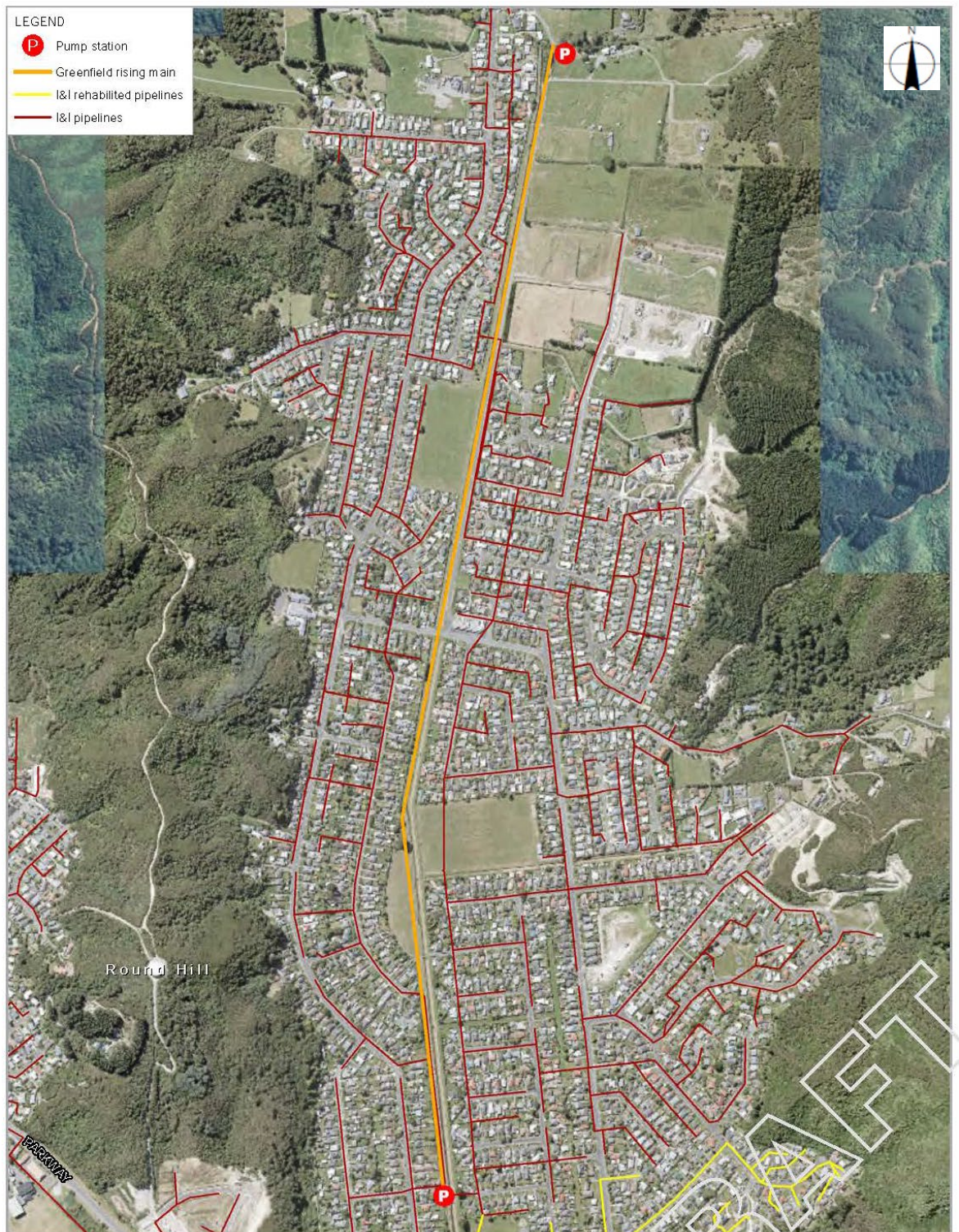


Figure 6-7 Northern greenfield PS and rising main route

6.4.4 Fraser Street EOP (WW7)

It is considered unlikely that property purchase would be desirable for a storage tank, so it is recommended that a storage facility in the reserve is considered. With an I&I programme a storage volume of 150 m³ is expected to be sufficient to achieve the desired LOS. However the effectiveness of I&I is at this point uncertain. A size of storage tank should be determined after a new analysis of I&I effectiveness is conducted in the next 3 to 5 years.

A possible layout has been shown in Figure 6-8, which will provide a storage volume of 300 to 400 m³. Further investigation into the existing services in this area is required to confirm the feasibility of this option.



Figure 6-8 Potential storage location for Fraser Street EOP

6.4.5 Main Road and Rowe Parade EOPs (WW8)

A combined storage facility has been proposed as a more conservative approach for costing as it is larger and therefore likely to be more expensive. The preferred approach is likely to be informed by what can be cost-effectively constructed at the site and the extent of I&I required upstream to achieve and maintain levels of service.

A potential location for the combined tank is shown in Figure 6-9. This option will require a gravity fill and pump return configuration.

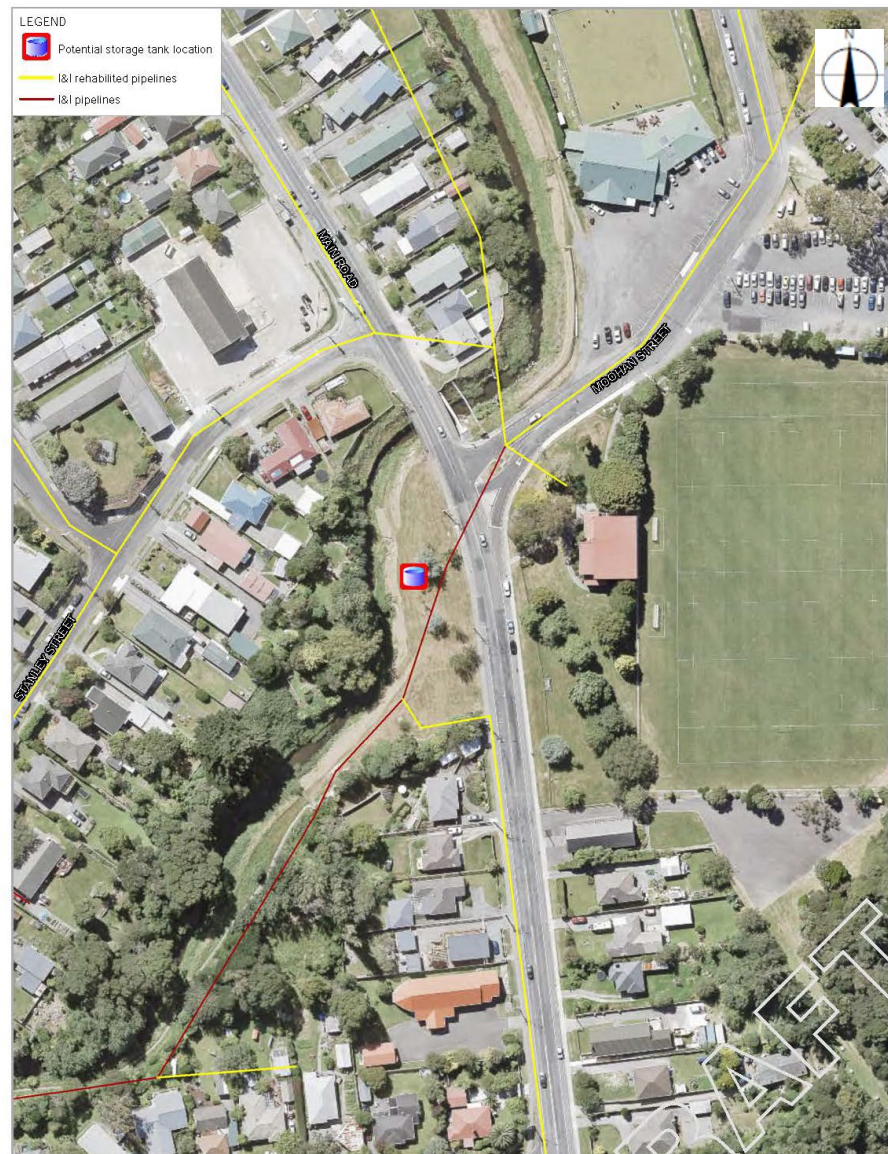


Figure 6-9: Main Road/Rowe Parade combined storage tank location

6.4.6 Wellington Street PS (WW10)

Once additional capacity is provided through the ultimate future upgrade at Wise Park Pump Station, increasing the capacity of the Wellington St PS is preferred as more cost-effective option over Inflow and Infiltration programme in the upstream catchment.

Without any allowance for the greenfield developments, Wellington Rd PS is simulated to meet the target LOS over the medium term (+20-year) horizon, assuming the 300 L/s capacity upgrade of the Wise Park PS is feasible.

This option has been costed by GHD to meet the 2050 growth horizon. As previously discussed, the effectiveness of I&I is at this point uncertain. The need for the Wellington Road Pump Station upgrade is dependent on the effectiveness of the storage tanks and I&I programme.

6.4.7 Moores Valley – potential future development

This area currently relies upon septic tanks. Whilst it is not zoned for residential development, there may be a push in the future to replace the on-site disposal. Future consideration should be given to servicing this area if re-zoned. This area was not re-zoned as part of PC 43 and has not been highlighted by HCC as an area of significant population growth so it was not considered as part of the scope of this study.

6.5 Consent Considerations

GHD's Planning Team has completed a high-level planning assessment of the proposed wastewater infrastructure options. This assessment is included in this report as Appendix G, and is summarised below.

Each option was assessed against the relevant provisions of the following plans:

- Hutt City Council District Plan
- Greater Wellington Regional Council (GWRC) Proposed Natural Resources Plan (PNRP)(Decisions Version)
- GWRC Regional Air Quality Management Plan for the Wellington Region (Air plan)
- GWRC Regional Soil Plan for the Wellington Region (Soil plan)
- GWRC Regional Plan for Discharge to Land for the Wellington Region (Discharges to land plan)
- GWRC Regional Freshwater Plan for the Wellington Region (Water plan)

6.5.1 Inflow and Infiltration

No additional consents are required – can proceed on a permitted basis as maintenance of existing network under both the HCC District Plan and GWRC pNRP.

Earthworks is excluded due to the definitions of the GWRC PNRP.

6.5.2 New Pump Station for Greenfield Developments

HCC: Subdivision may be required to take land for network utility purposes if it cannot fit in an area already set aside for such purposes, such as the road reserve. The rising main to the existing pump station would be able to be constructed as a permitted activity.

6.5.3 Wise Park Pump Station

No consents required by HCC or GWRC for upgrades to the existing pump station provided there is no material change in the existing footprint or effects on the environment.

6.5.4 Fraser Street Storage

GWRC: If in situ oversized pipes is the preferred method earthworks is excluded due to the earthworks definition of the GWRC PNRP.

HCC: Assessment against rule 13.3.1.6 required as there may be instances where the pipeline will not comply with permitted activity conditions for a variety of reasons.

6.5.5 Main Road and Rowe Parade Storage

GWRC: If in situ oversized pipes is the preferred method earthworks is excluded due to the definitions of the GWRC PNRP.

HCC: Assessment against rule 13.3.1.6 is required as there may be instances where the pipeline will not comply with permitted activity conditions for a variety of reasons.

6.6 Costing

A cost estimate has been prepared in accordance with the Wellington Water Cost Estimation Manual, see Table 6-1. Refer to Appendix H for a full cost breakdown. In addition to the assumptions detailed in Section 4, a number of assumptions were made for the wastewater upgrades as follows:

6.6.1 Pump Stations

Pump Station Upgrades

Options WW1 and WW2 incorporate upgrades to existing Pump Stations. Upgrade costs were estimated using the Optimisation Cost Data for upgraded pump stations contained in the *Wgtn Optimisation Unit Cost Data 2020-Rev11 Spreadsheet*. The original pump station upgrade spreadsheet included a 20% allowance for Preliminary and General items. This was removed as the revised cost estimation methodology applied Preliminary and General costs to the option as a whole, not to the individual components. In addition, the original pump station upgrade spreadsheet had been based on 95th percentile rates. To amend these to base estimates, GHD has recommended that a calibration factor of 0.7 be applied to the pump station upgrade costs. In addition, as this portion of the spreadsheet was based on the Christchurch market in 2017, an allowance of 20% was added to account for inflation.

The optimisation spreadsheet assumes that building and civil structures remain unchanged, electrical and pump components are upgraded and that the pump station remains operational during the upgrade (requiring temporary works, bypass pumping etc.). Upgraded Pump Stations were calculated as Level 1 estimates.

New Pump Stations

Option WW6 requires the construction of a new pump station. Costs were estimated using data from the 2017/2018 PCC WW NIP Study included in the *Wgtn Optimisation Unit Cost Data 2020-Rev11 Spreadsheet*. The original spreadsheet for new pump stations included an allowance for Traffic Management and Preliminary and General items. This was removed as the revised cost estimation methodology applied Traffic Management and Preliminary and General costs to the option as a whole, not to the individual components. An allowance of 20% was added to account for inflation. The NIP Study assumed a dry well-wet well configuration, duty/standby operation, roof slab at ground level and pump house structure, gantry crane and lay down areas below ground. No allowance for contingency and funding risk was included for this option as it is expected that this will be funded by developer contributions.

6.6.2 Inflow and Infiltration

For Inflow and Infiltration rehabilitation of the public network (WW3, WW4 and WW5), CIPP relining was assumed for costing purposes. The unit rate for CIPP relining includes an allowance for lateral opening and reconnection on rehabilitated pipelines. An additional allowance was made for CCTV or other investigation of 20 km of the network to further refine renewal locations.

For inflow and infiltration rehabilitation of the private network (WW9), it was assumed that 80% of laterals would be rehabilitated. Laterals were assumed to be 100 mm in diameter and rehabilitated by CIPP relining. An allowance was made for CCTV investigation of all private laterals in Wainuiomata.

