

# Wellington City Council- Spatial Plan

## Three Waters Assessment- Growth Catchments Mahi Table and Cost Estimates

March 2021

### Document History

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## 1. Introduction

### 1.1 Context and Scope

Wellington City Council (WCC) requested an updated assessment of three-water (3-water) investment to support growth expected to be realised under the draft Spatial Plan.

Earlier in the WCC's Spatial Planning process, Wellington Water prepared 3-waters assessments. These are publicly available and can be found on WCC Spatial Plan webpage:

- [Wellington Water Three Waters Assessment – Addendum Report \(2020\)](#)
- [Wellington Water Three Waters Assessment \(2019\)](#)

This assessment summarises the existing three-water network constraints, infrastructure upgrades and environmental considerations to support growth. This report builds on earlier work and presents the following information:

- Updated population assessed cost-estimates presented per new dwelling by suburb for comparative purposes.
- Mahi table illustrating how much work/effort is anticipated for three-waters infrastructure upgrades in each growth suburb.
- 3-waters growth mahi catchment map showing opportunities for synergies in investment/planning at a catchment level.
- 3-waters upgrades map indicating major infrastructure required to enable growth.

### 1.2 Assumptions

The following planning assumptions have been agreed with WCC for this update:

- Use updated population/dwelling estimates presenting growth expected to be realised under the draft Spatial Plan draft, available here: [Draft Spatial Plan For Wellington City - Citywide Estimated Growth Distribution Figures \(25 September 2020\)](#). Refer to Attachment 1 for comparison with previous estimates.
- The upper population scenario has been used to assess the full development scenario for three-water infrastructure consistent with previous assessments.
- WCC are still reviewing the final estimates for population density in the city centre area, including Pipitea, Te Aro and Wellington Central. Further work is underway and is not expected to be available in time to complete this updated assessment. Updated population estimates will be largely affected by draft district plan provisions for city centre density and building heights. For the purposes of this updated assessment, the previous population estimate of 22,600 was retained for combined Pipitea, Te Aro and Wellington Central.
- Population estimates for Greenfield areas have reduced from 11,000 to 6,970 due to further planning refinement resulting from structure planning undertaken for Upper Stebbings, and Glenside. The provision of three-waters infrastructure remains excluded from this assessment.
- Spatial extent of suburbs remain the same, with only a few minor corrections to parcel boundaries. Any significant change to growth area spatial extent will require further analysis of impacts to three-water infrastructure (e.g. longer pipe lengths).

## 2. Three-Water Investment to Support Growth

### 2.1. Explaining Growth Investment

Costs presented in this assessment (and previous versions), combine costs associated with overcoming existing levels of service deficits and growth costs as this is required to meet future demand and increases in level of service (as detailed in Figure 1).

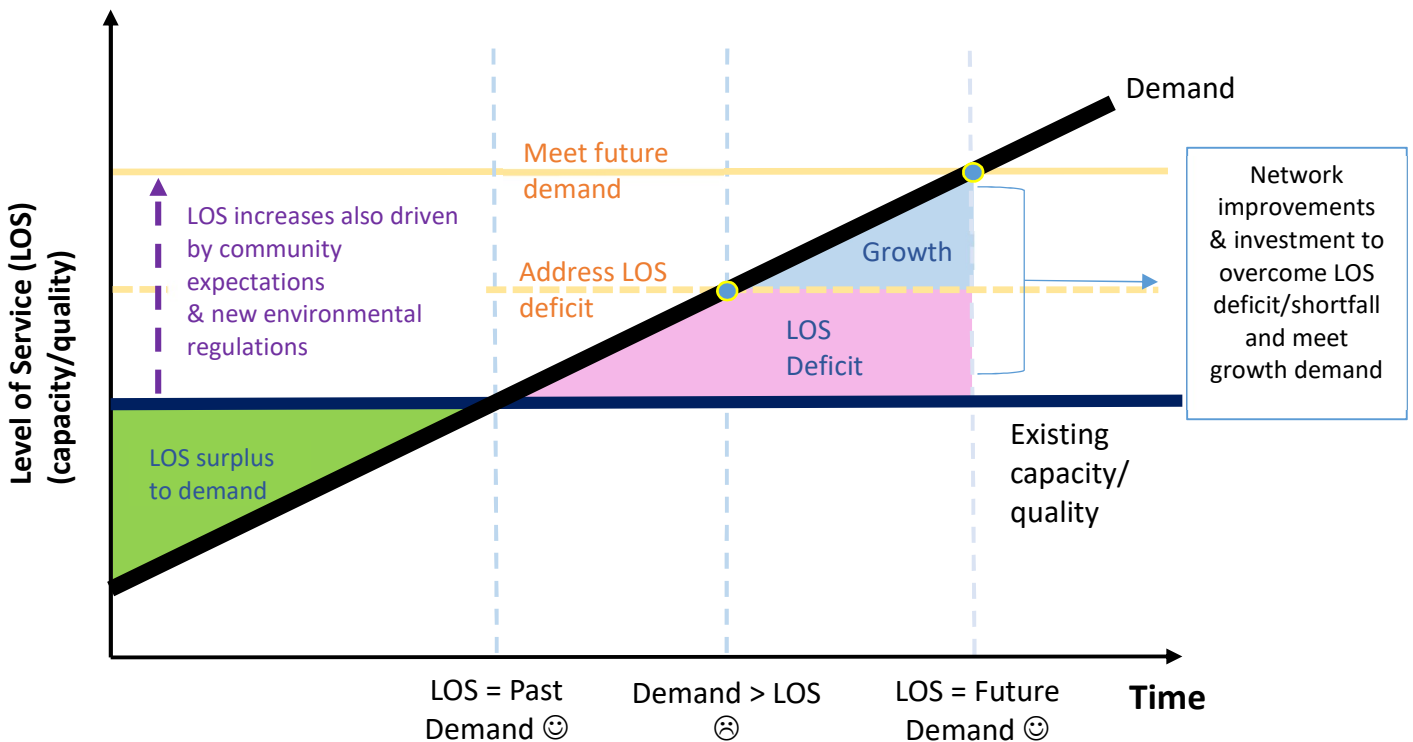


Figure 1 – Infrastructure Investment Diagram (Level of Service and Growth)

Description to accompany diagram:

- Level of Service (LoS) is measured in terms of quality or capacity of services to meet customer and regulatory expectations.
- Over time as demand, regulations or community expectations increase, a gap forms between existing service provided and that expected. This is known as level of service deficit.
- Network improvements must address existing LOS deficits as well as address future demands. Long term investment planning is essential where significant improvements or investment is required.

