

8 August 2023

File Ref: OIAPR-1274023063-6393

Tēnā koe [REDACTED]

Request for information 2023-184

I refer to your request for information dated 10 July 2023, which was received by Greater Wellington Regional Council (Greater Wellington) on 10 July 2023. You have requested the following:

1. *“What are the current risks to people and property across Wairarapa caused by the Flood Risk, in particular to the larger towns of Carterton, Greytown, Martinborough, Featherston and Masterton?”*
2. *Which areas of Wairarapa would be most at risk in a 1 in a 100 year flood?*
3. *What is the likelihood of the Flood Risk becoming a reality?*
4. *What steps have been taken to mitigate against the Flood Risk?*
5. *What would the likely damage in dollar terms be from the Flood Risk?*
6. *How many homes in Greytown would likely be inundated in such a flood?*
7. *How many homes in Carterton would likely be inundated in such a flood?*
8. *How many homes in Martinborough would likely be inundated in such a flood?*
9. *How many homes in Masterton would likely be inundated in such a flood?*
10. *How many homes in Featherstone would likely be inundated in such a flood?*
11. *Approximately how many rural properties in the Wairarapa would likely be inundated in such a flood?*
12. *Do you have an estimate of the value of property at risk?*
13. *Do you have any comment on whether floods of similar size and impact to 1947 and 1976 could happen again?*
14. *What rural areas would be most at risk in a 1 in a 100 year flood?*

15. Which roads would be most likely to be flooded out in such a flood?

16. Are there any bridges GWRC considers to be particularly at risk of failure in such a flood?

17. Do you have any further comment?"

Greater Wellington's response follows:

1. *What are the current risks to people and property across Wairarapa caused by the Flood Risk, in particular to the larger towns of Carterton, Greytown, Martinborough, Featherston and Masterton?*

Attachment 1 contains Greater Wellington Regional Flood Exposure Assessment – Summary Report July 2022. These statistics provide an overview of current and future risk to the Region and are based on our Regional Flood Hazard model.

Our regional flood hazard assessment can be found on our website: <https://www.gw.govt.nz/your-region/emergency-and-hazard-management/flood-protection/flood-hazard-advice/regional-flood-hazard-assessment/>.

Please note Greater Wellington manages risk from major rivers as set out in the Scheme Agreements. Communities are also likely to be at risk from surface water/stormwater flooding managed by the District Councils and in some areas of the Wairarapa Coastal Flooding.

2. *Which areas of Wairarapa would be most at risk in a 1 in a 100 year flood?*

We anticipate the major towns of Masterton, Carterton, Greytown, and Featherston to be most at risk from major river flooding. We also anticipate widespread flooding of rural land from the Ruamāhanga, particularly in the Lower Valley.

The Regional Flood Hazard model indicates key areas of flood risk in the Wairarapa.

3. *What is the likelihood of the Flood Risk becoming a reality?*

The '100 year flood' is also referred to as the 1% annual exceedance probability (AEP) flood. This means that there is a 1% chance that this flood could occur in a given year (possibly even multiple times).

4. *What steps have been taken to mitigate against the Flood Risk?*

To manage flood risk there are a number of tools available such as:

- Data collection
- Flood hazard modelling
- Flood risk management planning
- Emergency Management
- Engineering controls (stop banks etc.)
- River Management
- Land-use planning

A short summary of these can be found on our website: <https://www.gw.govt.nz/your-region/emergency-and-hazard-management/flood-protection/our-work/>

Greater Wellington maintains flood protection schemes in many of the Wairarapa Rivers, working with riverside landowners to provide erosion protection. We also have in place two floodplain management plans in the Wairarapa which sets out how Greater Wellington will manage flood risk to Greytown and the Upper Valley. These can be found here: <https://www.gw.govt.nz/your-region/emergency-and-hazard-management/flood-protection/our-work/floodplain-management-plans-and-strategies/>