All inflow and infiltration options were calculated as Level 1 estimate due to uncertainties in the location and extent of rehabilitation required.

6.6.3 Network Upgrades

Options WW2 and WW6 incorporate network upgrades. Trenched installation was assumed as the default methodology. For costing purposes, upsizing of existing pipelines was assumed to be equivalent to the cost of new pipelines. As both of these options also include pump stations, they were calculated as Level 1 estimates.

6.6.4 Storage

Options WW7 and WW8 require the construction of storage. For both locations, it was assumed that the most cost-effective option would be 2.1 metre diameter concrete pipes located in council-owned land (berm or reserve). Both options include an additional allowance within the physical works cost for pipe connections, overflow pipework and pumped output. As with other pipeline upgrades, these were calculated as Level 2 estimates.

Due to the depth of these pipes and the generally shallow groundwater in Wainuiomata, the unit rate was increased to allow for well point dewatering.

6.7 Further options considered

The preferred options include upgrade of the rising main from Wise Street Pump Station (WW1 and WW2), however no changes were proposed to the existing gravity sewer into Lower Hutt. The GIS indicates that this sewer varies from 300 mm to 375 mm. There is some uncertainty associated with this asset.

Following a meeting with Wellington Water on 14 September 2020, Wellington Water requested that GHD prepare a cost estimate for a possible upgrade of the gravity main between Wainuiomata and Gracefield. For the purposes of costing, the assumption has been made that a second, 1210 m long, 355 mmOD PE gravity pipe, would be added in the same tunnel as the existing pipe. This is based on the assumption that there is space in the existing tunnel for a second pipe, which is currently an unknown. No modelling has been undertaken for this pipe.

The location of this proposed upgrade is shown in Figure 6-10. This item has been costed as WW11.

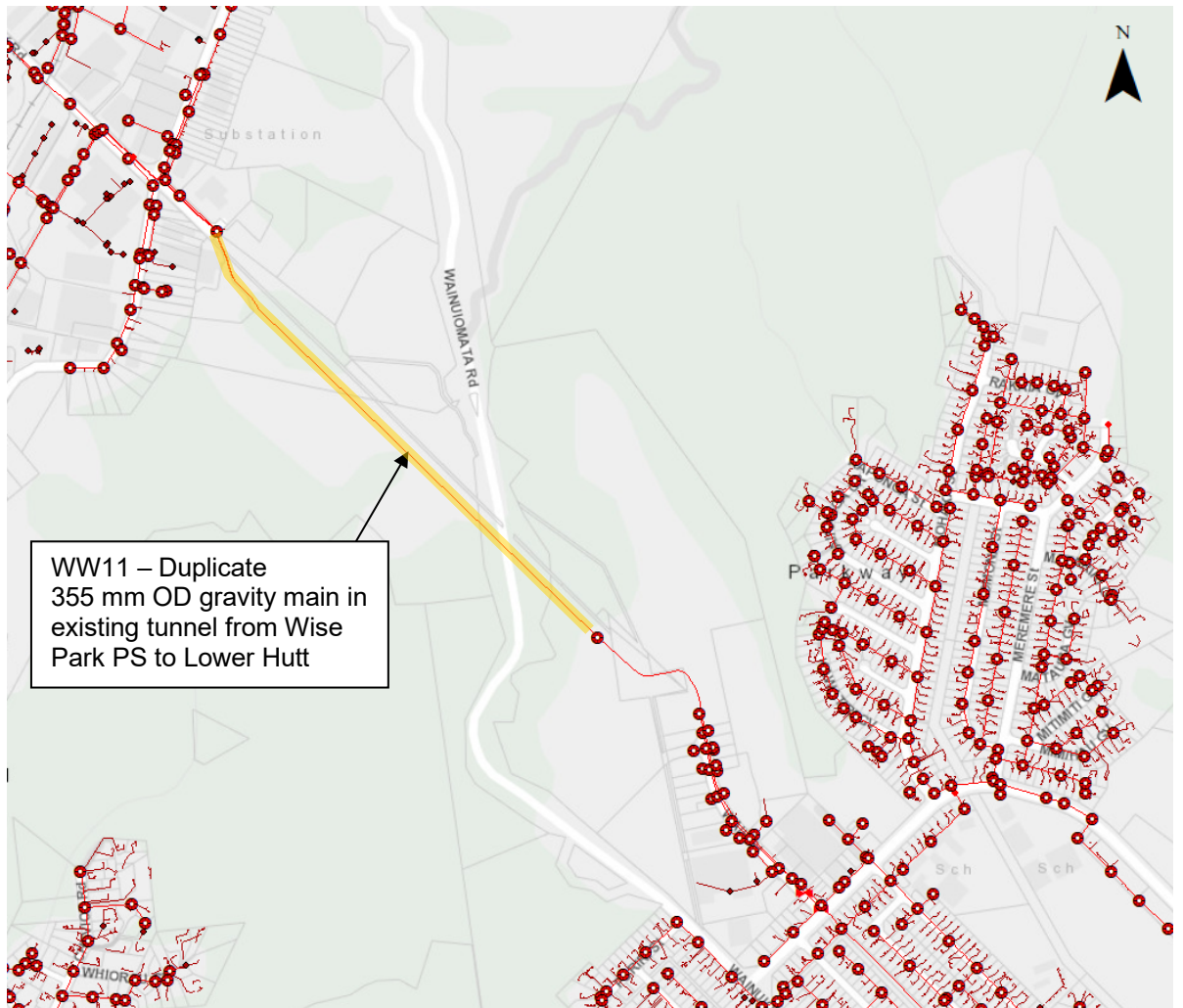


Figure 6-10 Location of proposed duplicate wastewater gravity main

Table 6-1: Wastewater infrastructure upgrades cost estimate

Project Estimate - Wastewater

Project Name: Hutt City Catchment Plan - 3Waters Assessment for PC43 Phase 1 - Wainuiomata
 Project Phase: Study/Report
 Base Date of Estimate: Sep-20

Phase & Task	%	WW1 - Wise St PS 1	WW2 - Wise St PS 2	WW3 - Prioritized I&I (23km)	WW4 - Targeted I&I (16km)	WW5 - Catchment Wide I&I (61km)	WW6 - NGreenfield Servicing	WW7-Fraser St EOP Storage	WW8 - Main Road EOP Storage	WW9 - Private Lateral I&I	WW10 - Wellington Rd PS Upgrade	WW11 - Duplicate Gravity Main in Tunnel
Development												
Consultancy and Council Fees	3%	\$12,000	\$151,000	\$397,000	\$270,000	\$1,014,000	\$96,000	\$51,000	\$60,000	\$274,000	\$10,000	\$75,000
Site Investigations												
Other Costs (Legal, Land, etc...)												
Total Project Development		\$12,000	\$151,000	\$397,000	\$270,000	\$1,014,000	\$96,000	\$51,000	\$60,000	\$274,000	\$10,000	\$75,000
Consenting												
Consultancy and Council Fees	3%	\$12,000	\$151,000	\$397,000	\$270,000	\$1,014,000	\$96,000	\$51,000	\$60,000	\$274,000	\$10,000	\$75,000
Site Investigations												
Other Costs (Legal, Land, etc...)												
Total Consenting		\$12,000	\$151,000	\$397,000	\$270,000	\$1,014,000	\$96,000	\$51,000	\$60,000	\$274,000	\$10,000	\$75,000
Detailed Design												
Consultancy and Council Fees	6%	\$24,000	\$302,000	\$793,000	\$539,000	\$2,028,000	\$192,000	\$102,000	\$120,000	\$548,000	\$21,000	\$150,000
Site Investigations												
Other Costs (Legal, Land, etc...)												
Total Detailed Design		\$24,000	\$302,000	\$793,000	\$539,000	\$2,028,000	\$192,000	\$102,000	\$120,000	\$548,000	\$21,000	\$150,000
Procurement												
Consultancy and Council Fees	1%	\$4,000	\$50,000	\$132,000	\$90,000	\$338,000	\$32,000	\$17,000	\$20,000	\$91,000	\$3,000	\$25,000
Other Costs (Legal, Land, etc...)												
Total Procurement		\$4,000	\$50,000	\$132,000	\$90,000	\$338,000	\$32,000	\$17,000	\$20,000	\$91,000	\$3,000	\$25,000
Construction												
Consultancy and Council Fees	5%	\$20,000	\$251,000	\$661,000	\$449,000	\$1,690,000	\$160,000	\$85,000	\$100,000	\$456,000	\$17,000	\$125,000
Land Acquisition												
Other Costs (Legal, Land, etc...)												
Physical Works												
Preliminary and General		\$75,000	\$1,106,000	\$2,512,000	\$1,708,000	\$6,422,000	\$608,000	\$306,000	\$361,000	\$1,735,000	\$66,000	\$400,000
Physical Works - Stormwater												
Physical Works - Wastewater		\$394,000	\$5,029,000	\$13,223,000	\$8,987,000	\$33,799,000	\$3,198,000	\$1,700,000	\$2,006,000	\$9,129,000	\$346,000	\$2,502,000
Physical Works - Potable Water												
Total Construction		\$489,000	\$6,386,000	\$16,396,000	\$11,144,000	\$41,911,000	\$3,965,000	\$2,091,000	\$2,467,000	\$11,320,000	\$429,000	\$3,027,000
Base Estimate												
Base Estimate		\$540,000	\$7,040,000	\$18,115,000	\$12,313,000	\$46,305,000	\$4,381,000	\$2,312,000	\$2,728,000	\$12,507,000	\$473,000	\$3,353,000
Contingency		\$216,000	\$2,816,000	\$7,246,000	\$4,925,000	\$9,261,000	0	\$462,000	\$546,000	\$2,501,000	\$95,000	\$671,000
Expected Estimate		\$756,000	\$9,856,000	\$25,361,000	\$17,238,000	\$55,565,000	\$4,381,000	\$2,774,000	\$3,274,000	\$15,008,000	\$568,000	\$4,023,000
95th Percentile Estimate												
Funding Risk		\$454,000	\$5,914,000	\$15,217,000	\$10,343,000	\$16,670,000	0	\$832,000	\$982,000	\$4,503,000	\$170,000	\$1,207,000
TOTAL VALUE		\$1,210,000	\$15,770,000	\$40,578,000	\$27,580,000	\$72,235,000	\$4,381,000	\$3,607,000	\$4,256,000	\$19,511,000	\$739,000	\$5,230,000

6.8 Preferred options

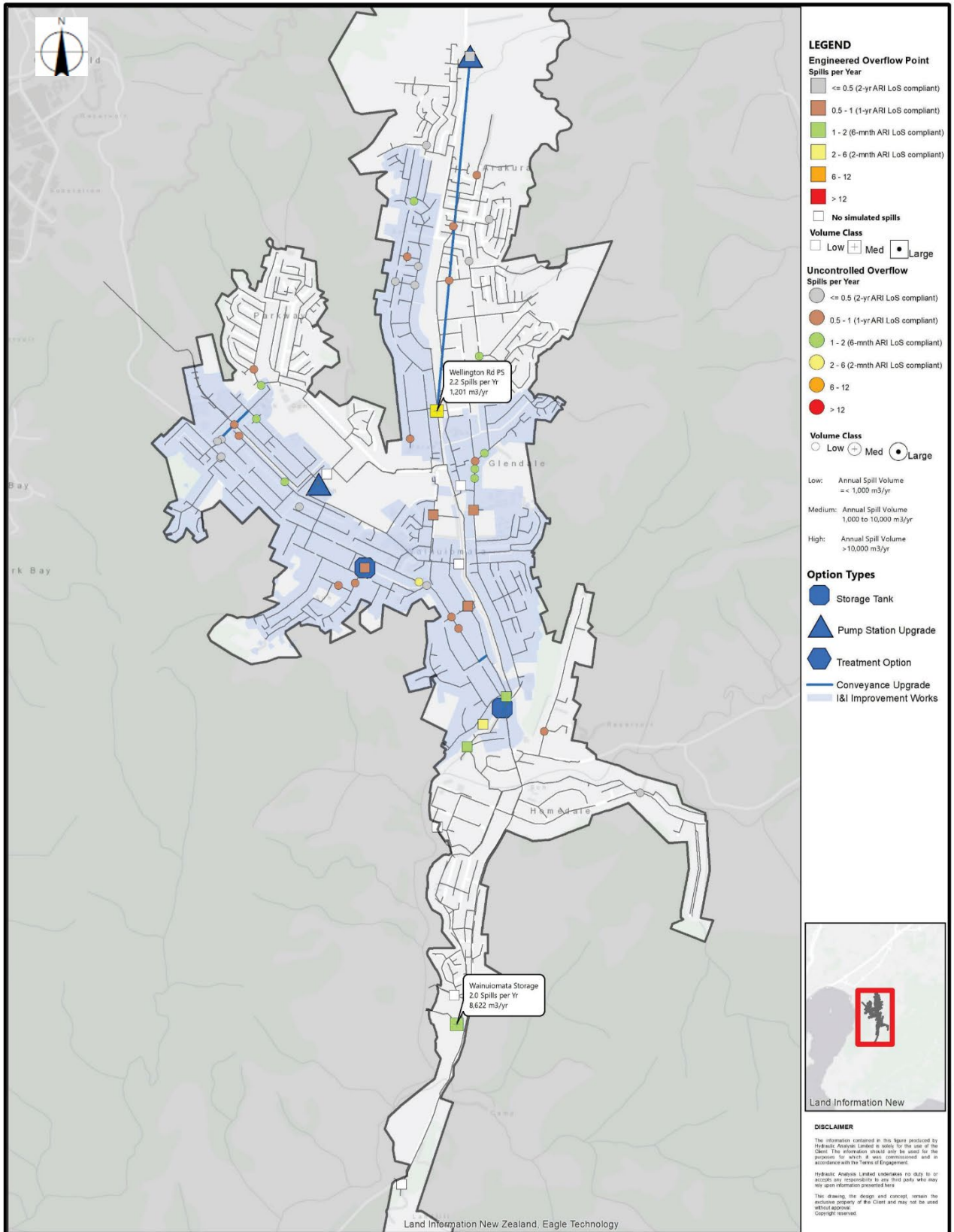
Two refined solution sets were chosen from the longlist, an interim upgrade and a future state upgrade. GHD has split the interim upgrade further into the 2020 and the 2033 planning horizons based on whether the issues being resolved are within the current network or due to growth (as per Table Table 8-2 at the end of this report).