The costs presented in this assessment remain at a pre-feasibility level. Details of this cost revision are summarised in Attachment 2. For further details of cost estimate methodology used, refer to earlier three-water assessment reports referenced in Section 1.1.

## 2.2. Comparative investment by suburb

To enable comparison of 3-waters investment by suburb, two charts are shown below.

- Figure 2 shows a comparison of 3-waters investment by suburb, using cost per dwelling.
- Figure 3 shows a comparison of 3-waters investment by suburb, using a cost per dwelling index.

For both charts the upper end of calculated cost-band has been divided by expected number of new dwellings from WCC Citywide Growth Estimates (September 2020). For the cost-index, values have been normalised to a scale of 1 to 5.

*It is important to note that costs presented in this report include level of service deficits combined with additional infrastructure to service growth. These cost estimates are pre-feasibility and have been prepared for scale and comparative purposes only. These cost estimates should not be used or relied upon to provide an indication of development contributions without additional investigations/design.*

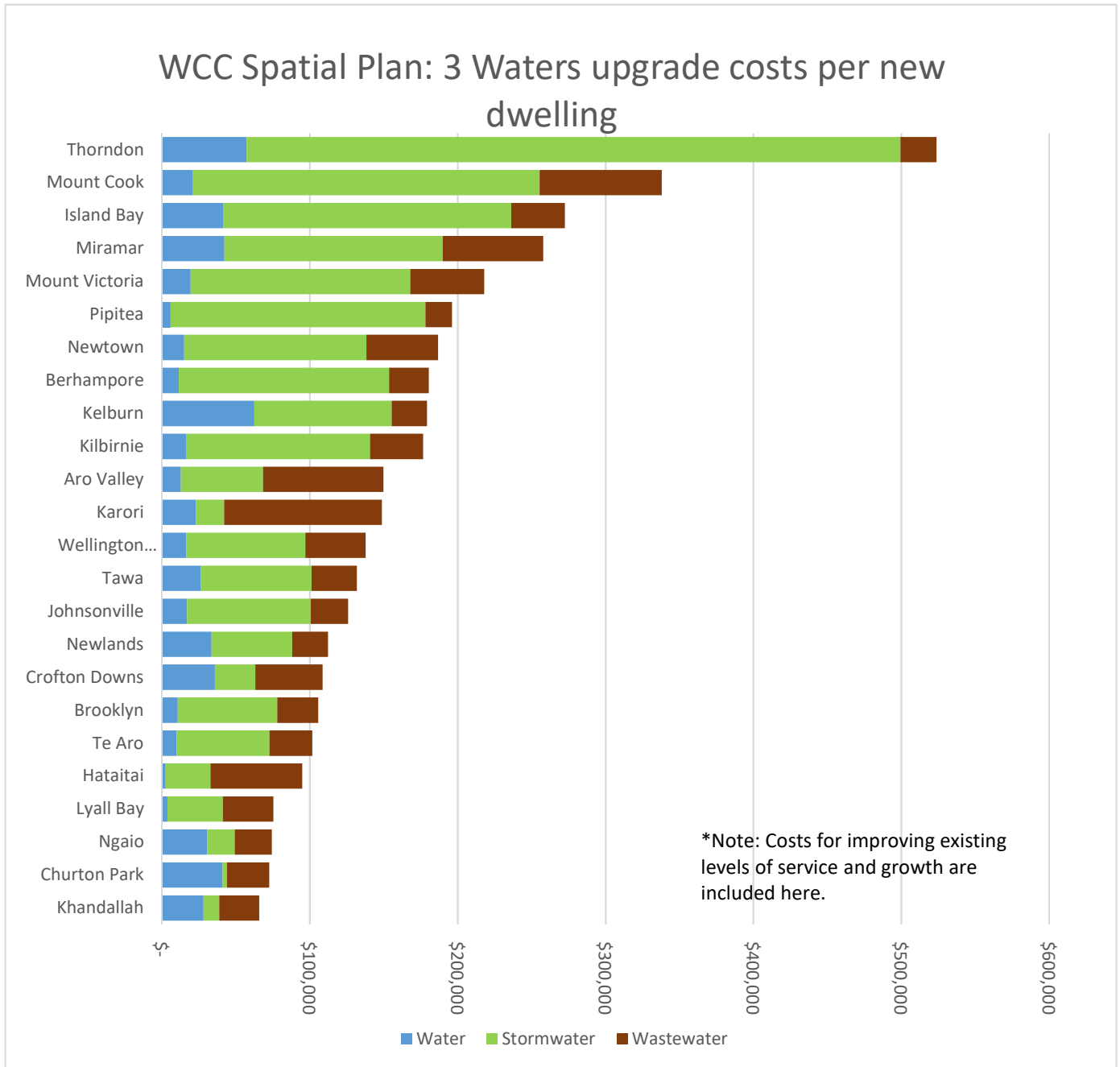


Figure 2 – WCC Spatial Plan: 3-Waters upgrade costs per new dwelling

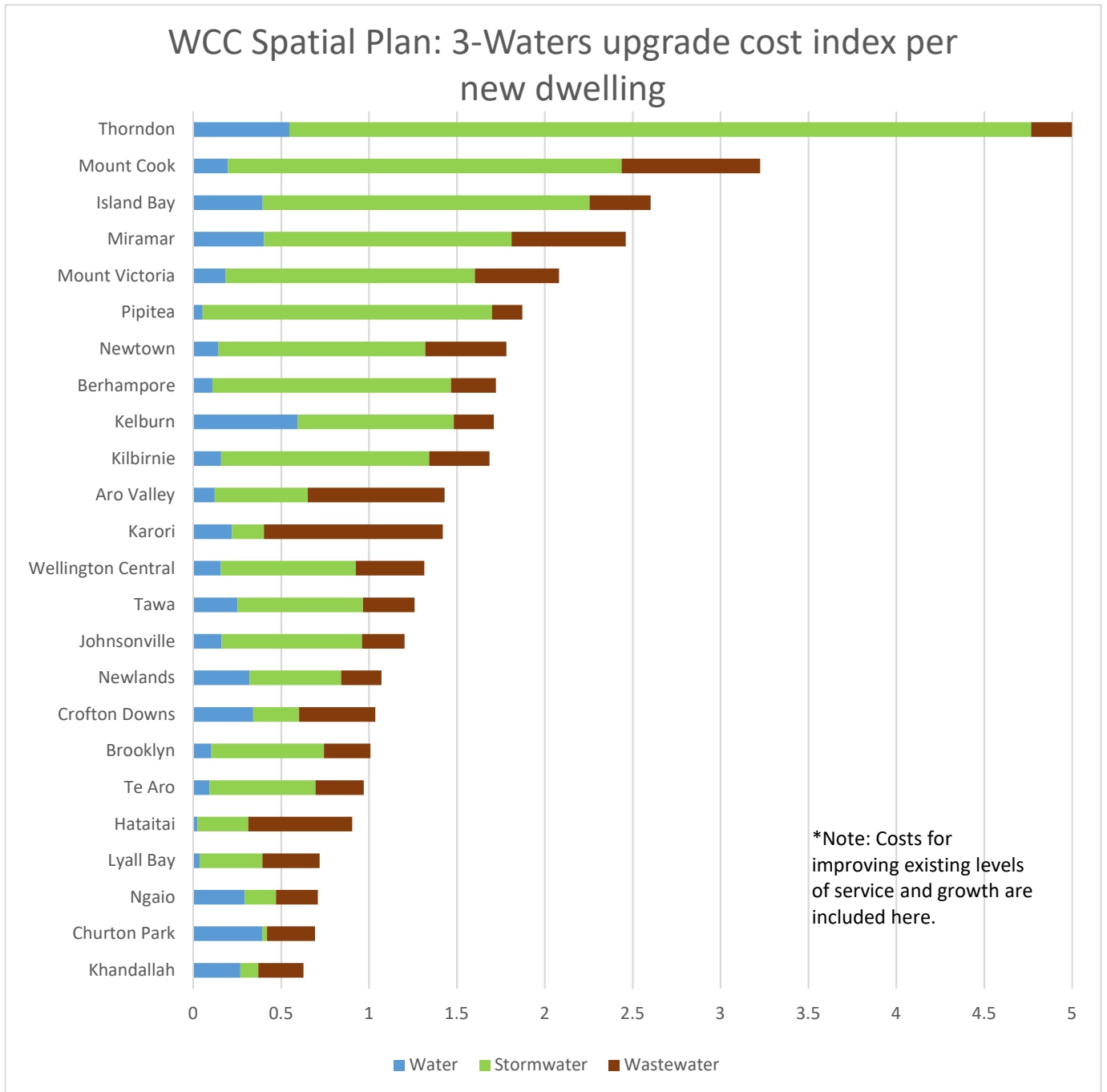


Figure 3 – WCC Spatial Plan: 3 Waters upgrade costs per new dwelling index

### 3. Three-Water Mahi Catchments and Tables

#### 3.1. Growth Catchments

A short analysis has been made to identify catchments for the grouping of suburbs. The intent is to identify 3-water infrastructure upgrade efficiencies where benefit extends beyond a single growth area, for flood management (stormwater), water supply reservoirs and wastewater overflow measures. The growth areas have been grouped into 8 potential catchments as described in the mahi table in Section 4. The catchment extents and the growth suburbs are shown in a mahi map provided in Attachment 3.

#### 3.2. Mahi Tables

To demonstrate the level of network constraint or the effort/work (Mahi) required in each suburb, for each of the three-waters to support growth information from previous assessments combined with updates for water storage and wastewater storage have been compiled and reviewed against a Mahi Level. Mahi level legend (Table 1) categorises mahi as low, medium or high.

*Table 1 – Mahi Legend*

Mahi Level	General Description
Low	No major trunk or local network constraints. May have some localised constraints
Medium	Poor condition, under capacity infrastructure with suburb-wide or reasonable investment required.
High	Significant/major network upgrades and investment required

For each suburb and each of the three-waters, the mahi level is presented in Table 2.