We are working with communities in Masterton and Carterton to develop management plans, and they are being developed following the process set out in the Floodplain Management Planning Guidelines. The guidelines can be found here: <https://www.gw.govt.nz/document/929/guidelines-for-floodplain-management-planning>

We have been working with Local Councils in the Wairarapa to develop flood hazard mapping for inclusion in District Plans. Preventing unsuitable development in flood prone areas is the most effective tool we have to manage flood risk. Detailed flood hazard mapping, developed in accordance with our Modelling Standard, has been provided. The District Plan is due to be released later this year. For more information, please see: <https://www.wairarapaplan.co.nz/>

5. *What would the likely damage in dollar terms be from the Flood Risk?*

We are refusing this part of your request under section 17(g) of the Local Government Official Information and Meetings Act 1987 (the Act) on the basis that the information is not held by Greater Wellington and there are no grounds for believing that the information is held by another local authority or a department or Minister of the Crown or organisation.

6. *How many homes in Greytown would likely be inundated in such a flood?*
7. *How many homes in Carterton would likely be inundated in such a flood?*
8. *How many homes in Martinborough would likely be inundated in such a flood?*
9. *How many homes in Masterton would likely be inundated in such a flood?*
10. *How many homes in Featherston would likely be inundated in such a flood?*
11. *Approximately how many rural properties in the Wairarapa would likely be inundated in such a flood?*

In response to questions 6 to 11, please see Attachment 1 - Greater Wellington Regional Flood Exposure Assessment – Summary Report July 2022. These statistics provide an overview of current and future risk to the Region are based on our Regional Flood Hazard model. The information has been provided for each of the territorial authorities in this area, Masterton District Council, Carterton District Council and South Wairarapa District Council.

12. *Do you have an estimate of the value of property at risk?*

We are refusing this part of your request under section 17(g) of the Local Government Official Information and Meetings Act 1987 (the Act) on the basis that the information is not held by Greater Wellington and there are no grounds for believing that the information is held by another local authority or a department or Minister of the Crown or organisation.

13. *Do you have any comment on whether floods of similar size and impact to 1947 and 1976 could happen again?*

Certainly, we can get a repeat of events of a similar size as the 1947 and 1976 floods although the impacts may be different due to development on the floodplain. The impacts of climate change are significant and intensifying, as has been experienced with the series of events affecting the north island earlier this year. Consequently, we are planning for events that may be even greater than those historical events.

14. *What rural areas would be most at risk in a 1 in a 100 year flood?*
15. *Which roads would be most likely to be flooded out in such a flood?*
16. *Are there any bridges GWRC considers to be particularly at risk of failure in such a flood?*

In response to questions 14, 15 and 16, see Attachment 1 - Greater Wellington Regional Flood Exposure Assessment – Summary Report July 2022 attached. These statistics provide an overview of current and future risk to the Region are based on our Regional Flood Hazard model.

Information on transport assets and risks maybe available from the Wairarapa Lifelines Group or Waka Kotahi.

17. Do you have any further comment?

On receipt of this response letter, we are able to arrange a meeting to answer any further questions.

If you have any concerns with the decision(s) referred to in this letter, you have the right to request an investigation and review by the Ombudsman under section 27(3) of the Local Government Official Information and Meetings Act 1987.

Please note that it is our policy to proactively release our responses to official information requests where possible. Our response to your request will be published shortly on Greater Wellington's website with your personal information removed.

Nāku iti noa, nā



Lian Butcher
Kaiwhakahaere Matua, Taiao | Group Manager, Environment

**Greater Wellington Regional Flood
Exposure Assessment – Summary Report
July 2022**

Background



Flooding is New Zealand's number one hazard. This is no different in the Wellington Region, where the majority of our towns are located on the floodplains of major rivers.

Climate change is causing an increase in flooding due to more extreme rainfall in terms of frequency, intensity and unpredictability. These increases will make it harder for flood risk management decision makers such as Greater Wellington Regional Council (GWRC) to provide protection.

A greater reliance on forecasting systems, and planning controls will be required to reduce damage to property and infrastructure and impacts on health, safety and wellbeing.