These are summarised in Table 6-2 and shown in Figure 6-11 and Figure 6-12. Costs have been added by GHD.

Table 6-2: Summary of wastewater infrastructure preferred options

Solution set component	Interim upgrade 2020 planning horizon	Estimated cost	Interim upgrade 2033 planning horizon	Estimated cost	Future state upgrade 2050 planning horizon	Estimated cost
Wise Park PS	WW1 - Wise Park stage 1 upgrade within existing rising main capacity (assumed up to ~300 l/s)	\$1,210,000			WW2 - Wise Park stage 2 upgrade and new rising main upgrade (1.56 km) (assumed up to ~400 l/s)	\$15,770,000
I&I programme	WW3 - 23,887 m of sewer rehab (prioritised works)	\$40,578,000			WW4 – 16,573 m of sewer rehab (targeted works). Assumes prioritized works (WW3) completed.	\$27,580,000
Greenfield Servicing			WW6 - 40 l/s pump station and 2.4 km rising main direct to Wellington PS	\$4,381,000	-	-
Fraser EOP	WW7 - 150 m ³ storage facility	\$3,607,000			-	-
Main/Rowe EOPs	WW8 - 500 m ³ storage facility	\$4,256,000			-	-
Wellington St PS					WW10 - Pump upgrade to ~225 l/s (if needed)	\$739,000
Private Lateral I&I	WW9 - Assessment and replacement of Laterals	\$19,511,000				

Source: HAL (2020) Wainuiomata Options Assessment, costs added by GHD



REV	AMENDMENTS	BY	DATE	BY	DATE
0	DRAFT FOR CLIENT APPROVAL	NWH	May 20	NWH	May 20
				NWH	May 20

0 250 500 1,000 Meters

SCALE (at A3)
1:22,500

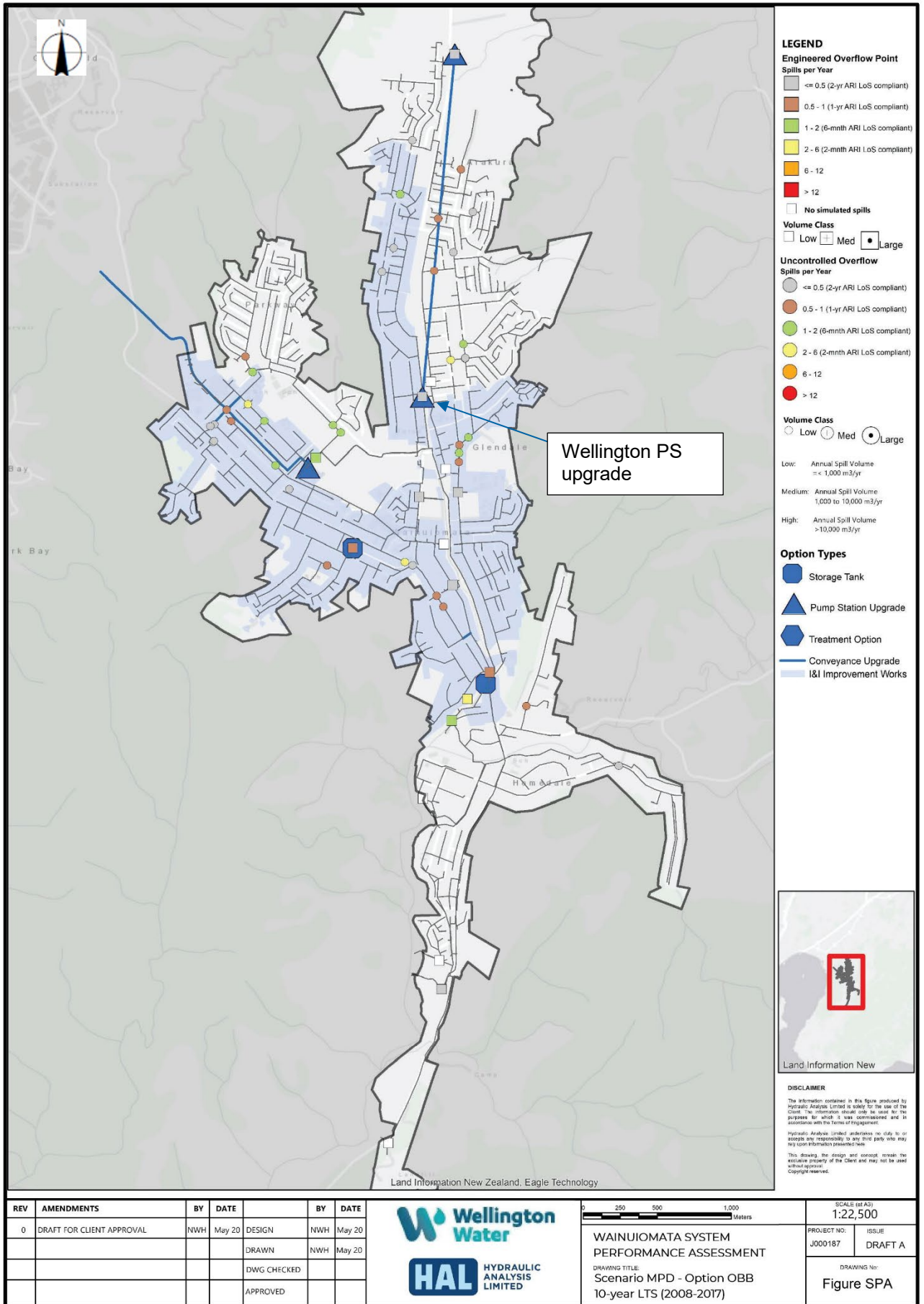
PROJECT NO: J000187 ISSUE: DRAFT A

DRAWING TITLE: WAINUIOMATA SYSTEM PERFORMANCE ASSESSMENT
Scenario MPD - Option OBA
10-year LTS (2008-2017)

DRAWING No: Figure SPA

Source: HAL (2020) Wainuiomata Options Assessment

Figure 6-11: Interim option upgrade suite



Source: HAL (2020) Wainuiomata Options Assessment

Figure 6-12: Final state option upgrade suite (for future 2050 growth)

7. Stormwater Infrastructure

7.1 Network configuration

The existing Wainuiomata catchment is primarily drained by Black Creek, which is a highly modified channel running from north to south through the catchment. The western areas of Wainuiomata drain to Parkway Drain before connecting to Black Creek downstream of the Nelson Crescent bridge.

Black Creek ultimately drains to the Wainuiomata River to the south (refer to Figure 7-1).

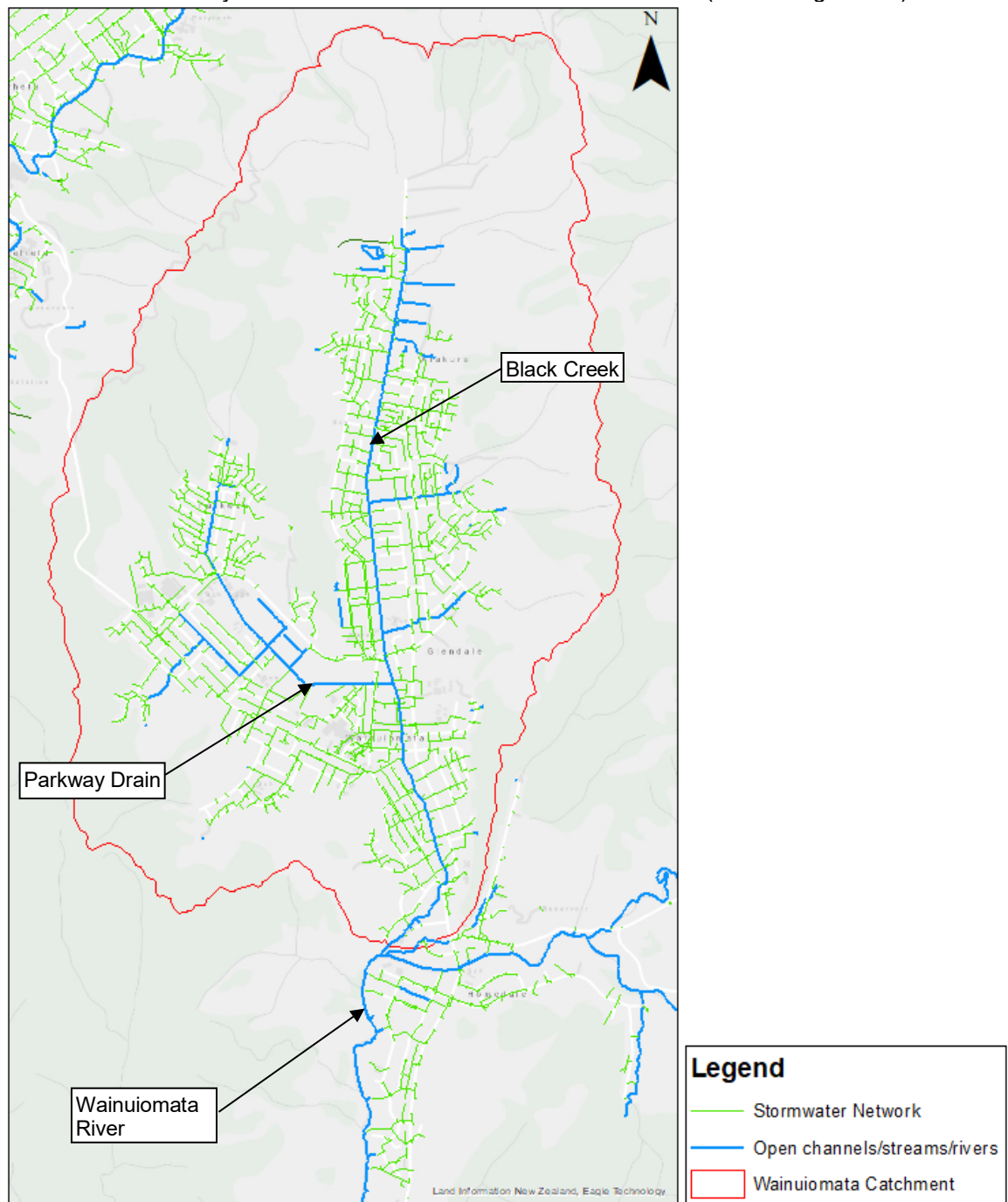


Figure 7-1 Wainuiomata existing stormwater network

7.2 Levels of service

The stormwater Levels of Service for the HCC Catchment Plan in Wainuiomata are in accordance with the activity brief as follows:

- Safe access to and protection from flooding of habitable floors in the 100-year flood event that includes the predicted impact of climate change.
- Safe access to and protection from flooding for Commercial/Businesses in the 10-year flood event.
- Attenuation of increased post-development runoff as a result of new developments in Greenfield areas will be required, as well as assessing their potential impact to the capacity of existing stormwater piped networks during a 10-year flood event.

For the purposes of this catchment scale modelling, it is assumed that a building floor level is 400 mm above ground level.

In addition to flood protection, water quality considerations need to include the effects of existing and future stormwater networks discharging into the receiving environment. These must be managed in accordance with the Wellington Water Stormwater Management Strategy for this catchment as well as Greater Wellington Regional Council guidelines.

7.3 Existing constraints

Flooding has been an issue in Wainuiomata for many years. Black Creek is a highly modified channel which was originally designed to convey a 1 in 50 year average recurrence interval (ARI) storm event. However, a hydraulic study undertaken in 2004/2005² found that much of the channel had less than a 1 in 30 year ARI capacity.



Source: Diana Isaac and Mike Prasad, Capacity (September 2010), *Black Creek Upgrade Project Wainuiomata*, PowerPoint presentation

Figure 7-2 Flooding at Nelson Crescent Bridge 1977

² Diana Isaac and Mike Prasad, Capacity (September 2010), *Black Creek Upgrade Project Wainuiomata*, PowerPoint presentation

Wellington Water engaged Stantec to review the existing Wainuiomata stormwater model to understand the causes of flooding. Stantec identified that flooding in the network is a result of three key issues:

7.3.1 Undersized channels

The major channels in the network, Black Creek and Parkway Drain, have insufficient capacity for large sections of the channels. The previous channel upgrades did not go far enough to resolve all of the problems associated with insufficient channel capacity.

7.3.2 Undersized pipe network

The upstream piped network is undersized in numerous locations such as the area around Parkway Drain and upstream of Mary Crowther Park. A number of open channels in the network which drain to Black Creek and Parkway Drain have road crossings with undersized culverts.

7.3.3 Backwater effects

Flow from the network and from overland is unable to enter the channel network at key locations due to backwater effects. For example, this occurs at multiple locations along the western side of Black Creek and around Mohaka St and Parkway Drain.

7.4 Option assessment

Work was undertaken by Stantec in 2019 and 2020 to investigate flooding issues in the existing catchment. On the 10 March 2020 a workshop was held between Stantec, Wellington Water and GHD to discuss stormwater modelling works completed to date. The outcomes of this workshop were summarised in a Wainuiomata Optioneering Phase 1 Memo by Stantec on 30 April 2020. This memo is included as Appendix E of this report.

Following this memo, additional work was undertaken to develop some of the options further. The interim results of this additional work were presented to Wellington Water and GHD on 21 June 2020 (The presentation is included in Appendix E.)