## WCC Spatial Plan - Three Waters Mahi Tables

Table 2 - 3-Waters Mahi Table

Three Waters Mahi Table				
Sources: WCC Spatial Plan –Three Waters Assessment – (1) Preferred Growth Scenario (Nov 2019), (2) Addendum (March 2020), prepared by Wellington Water Limited (3) Updated reservoir volume 2021				
Suburbs	Water Supply	Wastewater	Stormwater	Environment
<b>Catchment 1</b>				
Tawa	Numerous properties with low water pressure. Mains upgrades and approximately 7.5 ML additional water storage required.	Extensive overflows from under capacity mains and poor condition pipes. Approximately 6 km of local pipe upgrades and significant upgrades to the Porirua Joint Venture network. Tawa growth area drains to Porirua WWTP, WCC share of cost is ~30%, based on total population. To minimise wastewater overflows, requires a 5.2ML wastewater storage tank shared between Tawa, and Churton Park.	Significant flooding and overland flow paths restrictions. Extensive overflows from under capacity mains and poor condition pipes. Multiple stormwater pipe and overland flow path upgrades and stormwater treatment devices.	Wellington region Whaitua are currently preparing recommendations in support of improving environmental outcomes for region’s water bodies. These recommendations will likely lead to more stringent requirements for: <ul style="list-style-type: none"> <li>Managing wastewater overflows</li> <li>Managing stormwater discharges</li> <li>Reducing water demand</li> </ul>
<b>Catchment 2</b>				
Churton Park	System performance issues with a predicted pressure drop below 25m for approximately 30 customers in the Lakewood Avenue and Mallard Grove. There is a current shortfall in storage. A few properties with low water pressure. Potential 2 ML of water supply storage to address the shortfall and a likely upgrade of the existing water supply mains to increase capacity in the system.	Aging network and increased wet weather overflows. Wastewater storage required to minimise wet weather overflows shared with Tawa.  There is a likely upgrade of the gravity trunk main that is currently under capacity.	There are no significant flooding impacts in Churton Park, however, increased impermeable surfaces in this area may cause downstream effects to Tawa – which has known flooding problems.	<ul style="list-style-type: none"> <li>Whaitua requirements for streams and coastal water</li> <li>Managing wastewater overflows and stormwater discharges</li> <li>Reducing water demand</li> </ul>
<b>Catchment 3</b>				
Johnsonville	A few properties with low water pressure. Mains upgrades and approximately 7 ML additional water storage required.	Under capacity and poor condition pipes and increased wet weather overflows. Renewal of poor quality pipes (4.1km) and upgrades for capacity with storage (3.4 ML) and contribution to WWTP upgrade.	Extensive flooding due to topography and undersized pipes and lack of protected overland flow paths. The pipe upgrades identified are assumed to be indicative of the scale of investment needed to manage flooding. The solution is likely to be a mix of pipes, pumps and building control measures and stormwater treatment devices.	<ul style="list-style-type: none"> <li>Whaitua requirements for streams and coastal water</li> <li>Managing wastewater overflows and stormwater discharges</li> <li>Reducing water demand</li> </ul>
Newlands	A few properties with low water pressure. Some mains upgrades and 2.5 ML additional water storage required.	Under capacity and poor condition pipes and increased wet weather overflows. Renewal and upgrades of pipes (1.6 km), storage (1.5 ML) and contributions to WWTP upgrades.	Existing flooding in low laying areas. 3.5 km of stormwater pipes require upgrading and stormwater treatment devices.	<ul style="list-style-type: none"> <li>Whaitua requirements for streams and coastal water</li> <li>Managing wastewater overflows and stormwater discharges</li> <li>Reducing water demand</li> </ul>
<b>Catchment 4</b>				
Ngaio	No major constraints. Mains upgrades and 0.7 ML storage required.	Poor condition and under capacity pipes and increased wet weather overflows. Renewal and upgrade of pipes (1.5 km) and storage (0.8 ML) and contribution to WWTP upgrades.	Flooding along existing stream west of Ottawa Road and Khandallah Road. Approximately 600 m of stormwater pipe upgrades and improvement of overland flowpaths.	<ul style="list-style-type: none"> <li>Whaitua requirements for streams and coastal water</li> <li>Managing wastewater overflows and stormwater discharges</li> <li>Reducing water demand</li> </ul>

### Three Waters Mahi Table

Sources: WCC Spatial Plan –Three Waters Assessment – (1) Preferred Growth Scenario (Nov 2019), (2) Addendum (March 2020), prepared by Wellington Water Limited (3) Updated reservoir volume 2021

Suburbs	Water Supply	Wastewater	Stormwater	Environment
Crofton Downs	No current constraints. To accommodate projected growth in Ngaio and Crofton Downs, approximately 0.7ML additional water storage is required. Only mains upgrades to maintain existing pressures are required.	Poor condition pipes and increased wet weather overflows. Renewal of poor condition pipes (1.5 km) and system wide conveyance, storage (0.3 ML) and contribution to WWTP upgrade.	No stormwater hydraulic models were available for Ngaio, Crofton Downs and Khandallah. Approximately 300 m of upgraded pipe and stormwater treatment devices.  Upgrades were identified based on assuming that the main stormwater pipes would need to be duplicated.	<ul style="list-style-type: none"> <li>Whaitua requirements for streams and coastal water</li> <li>Managing wastewater overflows and stormwater discharges</li> <li>Reducing water demand</li> </ul>
Khandallah	A few properties with low water pressure. Mains upgrades, booster pump station and approximately 3.5 ML additional water storage required.	Under capacity and poor condition pipes and increased wet weather overflows from interceptor. Renewal and upgrade of pipes (4.9 km) and storage (2.4 ML) to manage wet weather overflows and contribution to WWTP upgrade.	Unknown as flood modelling is incomplete. 800 m of pipe upgrade, overland flow path protection and stormwater treatment devices. Upgrades were identified based on assuming that the main stormwater pipes would need to be duplicated.	<ul style="list-style-type: none"> <li>Whaitua requirements for streams and coastal water</li> <li>Managing wastewater overflows and stormwater discharges</li> <li>Reducing water demand</li> </ul>
<b>Catchment 5</b>				
Karori	A number of properties with low water pressure. Mains upgrades and approximately 6.5 ML additional water storage is required	Poor and under capacity condition pipes, wet weather related overflows and treatment plant and outfall capacities. Local pipe renewals (12.3 km) to meet capacity and water quality needs and 6 ML storage tank, new WWTP and outfall replacement/duplication.	Areas of surface flooding and overland flows. Approximately 3 km of stormwater network needs upgrading and stormwater treatment devices.	<p>Karori stream (freshwater bodies for secondary contact, schedule H2, PNRP)</p> <p>WWTP consent renewal will be challenging and costly. Higher treatment requirements.</p> <ul style="list-style-type: none"> <li>Whaitua requirements for streams and coastal water</li> <li>Managing wastewater overflows and stormwater discharges</li> <li>Reducing water demand</li> </ul>
<b>Catchment 6</b>				
Aro Valley	A few properties with low water pressure. The planned Moe-i-te-Ra (Brooklyn No.2) Reservoir will cater for the additional storage required. Only mains upgrades to address low pressure areas are required.	The aging network and increased wet weather overflows. Renewal of poor condition pipes (3.4 km) and system-wide upgrades for conveyance, storage (0.3 ML) and contribution to WWTP upgrades.	There is known deep flooding at the eastern end of Aro Street. Upgrade of trunk pipes leading to a new coastal outlet is required to reduce the risk of flooding and stormwater treatment devices.	<p>Wellington region Whaitua are currently preparing recommendations in support of improving environmental outcomes for region's water bodies. These recommendations will likely lead to more stringent requirements for:</p> <ul style="list-style-type: none"> <li>Managing wastewater overflows</li> <li>Managing stormwater discharges</li> <li>Reducing water demand</li> </ul>
Brooklyn	Numerous properties with low water pressure. Construction of the planned replacement Moe-i-te-Ra Brooklyn No. 2 reservoir will cater for the projected growth. Only mains upgrades to address low pressure areas are required.	Undersized and poor condition pipes and increased wet weather overflows. Renewal of poor condition pipes (5.4 km) and system wide conveyance, storage (1.5 ML) and contribution to WWTP upgrade.	Existing flooding in Cleveland Street, Todman Street and Ohiro Road. Approximately 1.5 km of upgraded stormwater pipes and stormwater treatment devices.	
Kelburn	Numerous properties with low water pressure. Pipe upgrades and approximately 2 ML additional water storage required.	Poor condition pipes and increased wet weather overflows. Renewal of poor quality pipes (1.7 km) and storage (0.9 ML) to manage wet weather overflows and contribution to WWTP upgrade.	Flooding on Kelburn Parade. Approximately 260m of pipe upgrades and stormwater treatment devices.	