The Wellington Region also has the challenge of balancing risk management and the continuing demand to build. Often this development occurs in hazard areas both in green & brownfield scenarios.

Purpose

In 2021 the Ōhariu stream flooded Makara, leaving trail of devastation in its wake. This catchment is not monitored so the severity was only known in the days after the event. As climate change increases the frequency, severity, and unpredictability of floods and development is seeing more homes built on marginal land across the region. We need to understand if there are other Makara's across the region both now and into the future.

This assessment aims to provide a better understanding of flood exposure across the Greater Wellington Region in the present hydrological conditions and how this changes in the future due to climate change and projected growth.

This assessment will inform flood risk decision makers on the areas with the greatest potential exposure to flooding and how this is expected to change over time. This will help support business planning and investment to:

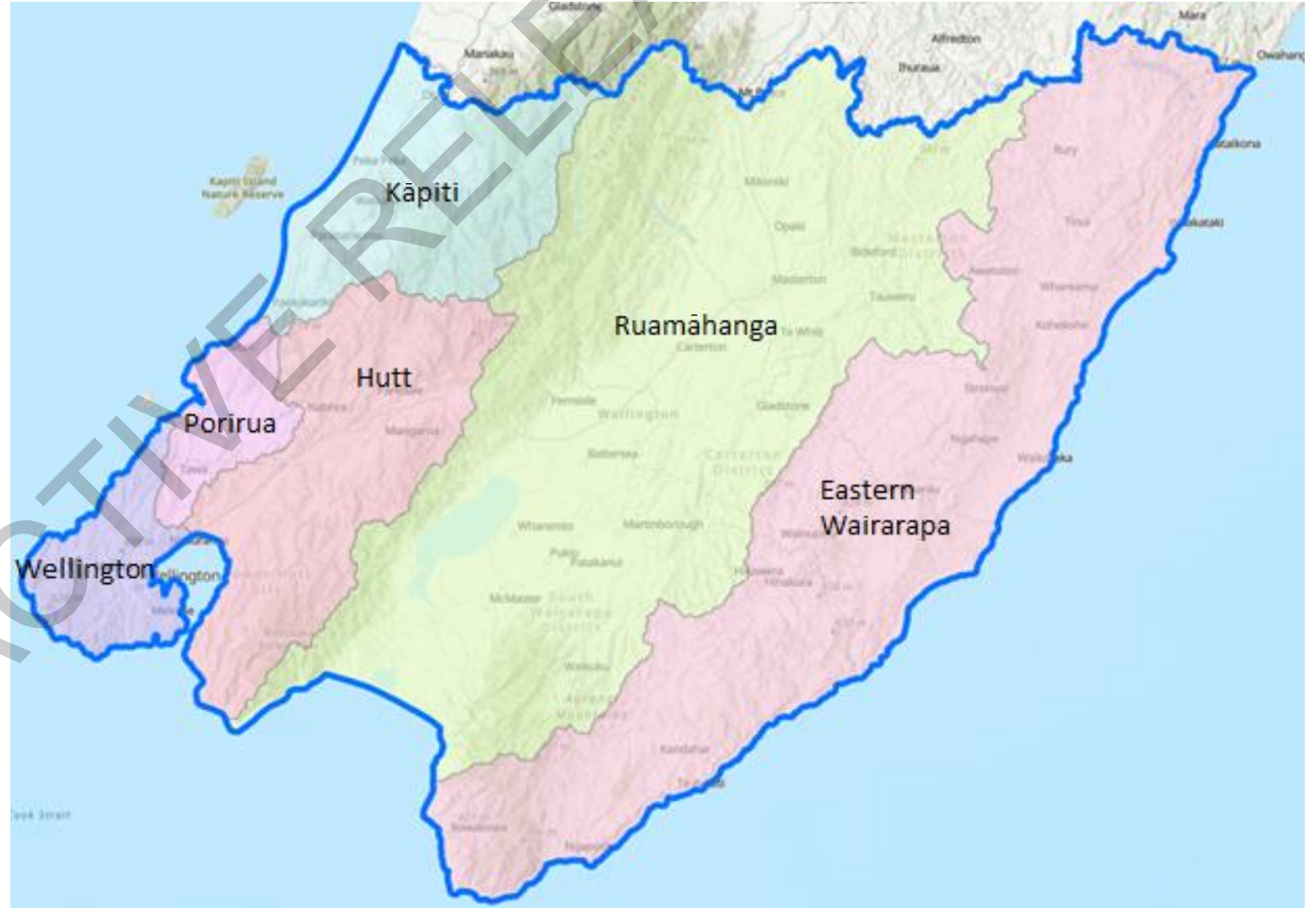
- Ensure flood risk management remains a core focus of GWRC.
- Invest in measures to reduce vulnerability in flood prone areas.
- Avoid development in highly vulnerable areas so as not to exacerbate existing issues over time.
- Support regional initiatives to adapt to climate change.