Three large scale upgrade options were considered by Stantec:

- Increase channel capacity in Black Creek
- Large scale detention (five locations proposed)
- Large scale flow diversions parallel to Black Creek and Parkway Drain

Following the presentation on 21 June 2020, GHD completed site investigations on 22 June 2020 to assess the feasibility and limitations with each of the potential options. Following this, GHD developed a longlist of feasible options, which included five detention storage options and four sections of channel improvements. These options were tested using the stormwater model to assess how they affected the catchment levels of service. For the assessment of each option refer to Appendix F.

The preferred options are discussed below.

7.4.1 New detention/wetland (SW3)

Upper Fitzherbert is in the northern greenfield development area and is currently farmland and lifestyle blocks (refer Figure 7-3). This area provides the most opportunity for stormwater storage, as it is largely undeveloped.

Wellington Water has noted that there are 30-40 landowners in this area. This could make it difficult to confirm a final storage location as it may serve a large area but only cover two or

three land parcels. One option would be for Hutt City Council to acquire the land needed to create a regional stormwater treatment and storage solution.

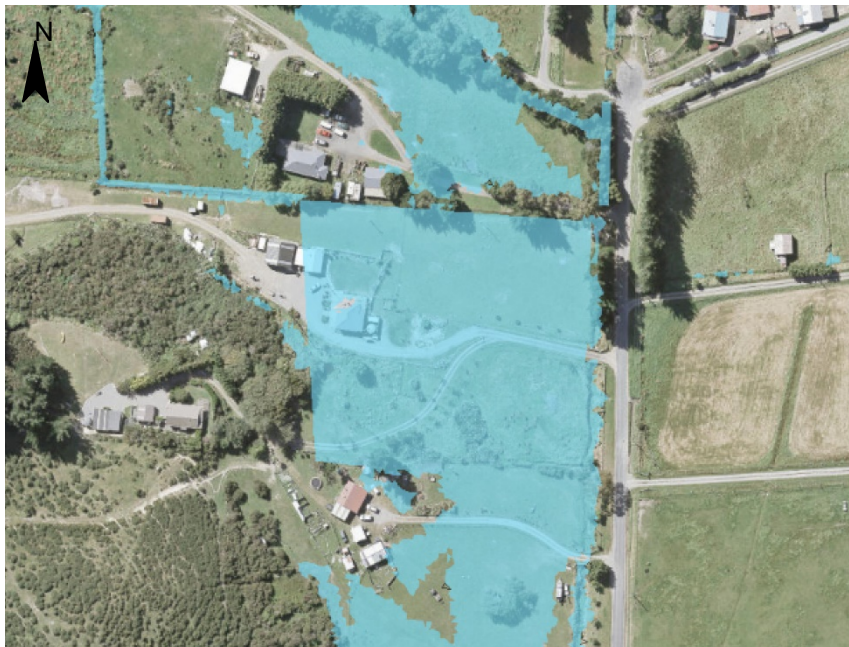
The proposal for Option C is to create an on-line treatment wetland, which will also provide a storage area adjacent to the wetland. There is a desire for all new greenfield runoff to be treated and this wetland would provide water quality treatment for most of the runoff from the northern greenfield area to be developed, including from new streets. This would require excavating the existing ground level by an average of 1.5 m for an area of approximately 10,000 m².



Figure 7-3 Black Creek at Upper Fitzherbert

The water storage volume in a 1% AEP event is about 13 ML.

The preferred location for the wetland / storage area is shown in Figure 7-4. This location is well suited for the new wetland with a low and continuous base flow.



**Figure 7-4 Storage C at Upper Fitzherbert (1% AEP + 20% CC storm event)
(location indicative only)**

7.4.2 Black Creek Widening - Top Section (SW4)

From the end of Wellington Road to the northern end of Upper Fitzherbert Road, Black Creek becomes narrower and significantly more vegetated (refer to Figure 7-5).



Figure 7-5 Black Creek near the northern end of Upper Fitzherbert Road

Based on site observations, GHD has proposed the following cross section (refer to Figure 7-6 as being achievable for widening the stream in this area without a significant impact on the adjacent properties and trees. An estimated 2,100 m³ of material would need to be removed for this option.

It should be noted that the proposed wetland (SW3) is adjacent to this section and would be connected to the stream in this area.

The proposed channel improvements have been modelled with the results of the modelling work presented in Section 8.

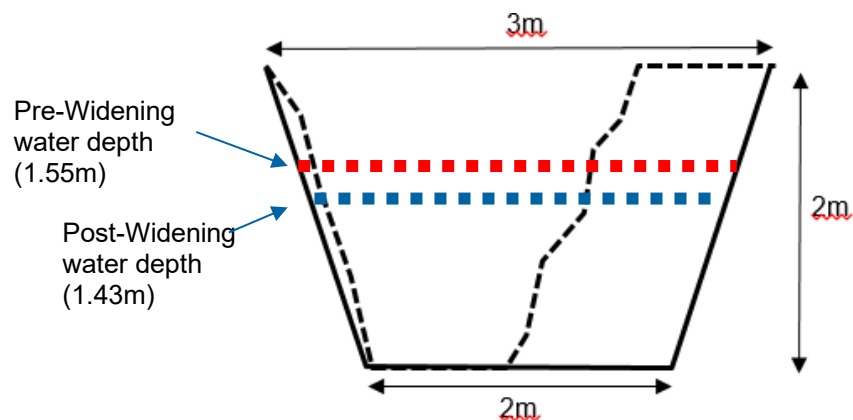


Figure 7-6 Sketch of proposed stream widening between Wellington Road and Upper Fitzherbert Road

7.4.3 Black Creek Widening - Middle Section (SW5)

The section upstream of Norfolk Street bridge (up to Wellington Road) is roughly trapezoidal and in some areas the banks have slumped into the stream (refer to Figure 7-7). In some locations this is undermining Upper Fitzherbert Road which runs parallel and very close to the creek. There is a proposal to replace Upper Fitzherbert Road with a loop road connecting Wise Street and Wellington Road. This would enable Upper Fitzherbert Road to be removed to provide space for the stream. The remaining width could be used as a pedestrian/cycle way and/or a services route.



Figure 7-7 Black Creek looking upstream from Norfolk Street bridge

GHD proposes to widen the stream here so that it has a cross-sectional area of 15 m^2 . This is approximately the same cross-sectional area as underneath Norfolk Street bridge (refer to Figure 7-8). An estimated $5,600 \text{ m}^3$ of material would need to be removed for this option.

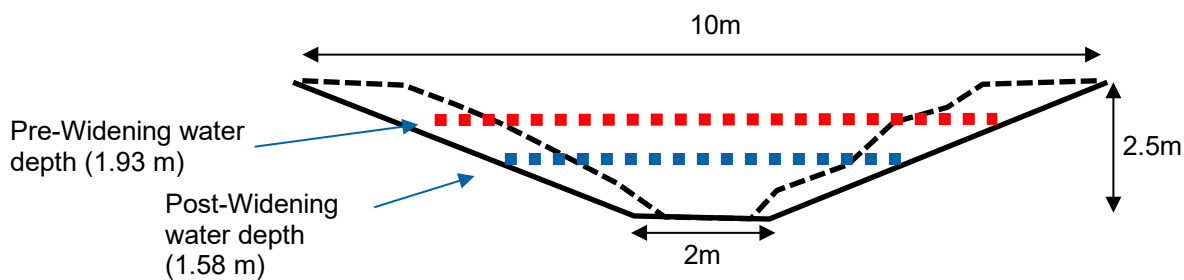


Figure 7-8 Sketch of proposed stream widening between Norfolk Street and Wellington Road



Figure 7-9 Norfolk Street bridge

The Norfolk Street bridge abutments are vertical concrete walls (refer to Figure 7-9). The proposed improvement works at this bridge is limited to soil removal as part of the stream widening works. The design of improvement works would need to consider scour and whether armouring of the existing abutments would be required following soil removal.

7.4.4 Black Creek Widening - Lower Section (SW6)

The Nelson Crescent Bridge is at the upstream boundary of the previous channel widening works. The downstream section has already been widened on the true left hand side. These historical works did not affect the stream bed with the increased capacity created using a terraced approach (refer to Figure 7-10).



Figure 7-10 Historic Channel Improvements on left hand bank (Photo taken from Nelson Crescent Bridge looking downstream)

When the channel flows increase, the flow will spill into the terraced portion of the channel, increasing the overall carrying capacity. The channel is roughly trapezoidal with flat, grassed banks on either side. There is public access to the banks but no formed paths.

The section of channel between Nelson Crescent and Norfolk Street (refer to Figure 7-11) was not included in the previous stages of channel improvements and it is recommended that a similar channel widening approach is applied to this section.



Figure 7-11 Black Creek looking upstream from Nelson Crescent Bridge

Based on the available space, GHD proposes to widen Black Creek in this section by 2 m on the true left hand side. The widening will be from approximately 1 m above bed level so that the low flow channel is unaffected (refer Figure 7-12). An estimated 5,100 m³ of material would need to be removed for this option.

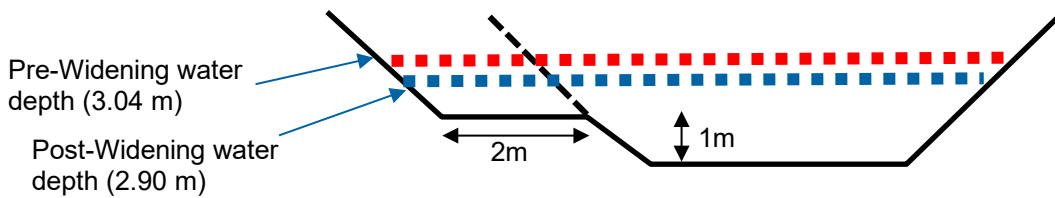


Figure 7-12 Sketch of proposed stream widening from Nelson Cres to Norfolk St, looking downstream

Nelson Crescent Bridge

The stream cross section at Nelson Crescent Bridge is currently trapezoidal below the bridge structure (refer to Figure 7-13).



Figure 7-13 Nelson Crescent Bridge

Once the channel is widened upstream of Nelson Crescent Bridge, the bridge will become a restriction for flood flows. To mitigate this, GHD proposes to increase the cross sectional area below the bridge, without increasing the total span of the structure. Gabion baskets would be used to increase the side slopes and widen the base of the stream under the bridge (refer to Figure 7-14). This option would require geotechnical investigation into the existing bridge abutment.



Figure 7-14 Sketch of proposed cross section widening under Nelson Crescent Bridge

7.4.5 Parkway Widening (SW7)

The proposed Parkway improvements include weir removal and channel widening.

There is an existing weir located in the Parkway drain behind 44 Mohaka Street (refer to Figure 7-15). GHD is not aware of the reason for this weir. This weir creates flow contraction in the drain and it is proposed that this weir is removed. The model was updated by removing this weir and modifying the channel profile immediately upstream and downstream on the weir to improve flow hydraulics. Based on the results of the model outputs, the localised flooding upstream of the weir is mitigated by the removal of the weir however further investigations are necessary in the design phase to fully understand the downstream impacts of removing the weir.



Figure 7-15 Model development with weir location identified

Parkway Drain is another open channel and is a tributary of Black Creek. The existing Parkway Drain between the Black Creek confluence and the Konini Street Drain was widened between 2005 to 2007. It is proposed that channel widening works continue upstream of the Konini Street drain to increase the capacity of Parkway drain between Rata Street and Wainuiomata High School (refer to Figure 7-16).



Figure 7-16 Extent of proposed Parkway drain widening (shown in orange)

The proposed widening does not change the width or depth of the channel. Instead the channel profile is proposed to be ‘smoothed out’ to increase its capacity. The improved channel profile is shown in Figure 7-17. An estimated 1,500 m³ of material would need to be removed for this option.

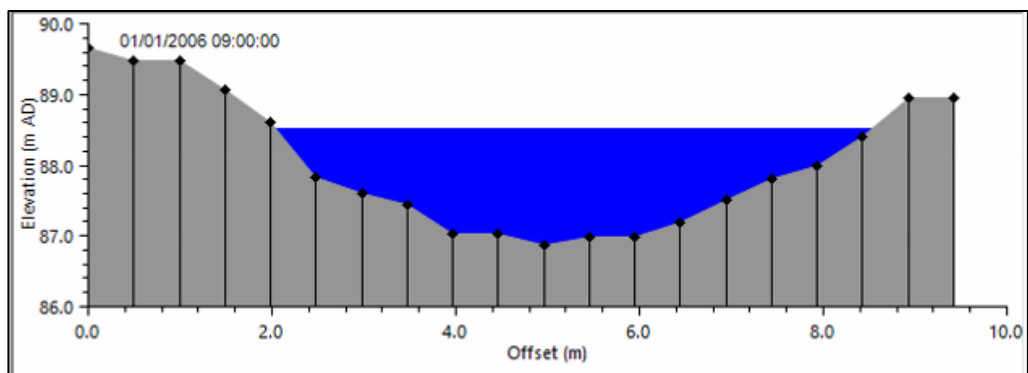


Figure 7-17 Typical channel modifications for Parkway Drain

7.5 Consent considerations

GHD's Planning Team has completed a high-level planning assessment of the proposed stormwater infrastructure options. This assessment is included in this report as Appendix G, and is summarised below.

Each option was assessed against the relevant provisions of the following plans:

- Hutt City Council District Plan
- Greater Wellington Regional Council (GWRC) Proposed Natural Resources Plan (PNRP)(Decisions Version)
- GWRC Regional Air Quality Management Plan for the Wellington Region (Air plan)
- GWRC Regional Soil Plan for the Wellington Region (Soil plan)
- GWRC Regional Plan for Discharge to Land for the Wellington Region (Discharges to land plan)
- GWRC Regional Freshwater Plan for the Wellington Region (Water plan)

7.5.1 Storage Option A (Upper Waiu Street)

HCC: Permission would be needed from GWRC for works as area is currently designated for a water supply pipeline

GWRC: Current uncertainty as to what works will be required in the stream as part of stopbank construction, which may trigger additional consent requirements. The NES Freshwater applies in addition to GWRC plans and operative rules, if the works and associated discharges are within 100m of a recognised wetland (Waiu Wetland/Gracefield Scrub).