### Three Waters Mahi Table

Sources: WCC Spatial Plan –Three Waters Assessment – (1) Preferred Growth Scenario (Nov 2019), (2) Addendum (March 2020), prepared by Wellington Water Limited (3) Updated reservoir volume 2021

Suburbs	Water Supply	Wastewater	Stormwater	Environment
Mount Cook	No major constraints. Only mains upgrades to maintain existing pressures are required.	Poor condition pipes, increased wet weather overflows under capacity pumps and rising mains. Renewal of pipes (3.0 km), upgrade of pump stations and rising main, storage (0.2 ML) and contributions to WWTP upgrades.	Stormwater from this catchment contributes to flooding in the CBD. 630 m of stormwater pipe upgrades and stormwater treatment devices.	
Mount Victoria	No major constraints. Mains upgrades and 6 ML additional storage prorated to the Berhampore, Mount Victoria, Newtown, Pipitea, Te Aro, Wellington Central, Mount Cook and Thorndon growth zones.	Poor condition pipes, increased wet weather overflows, under capacity pumps and rising mains. Renewal of pipes (1.4 km), upgrade of pump stations and rising main. Provision storage (0.3 ML) and contributions to WWTP upgrades.	Numerous overland flow paths. Protection of overland flow paths, 1.3 km of pipe upgrades and stormwater treatment devices.	
Newtown	Numerous properties with low water pressure. Mains upgrades and 6 ML additional storage prorated to the Berhampore, Mount Cook, Mount Victoria, Newtown, Pipitea, Te Aro, Wellington Central, Hataitai and Thorndon growth zones.	Poor condition pipes and wet increased weather overflows. Renewal and upgrade 4.9 km of pipes, 1.1 ML storage and contributions to WWTP upgrades.	Existing extensive flooding and lack of protected overland flow paths. 4.7 km of stormwater pipe upgrade and stormwater treatment devices.	
Pipitea	Potential supply issues. Mains upgrades and 6ML additional storage has been prorated to the Berhampore, Mount Cook, Mount Victoria, Newtown, Pipitea, Te Aro, Wellington Central, Hataitai and Thorndon growth zones.	Under capacity and poor condition pipes and wet weather overflows. 0.4 km of renewal and upgrade of pipes, storage (1.2 ML) and contribution to WWTP upgrades;	Flooding in major storm events and water quality. Stormwater main upgrade (3.6 km), future flood water pump station and stormwater treatment devices.	
Te Aro	Potential supply issues. Mains upgrades and 6 ML additional storage prorated to the Berhampore, Mount Cook, Mount Victoria, Newtown, Pipitea, Te Aro, Wellington Central, Hataitai and Thorndon growth zones	Under capacity and poor condition pipes, pumping capacity and increased wet weather overflows. Pipe renewal and upgrades (3.5 km), pump station and rising main upgrades, a new pump station and storage (10 ML) and contributions to WWTP upgrades.	Existing flooding and lack of protected overland flow paths. A new stormwater main and/or open channel along Kent Terrace with coastal outlet, stormwater treatment devices and a pump station to service low lying areas affected by sea level.	
Thorndon	Potential supply issues. Mains upgrades and 6 ML additional storage prorated to the Berhampore, Mount Cook, Mount Victoria, Newtown, Pipitea, Te Aro, Wellington Central, Hataitai and Thorndon growth zones	Pipe capacity and wet weather overflows. Minor pipe upgrade (300 m) and storage (0.1 ML) and contributions to WWTP upgrades.	Existing flooding and under capacity stormwater pipe. Upgrade of approximately 1.8 km of stormwater pipe and stormwater treatment devices.	
Wellington Central	Potential supply issues. Mains upgrades and 6ML additional storage prorated to the Berhampore, Mount Cook, Mount Victoria, Newtown, Pipitea, Te Aro, Wellington Central, Hataitai and Thorndon growth zones	Capacity of pipes, pump stations and rising main and wet weather overflows. 3.7 km of pipe upgrades and storage (1.6 ML) to manage wet weather overflows and contributions to WWTP upgrades.	Flooding due to lack of network capacity and low-lying (tidal influenced) areas. Stormwater pump station together with pipe upgrades and stormwater treatment devices.	Wellington Harbour (multiple locations) (coastal water priorities for improvement for contact recreation, H2, PNRP)
<b>Catchment 7</b>				
Berhampore	A few properties with low water pressure. A Wellington central-wide additional 6 ML storage shared across Berhampore, Mount Cook, Mount Victoria, Newtown, Pipitea, Te Aro, Wellington Central, Hataitai and Thorndon growth areas is needed. Only mains upgrades to address low pressure areas are required.	Undersized and poor condition pipes and increased wet weather overflows. Upgrade of undersized and poor condition pipes (3.3 km) and system wide conveyance, storage (0.6 ML) and contribution to WWTP upgrade.	Existing flooding in Luxford Street, Palm Grove and Adelaide Road. Approximately 2.6 km of new stormwater pipe and stormwater treatment devices. It is likely that Berhampore flooding issues can be addressed only if downstream network capacity constraints were removed, such as network capacity constraints in Island Bay.	<ul style="list-style-type: none"> <li>Whaitua requirements for streams and coastal water.</li> <li>Managing wastewater overflows and stormwater discharges</li> <li>Reducing water demand</li> </ul>