Modelling approach

A 2D rain-on-grid model was developed in TUFLOW across six domains for the entire Greater Wellington Region to inform the Flood Exposure. Modelled scenarios include:

- Present Day, 2050, 2080, 2110 timeframes.
- RCP 6, 8.5, 8.5+ climate scenarios – exposure assessment results were produced for RCP 8.5 only
- 1% and 20% AEP events with stop banks included (defended) and stop banks removed (undefended) to align with the target levels of service.



Model application

This is a high level model developed for the purpose of understanding flood exposure across the region. The modelling outputs are suitable to inform policy discussions and emergency planning. The model is intended for property level decision making and development control but can be used if no other information is available. These are they key areas of difference between this model and the Flood Hazard Modelling Standard developed models.

- The DEM used in this model is derived from LiDAR captured in 2013/2014.
- Modelling accuracy is expected to be reduced around features (channels, embankments) smaller than 20 m.
- A static tidal boundary has been adopted for this assessment which does not take varying tidal conditions into consideration.
- The model includes stormwater flooding but is less accurate in urban catchments.
- This model considers all catchments not just those with GWRC schemes in place.

The model build report has a full list of key limitations and assumptions associated with the flood models.



Model application



This summary report describes exposure in three scenarios:

- Current state – Exposure from the current 1% AEP flood across the region.
- RCP 8.5 2110 – Exposure from the 1% AEP flood including allowances for climate change across the region.
- Proposed Growth – Exposure assessment of the Regional Growth Framework proposed growth areas.

In all instances the undefended scenario has been considered. This is considered a true flood exposure as continued investment is required to maintain defences and schemes.

Current state

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Regional exposure to flooding

Buildings



Residential

73,000
31%



Commercial

4,000
69%

Emergency Service Sites



Total
11
24%

People



Total
197,000
31%

Transport



Road
1,000 km
20%



Rail
40 km
17%



Summary by Territorial Local Authority

In the present day, all TLA's have over 50% of commercial buildings exposed to flooding. Lower Hutt City has 90% of its commercial and 50% of its residential buildings exposed to flooding.