7.5.2 Storage Option B (Upper Mohaka Street)

HCC: The network utility rules cannot be complied with as the size of the stopbank along with the amount of earthworks required are larger than the permitted standards allow.

GWRC: Volume of earthworks required over the land cannot comply with permitted activity standards of rule R99 of the PNRP. Damming and diversion of water would require resource consent pursuant to rule R135 of the PNRP, As well as Rule 16 of the Water Plan.

7.5.3 Storage Option C (Upper Fitzherbert)

HCC: Proposed option is to create a wetland, or series of wetland areas, along with storage areas, as attenuation for stormwater in high flow events. Such wetlands are not considered by the network utilities section of the plan and the Rule 13.3.1.15 would be applied. SNR58 is not specifically mentioned within 14E 2.2(b), therefore the generic Chapter 14E rules apply.

GWRC: Consent would be required for a variety of activities. The uncertainty of the alignment and specific treatment of storage options means that the assessment is necessarily uncertain and broad. Consent would likely be required as a Discretionary Activity. Volume of earthworks cannot comply with permitted activity conditions of rule R99 therefore R101 applies.

7.5.4 Black Creek Channel Widening (all sections)

HCC: Earthworks along Black Creek is considered a network utility as works are undertaken by a network utility operator for the purpose of drainage. The permitted activity standards for earthworks cannot be met so Rule 13.3.1.6 applies.

GWRC: Works cannot comply with permitted activity standards of rule R99 as they are within 5m of the bed of a river therefore rule R101 applies.

No relevant rules for the widening of the channel apply so rule R129 applies to activities occurring in the beds of rivers.

7.5.5 Parkway Drain Channel Widening

HCC: Earthworks along the Parkway drain are considered a network utility as works are undertaken by a network utility operator for the purpose of drainage. The permitted activity standards for earthworks cannot be met so Rule 13.3.1.6 applies.

GWRC: Works within the bed of a river require resource consent, pursuant to rule R101 and R129 of the PNRP as well as rule 49 of the Water Plan. Resource consent is not needed under the NES Freshwater as modification of the weir is covered by regulation 72 as a permitted activity.

7.6 Costing

Cost estimates were prepared for each of the short-listed stormwater infrastructure options. Refer to Table 7-4 for the summary table and Appendix H for the cost breakdown.

The methodology and assumptions specific to the short-listed stormwater options is detailed below.

7.6.1 Storage Areas

Rates for individual components of storage areas were taken from historical projects including tendered rates for the *Porirua Central Stormwater Upgrade – Stage 1* project. This project was tendered in December 2019 and includes a wetland and flood protection walls in urban reserves and residential areas. It is assumed that the location and design criteria applied in Porirua would be similar to those for the proposed Wainuiomata storage areas.

For each proposed storage area, an allowance was made for tree and building removal based on features visible in aerial photographs. Re-vegetation costs varied according to the storage area components. Bunds/stopbanks were assumed to require grass revegetation across the entire surface area. Attenuation areas were assumed to require plantings over 20% of the area while wetlands were assumed to require planting over 100% of the area. An allowance was also made for wetland planting maintenance over a 24-month period following construction.

Property purchase was based on property values from QV with a 10% additional allowance for negotiations and legal fees.

Flood protection bunds/stopbanks were assumed to be constructed with imported fill (AP40), strengthened with HDPE Liner, geogrid and permathene and overlain with 150 mm of topsoil. If excavation was required for construction of an adjacent attenuation area, it was assumed that this could be reused for fill and no topsoil would be required.

Site specific components (inlet and outlet structures, wetland lining etc.) are detailed in the cost estimate for each storage option (see Appendix H).

7.6.2 Channel Improvements

For proposed channel works, an allowance was made for large tree removal based on tree cover visible in aerial photographs. Geotextile lining was assumed to be required for all of the excavated area and planting for 20% of the excavated area. Hydroseeding of all disturbed banks 1 metre above the stream invert was included in cost estimates.

Channel locations were reviewed to determine accessibility for large plant. Where required, an allowance was made for construction of a 3 metre temporary access road on one side of the channel. For channel upgrades along Upper Fitzherbert Road from Norfolk St to Wellington Rd,

Wellington Water advised that the existing road may be decommissioned. The cost estimate for this option includes removal of pavement and grass reinstatement across a 5m width.

7.6.3 Stormwater Network

For options including renewal of existing stormwater pipelines, the cost of renewal is a Level 2 estimate and assumed to be equivalent to the trench and lay rate for new pipelines. Where the alignment was within 3 metres of existing buildings, an allowance was included for structural support and underpinning.

7.7 Further options considered

Subsequent to the channel widening and storage option assessment, GHD considered pipe upgrade options. These options are conceptual only and have not been hydraulically modelled. The three options are discussed below.

7.7.1 Waiu Street stormwater upgrade (SW8)

The following pipe upgrades at Waiu Street are proposed to address capacity issues (refer Table 7-1 and Figure 7-18).

Table 7-1 Proposed Waiu Street stormwater pipe upgrades

Existing pipe size	Proposed pipe size	Approximate length
1200 mm	1500 mm	141 m
1500 mm	1950 mm	445 m

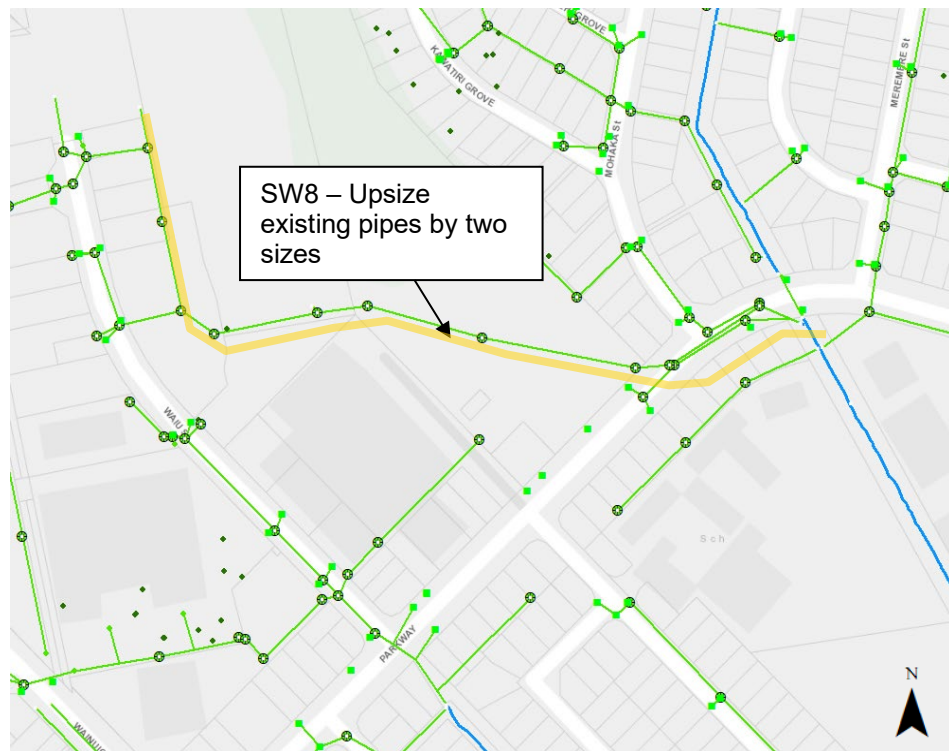


Figure 7-18 Location of Waiu Street stormwater pipe upgrades

7.7.2 Lees/Fraser Street stormwater upgrade (SW9)

The following pipe upgrades at Lees Street and Fraser Street are proposed to address capacity issues (refer Table 7-2 and Figure 7-19).

Table 7-2 Proposed Lees/Fraser Street stormwater pipe upgrades

Existing pipe size	Proposed pipe size	Approximate length
450 mm	600 mm	400 m
900 mm	1050 mm	144 m
1050 mm	1350 mm	300 m
1200 mm	1500 mm	365 m
1350 mm	1800 mm	485 m

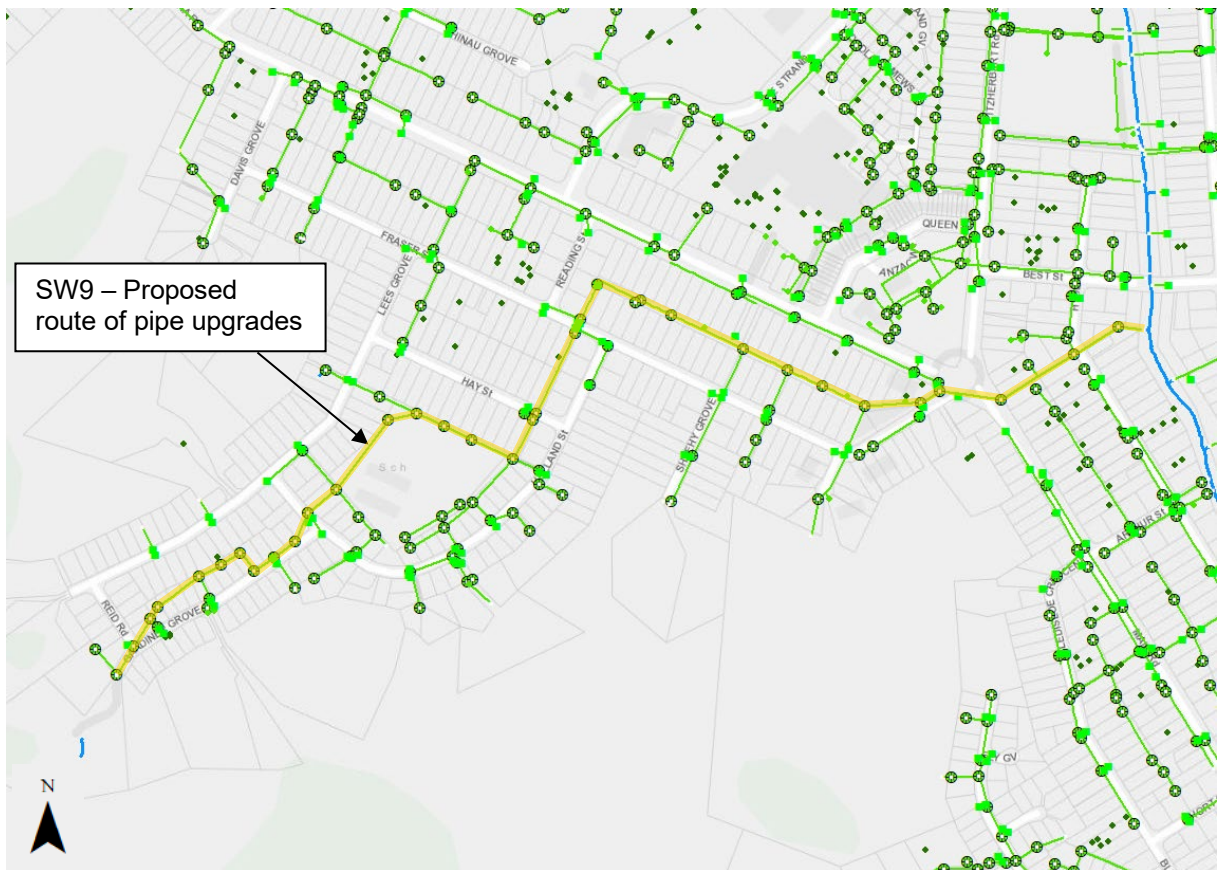


Figure 7-19 Location of Lees/Fraser Street stormwater pipe upgrades

7.7.3 Upper Fitzherbert stormwater network (SW10)

The greenfield developments around Upper Fitzherbert Road will require a new stormwater trunk network to direct the runoff into the proposed detention/wetland (SW3). This has been costed based on the sizes and pipe locations shown in Table 7-3 and Figure 7-20. The final location and extent of this trunk network will vary based on the proposed development layout.