### Three Waters Mahi Table

Sources: WCC Spatial Plan –Three Waters Assessment – (1) Preferred Growth Scenario (Nov 2019), (2) Addendum (March 2020), prepared by Wellington Water Limited (3) Updated reservoir volume 2021

Suburbs	Water Supply	Wastewater	Stormwater	Environment
Island Bay	A few properties with low water pressure. Mains upgrades and 4.5 ML additional water storage required.	Poor condition pipes and Main trunk is under capacity during wet weather events. Renewal of poor condition pipe (6.1 km), main trunk upgrade and system wide storage (1.5 ML) and contribution to WWTP upgrade.	Extensive areas of flooding and lack of overland paths. Approximately 8 km of upgrades with a new or upgraded stormwater discharge point to the coastline and stormwater treatment devices. Of note is that the trunk upgrades could also be used to address flooding problems in Berhampore.	Island Bay (coastal water priorities for improvement for contact recreation, H2, PNRP)
<b>Catchment 8</b>				
Hataitai	There are high elevation areas in Maida Vale Road, Waipapa Road, Overton Terrace, Belvedere Road and Hataitai Road where properties have low pressures. Upgrading 500m of cast iron pipes on Hamilton Road and Overtoun Road to 150mm PE. Upgrade of 2km of Asbestos Cement pipes over time and 2 ML of additional storage at Miramar.	The aging network and increased wet weather overflows. Likely upgrade of 1.7 km of wastewater gravity mains and replacement of 4 km of poor condition pipes. Share of costs for Moa Point WWTP upgrade. 0.9ML storage.	Increased impermeable surfaces in this area may cause downstream effects in intensified areas and lower areas of the catchment. 1.4 km of pipe upgrades varying in size from 375mm to 1800 mm diameter and provision for stormwater quality for medium and high density areas. There are potential benefits to retrofitting and installing water sensitive devices around the existing town centre to treat stormwater runoff using devices, for example, rain gardens.	<ul style="list-style-type: none"> <li>Whaitua requirements for streams and coastal water.</li> <li>Managing wastewater overflows and stormwater discharges</li> <li>Reducing water demand</li> </ul>
Kilbirnie	No major existing constraints. Mains upgrades to maintain existing pressures are required. Storage upgrades have been applied to the Miramar growth zone.	Pipe capacity and poor condition. WWTP capacity constraints. Upgrade and replacement of pipes (3 km), storage (0.8 ML) and contribution to WWTP upgrades.	Extensive flooding likely to be compounded by high tide and sea level rise. 3 km of stormwater pipe upgrades and a pump station with at least 5 m <sup>3</sup> /s capacity and stormwater treatment devices.	
Lyllall Bay	No major constraints. Only mains upgrades to maintain existing pressures are required. Storage provided in Miramar to supply Lyllall Bay area.	Poor condition pipe and WWTP capacity constraints. 1.7km of pipe renewals, 0.5 ML of storage and contribution to WWTP upgrades.	Existing flooding likely to be compounded by high tide and sea level rise. 670 m of stormwater trunk main upgrade along Freyberg St and stormwater treatment devices.	
Miramar	No major constraints. Mains upgrades and 12 ML storage required to provide for Miramar, Kilbirnie, Lyllall Bay.	Main wastewater pipes are under capacity and prone to high levels of I&I. Upgrade and replacement of pipes (8km), upgrade of pump station PS23 and rising mains and contribution to WWTP upgrades.	A large area is a former lake and prone to flooding. Flooding can be exacerbated with future sea level rise. 2.5 km of stormwater pipe would require upgrading in addition to stormwater treatment devices. To address rising sea levels, the proposed upgrades include a large pump station and associated outlet pipe with significant capacity of up to 40 m <sup>3</sup> /s.	

## 4. Conclusions

To accommodate future population growth in Wellington City Council area, there will need to be significant upgrades to 3-water infrastructure, with intervention needed to meet growth in the following way.

- Central City (in Te Aro, Adelaide Rd), Newtown, Johnsonville, Tawa – immediate and significant intervention to meet short term growth forecasts to create development capacity in the 3-water networks.
- Newlands, Mt Cook, Mt Vic, Hataitai, Aro Valley, Berhampore, Island Bay, Khandallah, Ngaio, Crofton Downs - short term interventions to meet medium-term growth forecasts and create development capacity in the 3-water networks.
- Karori, Kelburn, Brooklyn, Thorndon, Churton Park, Lyall Bay, Kilbirnie, Miramar – medium term intervention to create development capacity in the long term.
- Greenfields – short to medium term structure planning in place to lead long term outlook for future development led by others.

The level of mahi provides an understanding of the extent of challenges to overcome and also the opportunities that exist in supporting catchment-wide solutions integrating 3-waters solutions.

A summary of key 3-water infrastructure upgrades to support WCC Spatial Plan is provided in Attachment 4. These upgrades are indicative and will be refined in more detailed investigations and design work.

It is highly recommended that detailed studies and investigations in prioritised growth catchments commences as soon as practical in order for 3-waters infrastructure to be able to support WCC's Spatial Plan.

## ATTACHMENT 1: Population/Dwelling Estimates

Table 3 shows population estimates for Draft Spatial Plan compared with earlier versions of three-water assessments.