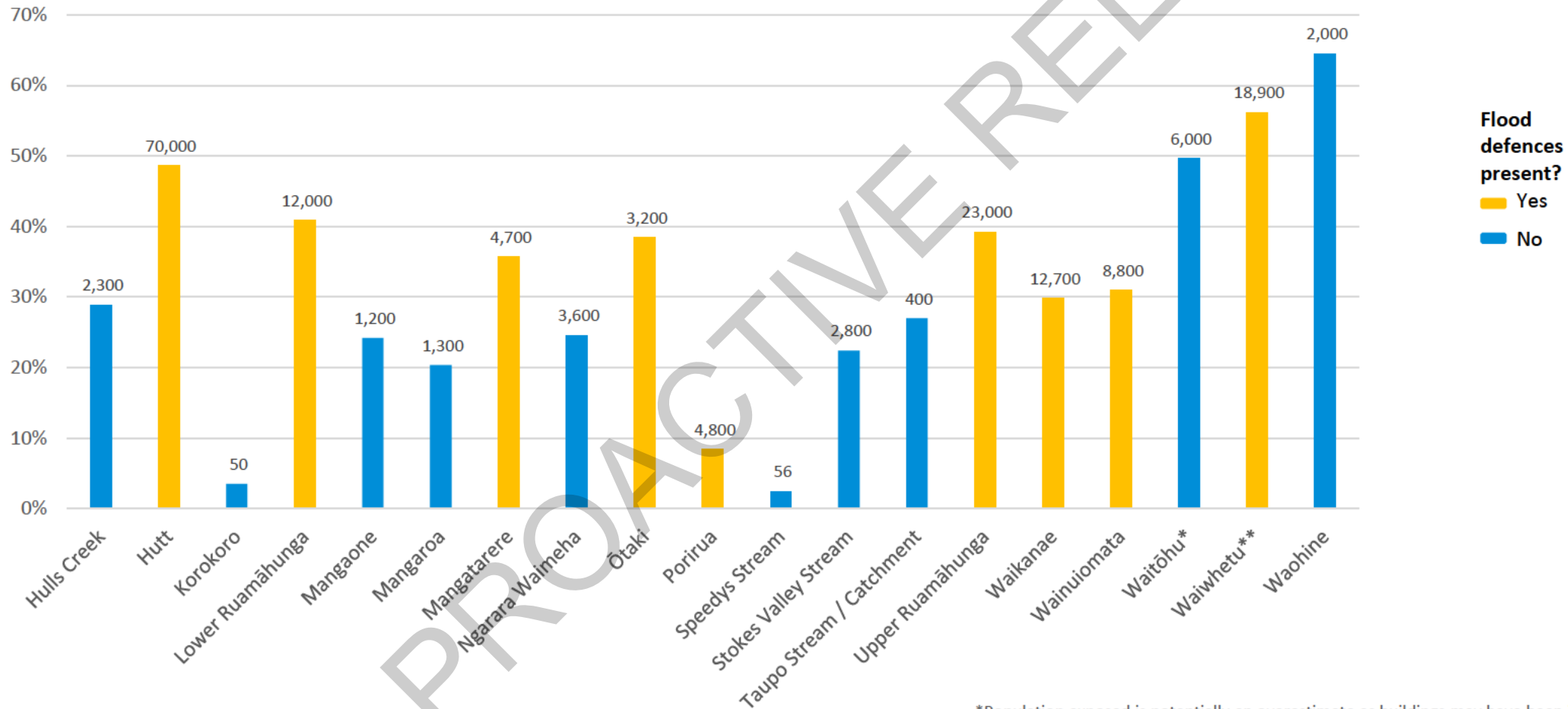
Although Carterton District only has approximately 100 commercial buildings exposed, this represents over 50% of the total buildings in the district. Similarly with South Wairarapa District and Porirua City with ~200 and ~300 commercial buildings exposed respectively representing over 50%.

Across the TLA's, there is a smaller proportion of residential buildings exposed with 50% exposed in Lower Hutt followed by Masterton District and Upper Hutt City respectively with 41% of all residential buildings.

| TLA | 2022 1% AEP Undefended Commercial | | 2022 1% AEP Undefended Residential | |
|---------------------------------|-----------------------------------|-----|------------------------------------|-----|
| | Count | % | Count | % |
| Carterton District | 100 | 55% | 3,000 | 32% |
| Kapiti Coast District | 400 | 63% | 11,300 | 34% |
| Lower Hutt City | 1,100 | 90% | 24,200 | 50% |
| Masterton District | 400 | 66% | 9,000 | 41% |
| Porirua City | 300 | 55% | 1,800 | 8% |
| South Wairarapa District | 200 | 55% | 5,100 | 40% |
| Upper Hutt City | 400 | 71% | 9,200 | 41% |
| Wellington City | 1,000 | 67% | 9,700 | 15% |