Table 7-3 Proposed Upper Fitzherbert stormwater network

Proposed pipe size	Approximate length
450 mm	300 m
525 mm	1090 m
600 mm	470 m
750 mm	140 m

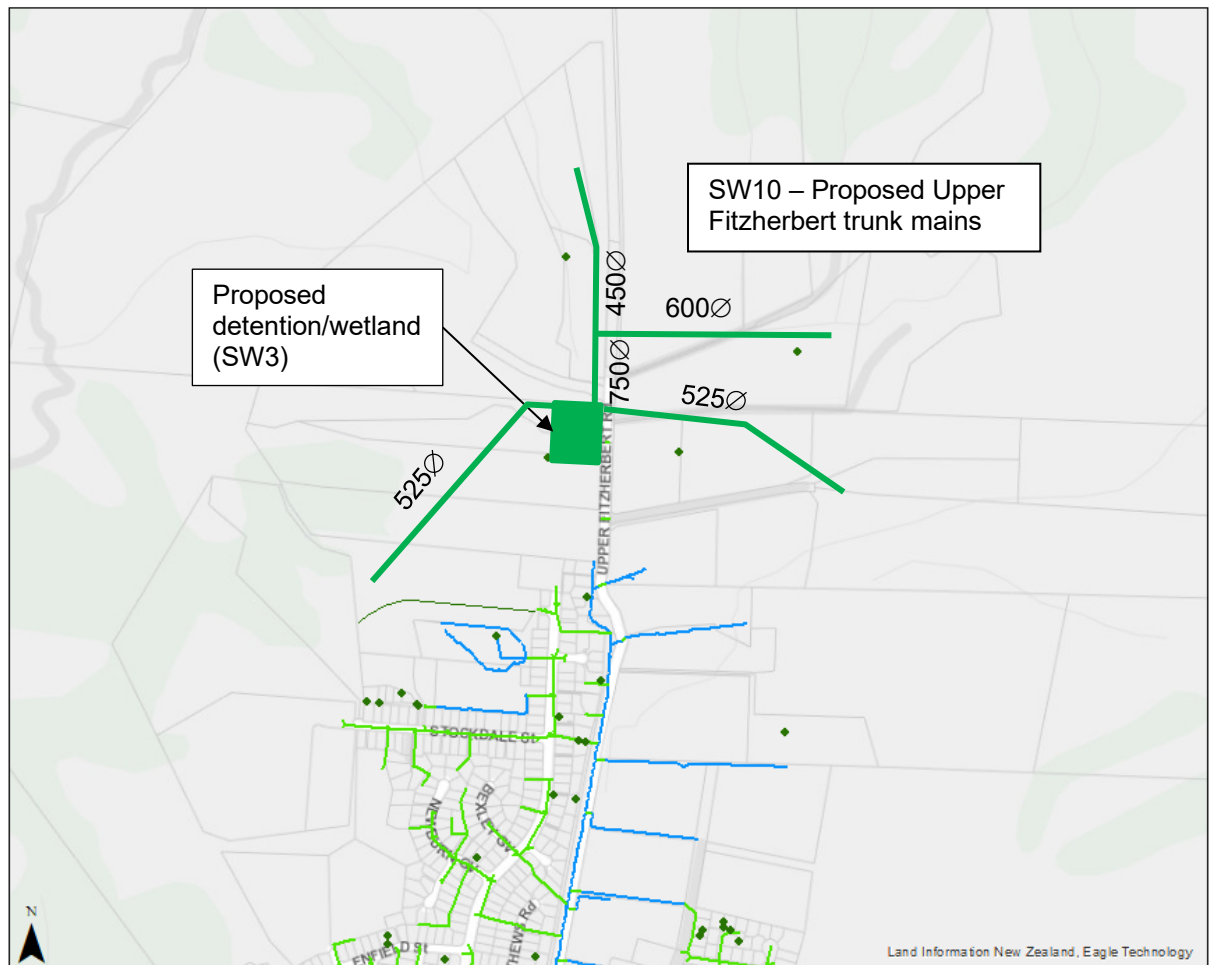


Figure 7-20 Indicative location of proposed Upper Fitzherbert stormwater network (for costing purposes)

A summary of the short-listed options is shown below.

Table 7-4 Stormwater infrastructure upgrades cost estimate (short-listed options)

Project Estimate - Storm Water

Project Name: Hutt City Catchment Plan - 3Waters Assessment for PC43 Phase 1 - Wainuiomata
 Project Phase: Study/Report
 Base Date of Estimate: Sep-20

Phase & Task	%	SW1 - Storage A: Upper Waiu St	SW2 - Storage B: Upper Mohaka	SW3 - Storage C: Upper Fitzherbert Wetland	SW4 - Black Creek A: Wellington Rd to Upper Fitzherbert	SW5 - Black Creek B: Norfolk St to Wellington Rd	SW6 - Black Creek C: Nelson Cresc to Norfolk St and Nelson Cresc Bridge	SW7 - Parkway Drain Improvements	SW8 - Waiu St Stormwater Upgrade	SW9 - Lees/Fraser St SW Upgrade	SW10 - Upper Fitzherbert SW Network
Development											
Consultancy and Council Fees	3%	\$15,000	\$49,000	\$162,000	\$16,000	\$51,000	\$62,000	\$19,000	\$129,000	\$273,000	\$102,000
Site Investigations											
Other Costs (Legal, Land, etc...)											
Total Project Development		\$15,000	\$49,000	\$162,000	\$16,000	\$51,000	\$62,000	\$19,000	\$129,000	\$273,000	\$102,000
Consenting											
Consultancy and Council Fees	3%	\$15,000	\$49,000	\$162,000	\$16,000	\$51,000	\$62,000	\$19,000	\$129,000	\$273,000	\$102,000
Site Investigations											
Other Costs (Legal, Land, etc...)		\$300,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
Total Consenting		\$315,000	\$249,000	\$362,000	\$216,000	\$251,000	\$262,000	\$219,000	\$129,000	\$273,000	\$102,000
Detailed Design											
Consultancy and Council Fees	6%	\$30,000	\$97,000	\$324,000	\$31,000	\$101,000	\$125,000	\$38,000	\$258,000	\$545,000	\$204,000
Site Investigations											
Other Costs (Legal, Land, etc...)											
Total Detailed Design		\$30,000	\$97,000	\$324,000	\$31,000	\$101,000	\$125,000	\$38,000	\$258,000	\$545,000	\$204,000
Procurement											
Consultancy and Council Fees	1%	\$5,000	\$16,000	\$54,000	\$5,000	\$17,000	\$21,000	\$6,000	\$43,000	\$91,000	\$34,000
Other Costs (Legal, Land, etc...)											
Total Procurement		\$5,000	\$16,000	\$54,000	\$5,000	\$17,000	\$21,000	\$6,000	\$43,000	\$91,000	\$34,000
Construction											
Consultancy and Council Fees	5%	\$25,000	\$81,000	\$270,000	\$26,000	\$84,000	\$104,000	\$32,000	\$215,000	\$454,000	\$170,000
Land Acquisistion			\$1,320,000	\$1,397,000							
Other Costs (Legal, Land, etc...)											
Physical Works											
Preliminary and General		\$96,000	\$292,000	\$971,000	\$100,000	\$321,000	\$396,000	\$120,000	\$775,000	\$1,636,000	\$645,000
Physical Works - Stormwater		\$503,000	\$1,625,000	\$5,394,000	\$525,000	\$1,687,000	\$2,083,000	\$633,000	\$4,305,000	\$9,086,000	\$3,394,000
Physical Works - Wastewater											
Physical Works - Potable Water											
Total Construction		\$623,000	\$3,319,000	\$8,032,000	\$651,000	\$2,092,000	\$2,582,000	\$785,000	\$5,295,000	\$11,176,000	\$4,209,000
Base Estimate											
Base Estimate		\$989,000	\$3,730,000	\$8,933,000	\$919,000	\$2,511,000	\$3,053,000	\$1,067,000	\$5,854,000	\$12,357,000	\$4,650,000
Contingency		\$396,000	\$1,492,000	\$3,573,000	\$368,000	\$1,004,000	\$1,221,000	\$427,000	\$1,171,000	\$2,471,000	\$930,000
Expected Estimate		\$1,384,000	\$5,222,000	\$12,507,000	\$1,287,000	\$3,516,000	\$4,274,000	\$1,494,000	\$7,025,000	\$14,829,000	\$5,581,000
95th Percentile Estimate											
Funding Risk		\$831,000	\$3,133,000	\$7,504,000	\$772,000	\$2,109,000	\$2,565,000	\$896,000	\$2,108,000	\$4,449,000	\$1,674,000
TOTAL VALUE 95th Percentile Estimate		\$2,215,000	\$8,355,000	\$20,011,000	\$2,058,000	\$5,625,000	\$6,839,000	\$2,390,000	\$9,133,000	\$19,277,000	\$7,255,000

7.8 Preferred options

Based on the analysis of the stormwater model, some of the options for stormwater detention had minimal impact on reducing downstream flooding, which is largely related to local catchment capacity issues downstream of the Black Creek / Parkway confluence. Two of the options were discounted early on for this reason.

Two of the detention storage options (SW1 and SW2) were not recommended as the total storage volume available was relatively small and therefore of limited benefit for large storm events. In general, stream widening was found to be more effective at achieving the desired levels of service. Further detail regarding these two excluded options is included in GHD's Stormwater Assessment Report in Appendix F.

The recommended detention storage and stream widening works are summarised in Table 7-5.

Table 7-5 Summary of stormwater infrastructure preferred options

Ref	Option	Description	Estimated cost	Planning horizon
SW3	New Detention / Wetland	New wetland and detention storage next to Upper Fitzherbert Road (13 ML)	\$20 M	2033
SW4	Black Creek Widening (Top Section)	Widening of Black Creek from Wellington Road to Upper Fitzherbert (316 m)	\$2.1 M	2020
SW5	Black Creek Widening (Middle Section)	Widening of Black Creek from Norfolk Street to Wellington Road (1190 m)	\$5.6 M	2020
SW6	Black Creek Widening (Lower Section)	Widening of Black Creek from Nelson Crescent to Norfolk Street (1500 m)	\$6.8 M	2020
SW7	Parkway Widening	Widening of Parkway Drain from Rata Street to Wainuiomata High School + Weir removal (595 m)	\$2.4 M	2020

The location of the proposed wetland/storage area and the locations of the proposed channel widening works are shown in Figure 7-21 and Figure 7-22.

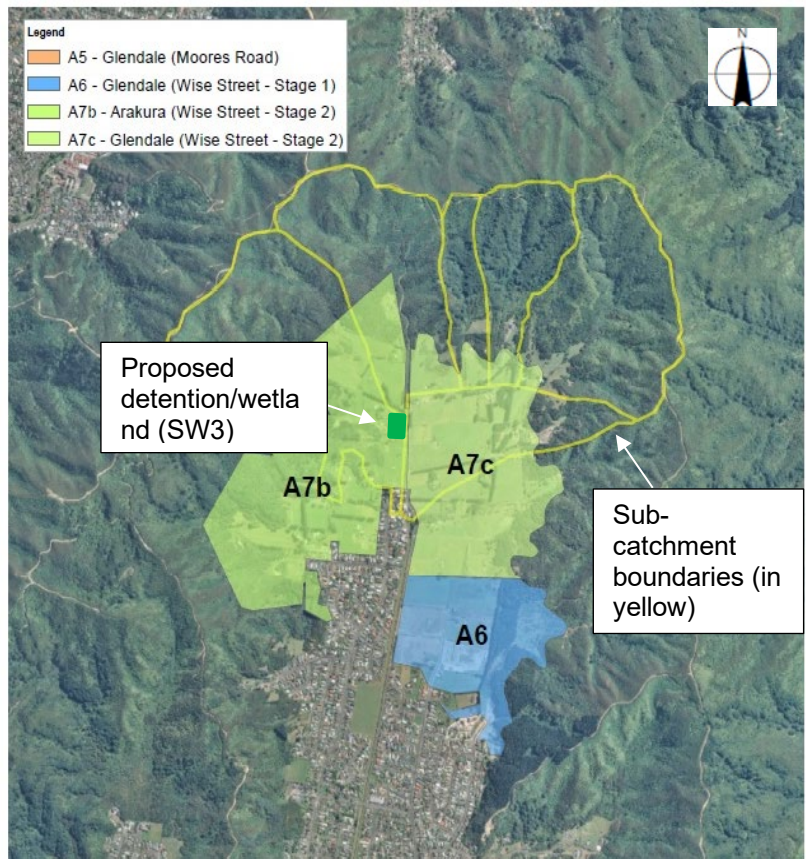


Figure 7-21 Location of proposed detention/wetland

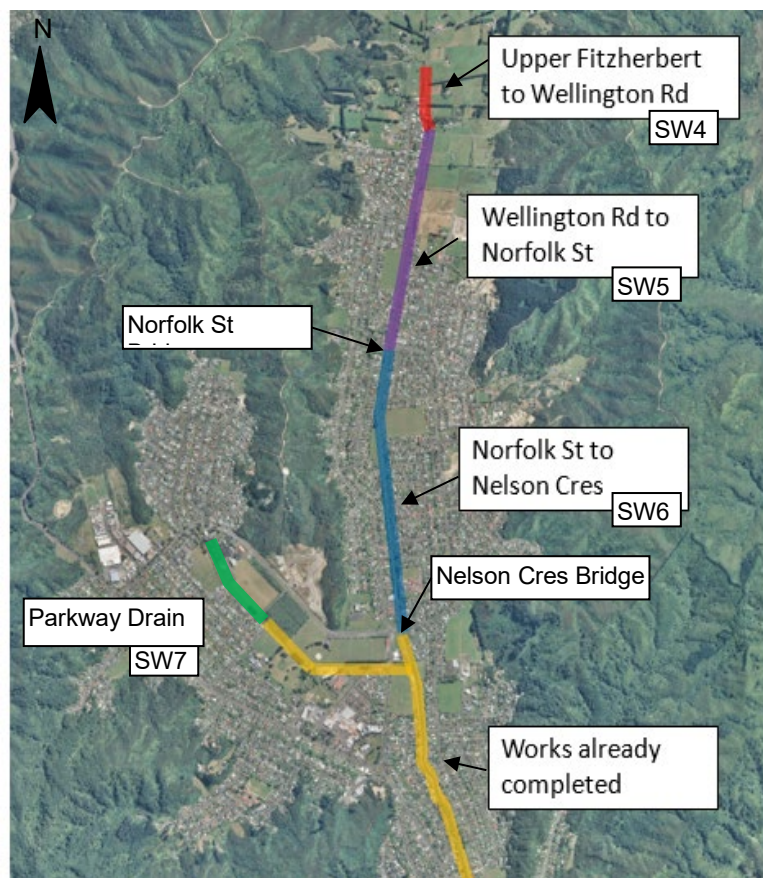


Figure 7-22 Wainuiomata channel locations

7.9 Model results for the proposed options

7.9.1 Wetland (SW3)

Based on the existing state and outputs from the model, the peak flow rate entering Black Creek at Upper Fitzherbert Road is 24.6 m³/s for a 1 in 100 year event + climate change.

Following the completion of the northern development (Wise Street – Stage 2), the peak flow rate entering Black Creek at Upper Fitzherbert Road is 41.6 m³/s based on a 1 in 100 year event + climate change. The increase in peak flowrate due to this development is 17 m³/s.

Based on GHD's assessment, the total volume of runoff that needs to be stored in order to enable the Wise Street – Stage 2 development and maintain the existing peak flow rate of 24.6 m³/s is approximately 11,000 m³.