Table 3 – WCC Growth Population and Dwelling Estimates

Suburb Type	Suburb	Population Estimates			Dwelling Estimate
		Nov-19	Jan-20	Sep-20	Sep-20
Inner	Aro Valley	1100	1100	488	194
Inner	Berhampore	1600	1600	1089	462
Outer	Brooklyn	1800	2343	2662	1082
Outer	Churton Park		1302	1680	613
Outer	Crofton Downs	300	339	467	180
Outer	Hataitai		1262	1570	628
Outer	Island Bay	3500	2111	2728	1070
Outer	Johnsonville	5700	3458	6008	2242
Outer	Karori	6600	6327	7906	3006
Outer	Kelburn	1900	1002	1503	601
Outer	Khandallah	2800	3261	4181	1666
Outer	Kilbirnie	1300	1363	1374	580
Outer	Lyll Bay	500	658	822	329
Outer	Miramar	800	1644	2222	854
Inner	Mount Cook	2500	2500	440	174
Inner	Mount Victoria	200	200	454	188
Outer	Newlands	2400	1817	2723	994
Inner	Newtown	2900	2900	2011	759
Outer	Ngaio	1300	969	1469	565
City Centre	Pipitea	2100	2100	2100	760
Outer	Tawa	5300	4491	7576	2677
Inner	Te Aro	17600	17600	17600	6372
Inner	Thorndon	1300	1300	206	99
City Centre	Wellington Central	2900	2900	2900	1050
other	Greenfields	11000	11000	6970	2500
other	Infill elsewhere	2600	2600	3570	1447
	<b>Total</b>	<b>80,000</b>	<b>78,147</b>	<b>82,719</b>	<b>31,092</b>

The latest estimates are available at: [Draft Spatial Plan for Wellington City - Citywide Estimated Growth Distribution Figures \(25 September 2020\)](#).

## ATTACHMENT 2: Summary of Cost Estimate Changes

To present updated cost estimates for the new population estimates, involved the following activities:

### Water

1. Modelling team reviewed required storage volumes based on population estimates.
2. Updated storage volumes used to calculate resulting costs for reservoir storage.
3. Updated cost-share proportion of system-wide assets to match new population estimates/suburb distribution.

### Wastewater

1. Calculated new wastewater storage volumes based on population estimates.
2. Updated wastewater storage volumes used to calculate resulting costs.
3. Updated cost-share proportion of system-wide asset to match new population estimates/suburb distribution.

### Stormwater

1. Updated cost-share proportion of system-wide asset to match new population estimates/suburb distribution.
2. Updated cost-share proportion for the Stormwater Quality costs for City Centre suburbs (Aro Valley, Brooklyn, Mount Victoria, Newtown, Pipitea, Te Aro, Thorndon, Wellington Central). Previously this cost was allocated based on suburb land area. The suburb costs have been aggregated and then disaggregated to each of these suburbs based on population growth. This updated method better represents the distribution of costs and benefits on a catchment scale.

As specified in the assumptions in section 1.2 above, it was assumed that the spatial extent of suburbs remained the same therefore no changes to the new pipe lengths have been considered. Likewise no changes have been applied to furthering extent of replacement of wastewater pipes with condition 4/5 that need to be renewed in order to meet water quality objectives (i.e. reduce exfiltration).



## ATTACHMENT 3: 3-Water Mahi Growth Catchments Map



# 3W Mahi Growth Catchments



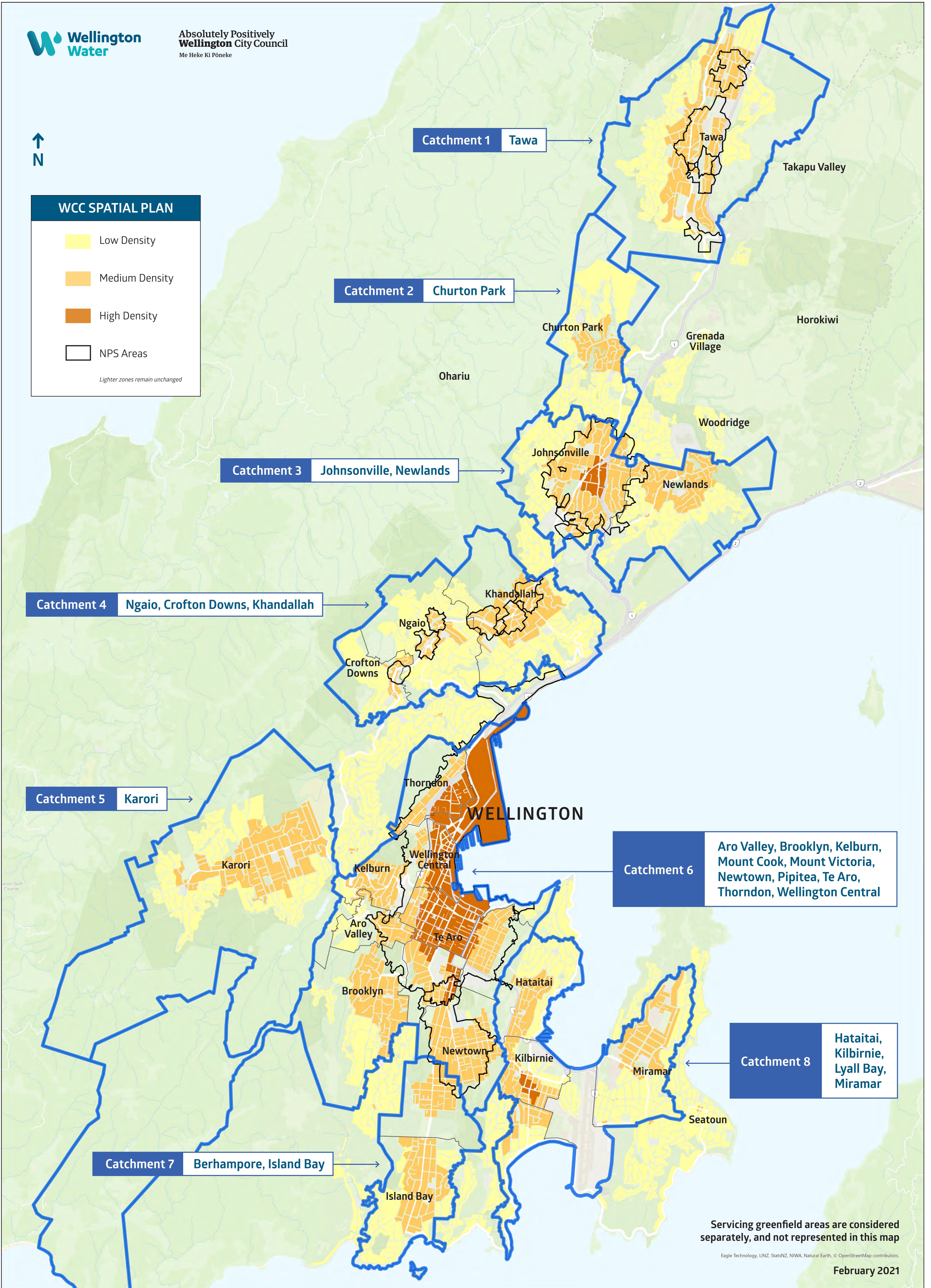
Absolutely Positively  
Wellington City Council  
Me Heke Ki Pōneke