Catchments of interest current exposure

Percentage of population exposed to flooding across the catchments of interest



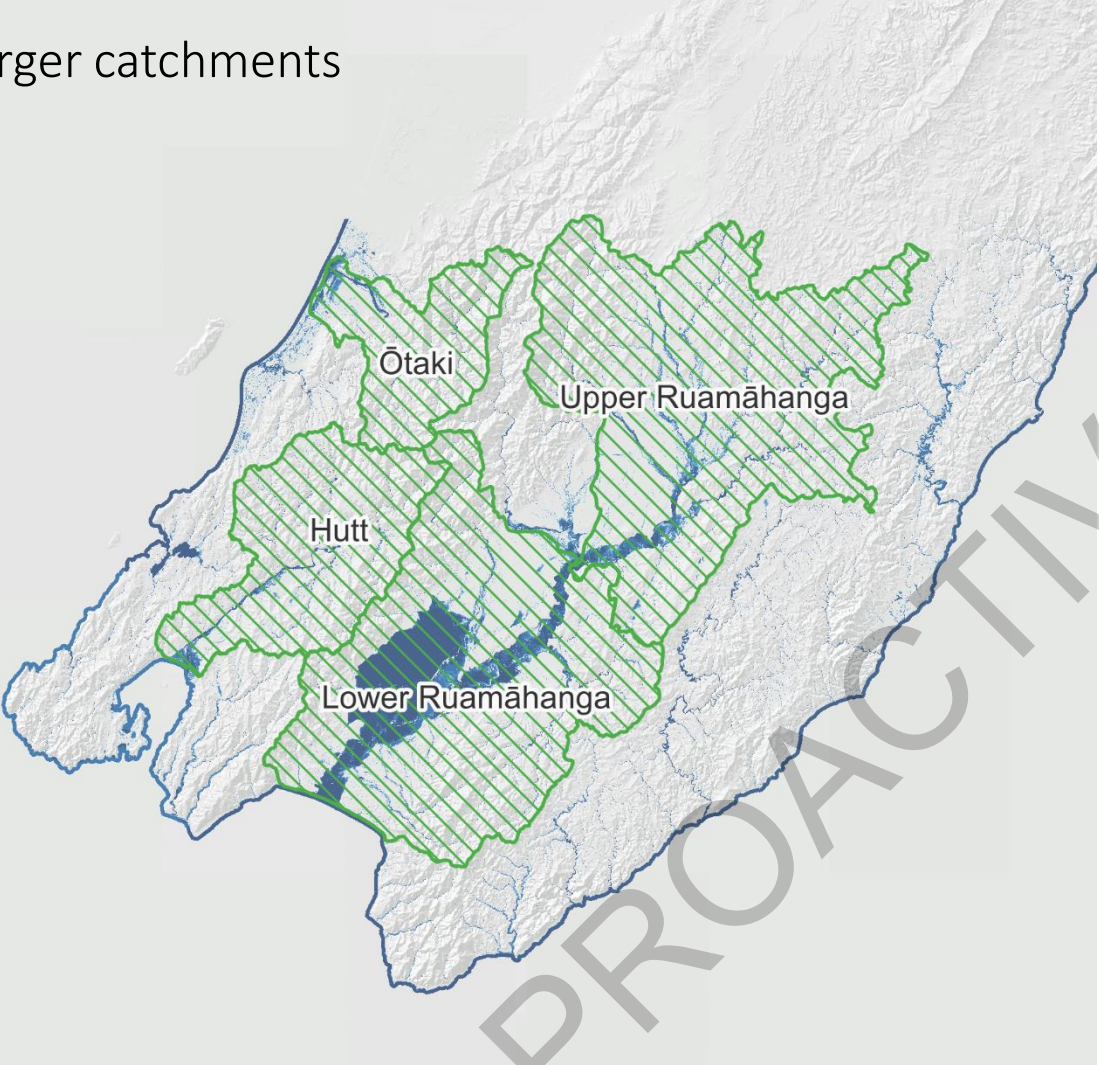
Count indicating 2022 population exposed to flooding