As detailed in Section 6.8, the proposed storage volume is approximately 13,000 m³. It is recommended that the total storage area for the new wetland/storage (SW3) be at least 11,000 m³. This storage volume is considered sufficient to prevent any increase in peak downstream channel flows as a result of the Wise Street – Stage 2 development.

It is important to note that this assessment only considers the peak flow and does not consider the increase in total runoff volumes as a result of the developments.

7.9.2 Channel Improvements (SW4, SW5, SW6 and SW7)

The calculated increase in channel capacity as a result of the proposed channel improvements is between 52% and 84% (Refer to Table 7-6).

Table 7-6 Increase in Channel Capacity

Channel Reach	Channel Capacity – Existing State	Channel Capacity – After Channel Improvements	Increase in Channel Capacity – Due to proposed Improvements
Black Creek -SW4	7.9 m ³ /s	13.9 m ³ /s	6 m ³ /s (76%)
Black Creek -SW5	50.0 m ³ /s	75.8 m ³ /s	25.8 m ³ /s (52%)
Black Creek -SW6	54.5 m ³ /s	83.6 m ³ /s	29.1 m ³ /s (53%)
Parkway SW7	8.1 m ³ /s	14.9 m ³ /s	6.8 m ³ /s (84%)

Black Creek Channel Improvements from Wellington Rd to Upper Fitzherbert

The proposed channel upgrade will increase the capacity by 6 m³/s for this channel reach with the catchment growth (from SW4) taking up 1.4 m³/s (23%) of this increased capacity.

Black Creek Channel Improvements Norfolk to Wellington Road

The proposed channel upgrade will increase the capacity by 25.8 m³/s for this channel reach with the catchment growth (from SW4 and SW5) taking up 10.3 m³/s (40%) of this increased capacity.

Black Creek Channel Improvements Nelson Crescent to Norfolk

The proposed channel upgrade will increase the capacity by 29.1 m³/s for this channel reach with the catchment growth (from SW4, SW5 and SW6) taking up 11.3 m³/s (39%) of this increased capacity.

Parkway Drain Channel Improvements Rata Street to Manutuku

The proposed channel upgrade will increase the capacity by 6.8 m³/s for this channel reach with the catchment growth (SW7) taking up 0.8 m³/s (12%) of this increased capacity.

8. Timing

The proposed water infrastructure improvement projects including proposed timing is tabulated in Table 8-1.

Table 8-1 Proposed Water Infrastructure Projects including proposed timing

Upgrade Type	Next 10 Year LTP (to serve population growth to 2033)	2020 Cost Estimate (Level of Service)	2033 Growth Cost Estimates	2033 to 2050 Upgrades	2050 Growth Cost Estimates	Timing
Local Upgrades - Insufficient Fire Flow	Includes 2020 Upgrades (PW1) and 2033 Upgrades (PW2)	\$5,555,000	\$4,241,000			2020 Upgrades to be completed in the first 5 years to meet issues with current levels of service. 2033 upgrades to be completed from Year 5 to Year 10 to meet 2033 growth
New Reservoir	New Wainui Reservoir (Fernlea Site) including new pump station, access track, delivery main and discharge main (PW3)	\$19,698,500	\$19,698,500			Half of the storage requirements (4 ML) for the new reservoir is required to meet the existing levels of service and increase the Wainui storage volumes from 9 ML to 13 ML. An additional 4 ML is required by 2050 to increase the Wainui storage volumes for growth from 13 ML to 17 ML. However the reservoir needs to be constructed as a single project (8 ML by 2033). Note that the water reservoir will be more of a priority if the Wise Street greenfield development goes ahead.
Local Upgrades - Insufficient Pressure				Pipeline upsizing to allow for management of pressures due to increased demand (PW4)	\$13,637,000	Required to meet 2050 growth
Bulk Water Main Upgrade	New 914mm OD CLS pipe to replace 750 mm bulk watermain, includes: Section 1 - 1643 m (PW5) Section 2 - 442 m (PW6) Section 3 - 3117 m (PW7)	\$82,451,000				Works as per MWH (now Stantec) report with Section 3 completed first, then Section 2 followed by Section 1. As per the MWH report, this project is needed due to existing assets being at the end of their design life. Note that the cost of the bulk water main upgrade is not a direct cost for HCC as it is owned by GWRC.
	Subtotal	\$107,704,500	\$23,939,500		\$13,637,000	
	TOTAL				\$145,281,000	

The proposed wastewater infrastructure improvement projects including proposed timing is tabulated in Table 8-2.

Table 8-2 Proposed Wastewater Infrastructure Projects including proposed timing

Upgrade Type	Next 10 Year LTP (to serve population growth to 2033)	2020 Cost Estimate (Level of Service)	2033 Growth Cost Estimates	2033 to 2050 Upgrades	2050 Growth Cost Estimates	Timing
Wise Park Pump Station	Includes Wise Park Stage 1 upgrade - Pump Upgrade and internal pump station upgrade (WW1) and Stage 2 upgrade of existing rising main capacity to 400 l/s (WW2)	\$1,210,000	\$15,770,000	Wise park Stage 3 Upgrade which includes the duplication of the gravity main in the tunnel (WW11)	\$5,230,000	The initial upgrade of the pump station (Stage 1) is to mitigate some of the existing catchment overflow issues however Stage 1 is to only proceed following the upgrade of Seaview Treatment Plant. Stage 1 and Stage 2 will be implemented towards the end of the first 13 year band following the completion of the Seaview Treatment Plant Upgrade. Stage 2 is to accommodate 2033 growth. From Year 2033 to 2050 Stage 3 will take place which will increase carrying capacity further (to serve the 2050 growth scenario).
I&I Programme	Prioritized investigation of 23,900 m of Council wastewater network and rehabilitation as needed (WW3)	\$30,434,000	\$10,144,000	Targeted investigation of 16,000 m of Council wastewater network and rehabilitation as needed (WW4)	\$27,580,000	I&I works to be implemented in the first 10 years of the 2033 growth scenario (Stage 1). The \$40,578,000 for the prioritised works has been split with 75% attributed to existing LOS and 25% attributed to growth (to offset additional wastewater flows). Further analysis is needed to confirm the appropriate split. The targeted programme targets additional areas starting in 2033 (Stage 2). The 3rd Stage is the Catchment wide I&I investigation (WW5) which is not considered required for the growth through to 2050 and has not been included.
Greenfield servicing	40l/s pump station and 2.4Km rising main to Wellington Rd PS (WW6)		\$4,381,000			Assumed that the Greenfield servicing will need to be completed within the next 5 years
Fraser EOP	Storage pipeline - 150 m3 storage (WW7)	\$3,607,000				This project considered to commence after the initial I&I works. Construction between 2025 and 2030 with this storage tank considered necessary to meet existing LOS and prevent existing overflows. Investigations and design could commence between 2023 - 2025 (I&I should be re-assessed in this period as well to refine the storage requirements) to re-confirm storage sizing, and construction to commence by 2025
Main/Rowe EOPs	Storage pipeline – 500 m3 storage (WW8)	\$4,256,000				This project considered to commence after the initial I&I works, between 2025 and 2030 with this storage tank considered necessary to meet existing LOS and prevent existing overflows. Investigations and design could commence between 2023 - 2025 (I&I should be re-assessed in this period as well to refine the storage requirements) to re-confirm storage sizing and construction to commence by 2025
Private laterals I&I	Assessment and replacement of laterals (WW9)	\$19,511,000				This project carried out in conjunction with the I&I works to investigate and repair private laterals. Works relate to existing infrastructure with rehabilitation for existing defects. Note that the cost of I&I work on private laterals is not a direct cost for HCC as they are privately owned.
Wellington Rd PS	Wellington Road PS upgrade - Pumps and internal pipework			PS upgrade to ~225 l/s (following Wise Park Upgrade)	\$739,000	This project will proceed if needed after 2033, depending on the outcome of the I&I, storage and Wise Park PS works.
	Subtotal	\$59,018,000	\$30,295,000		\$33,549,000	
	TOTAL				\$122,862,000	

The proposed stormwater infrastructure improvement projects including proposed timing is tabulated in Table 8-3.

Table 8-3 Proposed Stormwater Infrastructure Projects including proposed timing

Upgrade Type	Next 10 Year LTP (to serve population growth to 2033)	2020 Cost Estimate (Level of Service)	2033 Growth Cost Estimates	2033 to 2050 Upgrades	2050 Growth Cost Estimates	Timing
Storage C : Upper Fitzherbert Wetland and Storage Area	1.05 hectare wetland and 13,000 m3 storage area to support the northern development (SW3)		\$20,011,000			Storage area is required to prevent any increase in peak flow rates as a result of the predicted northern development. Option includes a wetland to manage water quality. The planning and land acquisition needs to start immediately in order to secure a site prior to development
Black Creek Channel Improvements - A	Wellington Road to Upper Fitzherbert Channel widening - 332 m (SW4)	\$1,584,660	\$473,340			Majority of works required to mitigate existing capacity issues with 23% (\$473,340.00) of increased capacity taken up by catchment growth
Black Creek Channel Improvements - B	Norfolk Street to Wellington Road Channel widening - 1190 m (SW5)	\$3,375,000	\$2,250,000			Majority of works required to mitigate existing capacity issues with 40% (\$2,250,000) of increased capacity taken up by catchment growth
Black Creek Channel Improvements - C	Nelson Crescent to Norfolk Street Channel widening - 1500 m including Nelson Bridge Channel Improvements (SW6)	\$4,171,790	\$2,667,210			Majority of works required to mitigate existing capacity issues with 39% (\$2,667,210) of increased capacity taken up by catchment growth
Parkway Drain Improvements	Parkway Drain improvements - 595 m (SW7)	\$2,103,200	\$286,800			Majority of works required to mitigate existing capacity issues with 12% (\$286,800) of increased capacity taken up by catchment growth
Waiu Stormwater Upgrade				Upsize existing SW pipes along Waiu Street - 586 m (SW8)	\$9,133,000	Upgrade required under the 2050 growth scenario
Lees/Fraser St SW Upgrade	Upsize existing SW pipes along Lees/Fraser Street - 1694 m (SW9)	\$19,277,000				Works to mitigate existing flooding issues
Upper Fitzherbert SW Network	New Stormwater Network for development in Upper Fitzherbert. Drains to proposed wetland - 2,000 m (SW10)		\$7,255,000			Trunk stormwater infrastructure through the northern developments to be constructed as part of the new wetland works
	Subtotal	\$30,511,650	\$32,943,350		\$9,133,000	
	TOTAL				\$72,588,000	

9. Conclusion

The water, wastewater and stormwater infrastructure in Wainuiomata does not currently meet the required levels of service. There are undeveloped areas of Wainuiomata with significant growth forecasted, particularly in the northern part of Wainuiomata. Development in Wainuiomata will require the construction of new three waters infrastructure, as well as upgrades to existing networks. The predicted growth will place significant strain on the existing infrastructure if no improvement works are completed in advance of this growth.

The northern end of Wainuiomata is zoned for residential development and a servicing strategy for this area is recommended to be undertaken as soon as possible.

The catchment planning assessment in this report identifies the required infrastructure upgrades needed to meet the existing levels of service, as well as the new infrastructure needed to enable growth. The upgrades required for water, wastewater and stormwater infrastructure are discussed below.

Water

The current water storage capacity in Wainuiomata is 8 ML. An additional 4 ML of storage is needed to meet the existing levels of service with an additional 4 ML needed based on the predicted growth by 2050.

It is recommended that, as soon as possible, Wellington Water undertakes a preliminary investigation to confirm the location of the proposed Wainui 3 Reservoir and commence land acquisition as needed for the new 8 ML tank. The location of this reservoir and its final elevation have an impact on most of the other recommended pipe upgrades.

Further detailed investigations should be completed to confirm fire flow requirements. Physical multi-hydrant flow tests should be conducted to confirm available fire flow capacity prior to capital investments.

The total cost to meet the target Levels of Service and support growth is estimated to be in the order of **\$145 million dollars** (95th percentile estimate). Approximately \$33 million dollars (95th percentile estimate) of this cost is directly required to service the northern greenfield area currently zoned rural residential.

Wastewater

For the wastewater assessment, a range of options were considered for addressing wet weather overflows within the catchment and to allow for future growth. Wellington Water has an objective of supporting growth without adverse environmental impacts.

This report has identified that there is no available capacity in the downstream wastewater system for additional development. Significant additional infrastructure and improvements to existing downstream infrastructure within the Wainuiomata catchment will be required to accommodate new development without significant adverse environmental effects.

The Seaview Wastewater Treatment Plant receives flow from both the Upper and Lower Hutt wastewater networks as well as Wainuiomata. Passing forward additional flows from Wainuiomata due to increased growth will increase the frequency and volume of wet weather overflows from the plant. The proposed strategy is to target the reduction in catchment flows by reducing wastewater inflow and infiltration (I&I).

The existing pipe network will be rehabilitated as part of the proposed I&I works and increase the capacity of the network to support growth. As noted by Hydraulic Analysis Limited, approximately half of the service faults (and associated I/I loads) can be expected to be found

within the private network and private laterals. It is recommended that Wellington Water assess the required policy changes needed to enable the investigation and replacement of private wastewater laterals.

It is proposed that the Fraser Storage Tank and the Main / Rowe Storage Tank be constructed in the Year 2025. At this time the effectiveness of the I&I work can be assessed and the proposed size of the storage tanks rechecked. Following the completion of the Seaview Treatment Plant upgrade, it is recommended the Wise Park Pump Station upgrade be completed to allow for increased pumping.

The previous flow monitoring programme was completed in 2011 and a new study would help capture some of the network changes and performance changes that have occurred in the last 9 years.

The total cost to meet the target Levels of Service and growth is estimated to be in the order of **\$123 million dollars** (95th percentile estimate). Approximately \$5.1 million dollars (95th percentile estimate) of this cost is directly required to service the northern greenfield area currently zoned rural residential.