**WCC SPATIAL PLAN**

- Low Density
- Medium Density
- High Density
- NPS Areas

Lighter zones remain unchanged



**Catchment 1** Tawa

**Catchment 2** Churton Park

**Catchment 3** Johnsonville, Newlands

**Catchment 4** Ngaio, Crofton Downs, Khandallah

**Catchment 5** Karori

**Catchment 6** Aro Valley, Brooklyn, Kelburn, Mount Cook, Mount Victoria, Newtown, Pipitea, Te Aro, Thorndon, Wellington Central

**Catchment 8** Hataitai, Kilbirnie, Lyall Bay, Miramar

**Catchment 7** Berhampore, Island Bay

Servicing greenfield areas are considered separately, and not represented in this map

Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors.

February 2021



## ATTACHMENT 4: 3-Water Upgrades to Support Growth Map

# Three Waters Upgrades to Support Growth



Absolutely Positively  
**Wellington City Council**  
Me Heke Ki Pōneke

Porirua JV network upgrades (storage, pipes, + pump stations)



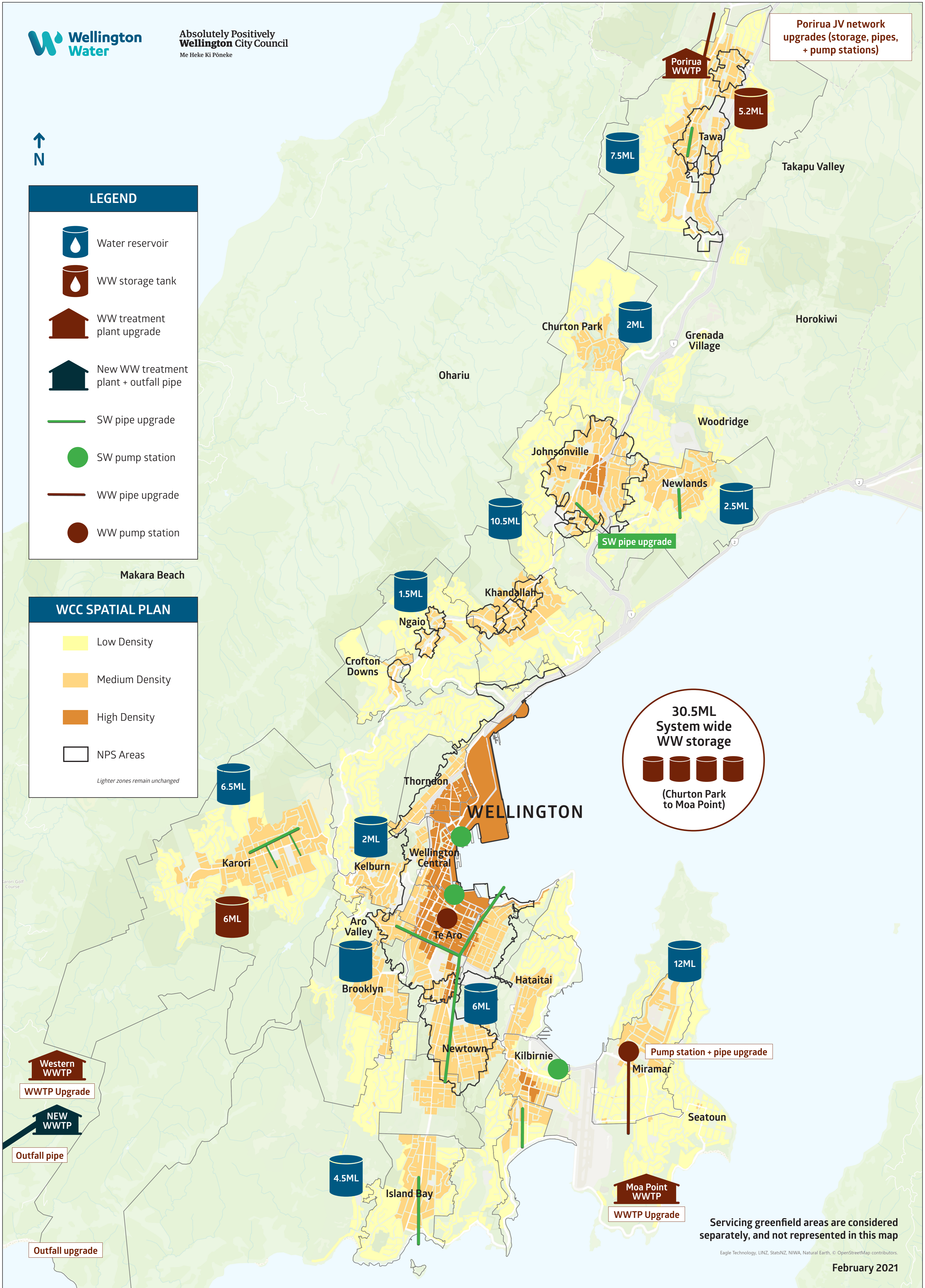
### LEGEND

- Water reservoir
- WW storage tank
- WW treatment plant upgrade
- New WW treatment plant + outfall pipe
- SW pipe upgrade
- SW pump station
- WW pipe upgrade
- WW pump station

### WCC SPATIAL PLAN

- Low Density
- Medium Density
- High Density
- NPS Areas

*Lighter zones remain unchanged*



**30.5ML**  
System wide  
WW storage  
  
(Churton Park to Mōa Point)

Servicing greenfield areas are considered separately, and not represented in this map

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