Stormwater

During significant rainfall events there is extensive flooding throughout Wainuiomata, particularly in the low-lying areas and adjacent to the open channel sections. The flooding can be attributed to network capacity issues, open channel capacity issues, restricted overland flow paths and the restricted intake capacity of sumps and inlets.

The two main open channels in Wainuiomata are Black Creek and Parkway Drain. Increasing the capacity of these two channels is considered the most effective means of improving the overall capacity of the network.

Historically the Black Creek Channel has been widened as far north as Nelson Crescent Bridge and Parkway Drain has been widened as far west as Rata Street. It is recommended that Black Creek is widened between Nelson Crescent Bridge and the end of Upper Fitzherbert Road (by the northern greenfield development area). This will increase the capacity of Black Creek by between 52 and 76%. It is also recommended that the Parkway Drain is widened between Rata Street and Parkway. This will increase the capacity of Parkway Drain by approximately 84%

GHD also recommends the construction of a wetland and a 13 ML storage area at the end of Upper Fitzherbert Road. This wetland and storage area are considered sufficient in size to prevent any increase in peak downstream channel flows as a result of the northern greenfield development and will mitigate the effects of a deterioration in water quality as a result of this development. Based on the proposed location for the wetland and storage area, three farming properties would need to be acquired. It is recommended that the negotiation for this land acquisition commence as soon as possible to avoid the risk that this land is acquired by developers. It is proposed that this wetland and storage area be initially funded by HCC with the full cost of the wetland and storage area recovered through development contributions. Without a centralised storage area and wetland, it is expected that individual developers may look to construct their own storage areas in order to achieve stormwater neutrality. This is expected to place a maintenance burden on Hutt City Council and is not recommended.

The total cost to meet the target Levels of Service and growth is estimated to be in the order of **\$72 million dollars** (95th percentile estimate). Approximately \$29 million dollars (95th percentile estimate) of this cost is directly required to service the northern greenfield area currently zoned rural residential.

10. Recommendations

- Set aside funding in HCC's LTP for the water infrastructure improvements as per Table 8-1 and commence the construction of the proposed 2020 water infrastructure projects
- Set aside funding in HCC's LTP for the wastewater infrastructure improvements as per Table 8-2 and commence the construction of the proposed 2020 wastewater infrastructure projects
- Set aside funding in HCC's LTP for the stormwater infrastructure improvements as per Table 8-3 and commence the construction of the proposed 2020 stormwater infrastructure projects
- Develop a servicing strategy for the northern greenfield area
- Development in the northern greenfield area does not proceed ahead of the proposed 2020 wastewater infrastructure improvements measures
- Further model analysis be completed to confirm the required contribution by developers to the I&I reduction programme
- As soon as possible Wellington Water undertakes a preliminary investigation to confirm the final location of the proposed Wainui 3 Reservoir and commence land acquisition as needed
- The negotiation for the acquisition of land needed for the Upper Fitzherbert wetland and storage area commence as soon as possible
- Commence design of the Black Creek channel widening within the next 10 years to allow for growth and meet levels of service
- The Wainuiomata wastewater catchment be considered for a new flow monitoring programme
- Assess the required Council policy changes or potential cost share arrangement that could be developed to enable Wellington Water to complete an investigation and rehabilitation of private wastewater laterals
- Further detailed investigations completed to confirm fire flow requirements. Physical multi-hydrant flow tests should be conducted to confirm available fire flow capacity prior to capital investments.

Appendices

Appendix A – Activity Brief

Appendix B – Water Zone Management Plan (Stantec)

Appendix C – Wainuiomata 750 CI Pipe Replacement Preliminary Design Report (MWH)

Appendix D – Wainuiomata Options Assessment (HAL)

Wastewater Optioneering Report

Appendix E – Wainuiomata Optioneering Phase 1 – Memo and Presentation (Stantec)

Stormwater Optioneering Report – Stage 1

Appendix F – Wainuiomata Stormwater Options Assessment (GHD)

Stormwater Optioneering Report – Rev 2

Appendix G – GHD High Level Planning Assessment

Appendix H – GHD Cost Estimates

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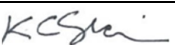

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Rev 1	J Matthews B Challis A Sutherland K Sliepen	PORTION OF THE REPORT RELATED TO SPECIFIC COSTING OF WASTEWATER AND WATER ISSUED FOR COMMENT ONLY				
Rev 2	J Matthews B Challis A Sutherland K Sliepen	C Allison		C Allison		
Rev 3	B Challis	K Sliepen		C Allison		11/12/2020

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Wainuiomata Growth Study

Paper Title:	Wainuiomata Growth Study Completion - Overview and long term planning advice
To:	Gary Craig, Head of City Growth; Christine Chong, Manager Development Liaison; Bruce Hodgins, Strategic Adviser
Authors:	Olena Chan, Manager Land Development; Mohammed Hassan, Principal Engineer, Network Engineering; Katrina Murison, Principal Adviser Growth and Land Development
Date:	24 December 2020

Purpose

1. The purpose of this paper is to provide:
 - a) Confirmation that the Wainuiomata Growth Study – Three Waters Assessment (Study) is now complete.
 - b) An overview of the study findings.
 - c) Long term planning and investment advice.
 - d) Recommendations for Growth as a result of the study findings.

Wainuiomata Growth Study

2. Wellington Water commissioned an independent study (rev 3, Dec 2020) to provide a three waters assessment for projected future growth in Wainuiomata to assist with planning to meet long term future growth demands.
3. The potential implications for three water infrastructure were investigated in the study based on the best information available at the time of study completion.
4. This study has assessed the potential demands on three waters infrastructure based on the current projected growth scenario.
5. Wainuiomata is expected to have a projected increase of around 6000 additional residents over next 30 years this includes the greenfield development area in the north, and intensification enabled by Plan Change 43 (PC43).
6. Three planning horizons were modelled to assess three waters infrastructure requirements including:
 - 2020 Planning Horizon – to understand any existing level of service gaps.
 - 2033 Planning Horizon – to inform upgrade requirements and growth over this horizon.
 - 2050 Planning Horizon– to inform network upgrades to support predicted development over next 30 years.

Overview of Findings

Enabling urban growth in Wainuiomata will require significant investment in existing three waters infrastructure as well as new infrastructure required to service future growth.

Key Constraints

7. The existing key constraints in the three-waters networks are:
- The key constraints identified for the wastewater network were significant existing and future overflows and lack of network capacity for both dry weather and wet weather flows. In addition, there are key constraints in the ability to transfer wastewater over the Wainuiomata Hill, and restrictions to the outfall at the Seaview Wastewater Treatment Plant (WWTP). The Seaview WWTP not only services Wainuiomata, but the remainder of the HCC and UHCC urban areas.
 - Flooding has been an issue in Wainuiomata for a number of years. The major channels in the network, Black Creek and Parkway Drain, have insufficient capacity for large sections of the channels. The upstream piped network is also undersized in areas around Parkway Drain and upstream of Mary Crowther Park.
 - In accordance with current levels of service, there is approximately 4ML of existing shortfall in drinking water storage. In addition, whilst not a HCC asset, the Greater Wellington Regional Council's bulk water main that services Wainuiomata, is due for renewal.

Overall estimated investment

8. New or proposed upgrades are identified for Wainuiomata assets to support a 30-year growth outlook and bring existing assets up to current levels of service. The Study found that the estimated costs of doing so are:

Table 1: Summary of 30yr estimated costs identified in the Study

Water Type	Estimated budget (\$M) (to 30 years)
Water supply	145.3
Stormwater	72.6
Wastewater	123.7
Total	341.6

Notes

1. Pipes upgrade costs are level 2 estimates with 20% contingency and 30% funding risk
2. All other upgrade costs are level 1 estimates with 40% project contingency and 60% funding risk.
3. Bulk water main upgrade cost of \$82.5M is recommended for the GWRC capital programme
4. The level of service cost for Black Creek channel and Parkway drain upgrade is not included.
5. The wastewater pipe renewals to support I&I reduction is budgeted at a city level.
6. The private lateral renewals will be property owner costs. Lateral inspection will be operational costs
7. The detention-wetland development (estimated cost of \$20M) will be required and could be joint funded from private developments to service northern Greenfield area.
8. The stormwater network development to service upper Fitzherbert area is expected to be installed and funded via private developments of this area.

Long term planning and investment advice

9. Considering the significant investment the study presents for the 30-year outlook, Wellington Water has undertaken an assessment of the priorities and requirements to service growth to inform the next LTP due to be confirmed in mid-2021.
10. The growth profile investment advice has been discussed with our Service Planning Team and incorporated into the LTP recommendation and early signals given to HCC over the course of 2020.

11. The LTP recommendation to HCC includes the following investments for growth:

Table 2: Long term infrastructure planning advice

Water Type	Project Name	Proposed Timing	LTP (2021-2031)	Y 11-30
Drinking Water	Wainuiomata local fire flow pipe upgrades	2025/26 – 2028/29	\$5,994,000	
Drinking Water	Wainui Reservoir Number 3	2029/30 – 2033/34	\$1,512,000	\$41,148,000
Stormwater	Black Creek Stormwater improvements	2031/32 -2034/35		\$3,024,000
Wastewater	Wastewater pipe upgrades - Wise St north ¹	2021/22 – 2023/24	\$3,780,000	
Wastewater	Wise Park Pump Station (Stage 1)	2021/22 – 2023/24	\$1,507,000	
Wastewater	New wastewater storage - Fraser St and Main Rd	2024/25 – 2026/27	\$7,560,000	
Wastewater	Greenfield Wainuiomata Pump Station and Rising Main	2033/34 – 2035/36		\$4,752,000
Wastewater	Wise Park Pump Station (Stage 2)	2041/42 – 2043/44		\$17,064,000
	Sub-Totals		\$23,377,000	\$62,964,000

Next steps and Recommendations

12. The study found that the demand for 3-water infrastructure to support forecast population growth in Wainuiomata will be significant and requires considerable effort to understand, plan, and invest in a way that meets the needs of our communities and changing national policy directives on urban development and water quality standards.
13. The current Wellington Water recommendations for LTP growth investment is to enable the future growth scenario assessed in the Study. Attachment 1 shows proposed 3-waters infrastructure.
14. The priority and timing to progress to any further detailed design for projects identified in the study will be dependent on the final commitments of the LTP 2021-31.
15. In future, the needs for prioritisation and decision-making may change and could give greater or different weighting to a number factors when considering how to plan and invest based on:
 - Final growth projections for the entire territorial area of HCC and not just Wainuiomata. The investment for Wainuiomata should ideally be balanced against the growth yield in the Valley Floor area.
 - Scale of an issue/constraint,
 - Strategic policy directives,
 - Community inputs,
 - Other Councils such as Upper Hutt City Council (in relation to Seaview WWTP) and Greater Wellington Regional Council (for the Bulk water main)
 - Environmental factors, and

¹ Recent assessment of the wastewater network to service the existing developments at Wise St may result in this upgrade not being required.

- Access to adequate funding.

16. We recommend further collaborative discussions between HCC and Wellington Water to better understand how to feasibly plan and invest for growth in a way that balances many competing factors.

References

GHD (2020) Hutt City Three Waters Catchment Growth Study Including Plan Change 43
Phase One: Wainuiomata Catchment Final Summary Report (rev 3) (December 2020)

Attachments:

Attachment 1 - Representation of Proposed 3-Water Infrastructure for Wainuiomata

Asset	Total Cost (HCC LTP)	Cost Y1-10	Cost Y11-29	Percentage funded from DCs	DC funded cost (excl interest)	Not funded by DC
WATER						
Wainuiomata reservoir number 3						
Provide 8,000m3 reservoir in Wainuiomata, including main and road access, for levels of service and growth.	\$57,914,400	\$1,923,965	\$55,990,434	50.00%	\$28,957,200	
sub TOTAL	\$57,914,400	\$1,923,965	\$55,990,434		\$28,957,200	
WASTEWATER						
Wise Park pump station upgrade stage 1						
Upgrade pump station capacity to provide increased forward flow capacity within capacity of existing rising main.	\$1,546,998	\$1,546,998	\$0	21.00%	\$324,870	
Wise Street North wastewater upgrade						
Upgrades to Wise Street North wastewater networks to provide capacity for growth.	\$3,936,240	\$2,073,248	\$0	55.00%	\$2,164,932	
Wastewater storage Fraser Street and Main Road						
Wastewater storage to minimise wet weather overflows.	\$8,568,730	\$8,568,730		9.00%	\$771,186	
Greenfield Wainuiomata pump station and rising main						
New wastewater pump station and rising main to convey wastewater from northern greenfield area to Wellington Road Pump Station.	\$6,890,951		\$6,890,951	100.00%	\$6,890,951	
Seaview Wastewater Treatment Plant storage						
Provision of 10,000m3 of additional storage capacity	\$20,098,380	\$20,098,380		25.00%	\$5,024,595	
sub TOTAL	\$41,041,299	\$32,287,356	\$6,890,951		\$15,176,533	
STORMWATER						
Black Creek improvements						
Management of risks associated with flooding from stormwater, channel improvements to increase capacity of the Black Creek.	\$4,157,868		\$4,157,868	100.00%	\$4,157,868	
sub TOTAL	\$4,157,868	\$0	\$4,157,868		\$4,157,868	
TRANSPORT						
Wise Street extension (urban growth strategy)						
	\$1,200,000	\$1,200,000		100.00%	\$1,200,000	
sub TOTAL	\$1,200,000	\$1,200,000			\$1,200,000	
ADDITIONAL						
Wise Park wastewater pump station and rising main (stage 2)	\$17,060,000		\$17,060,000	TBD		
TOTAL LTP	\$104,313,567	\$35,411,321	\$67,039,253	47.45%	\$49,491,601	\$54,821,966
TOTAL Medium Term (LTP + Stage 2 WW)			\$84,099,253			