*Population exposed is potentially an overestimate as buildings may have been incorrectly assumed as 'residential'

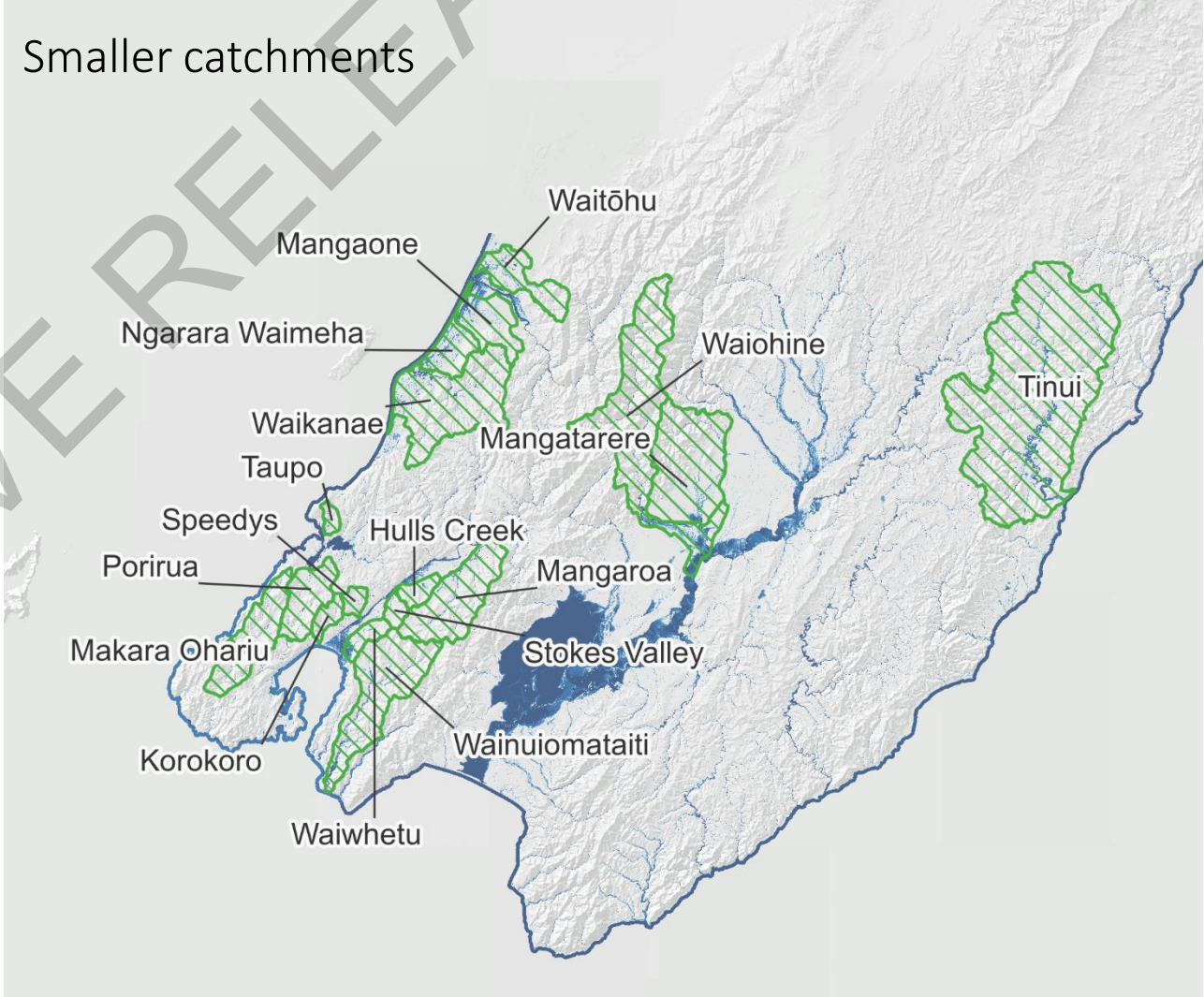
**Flood defences are present however not to the 1% AEP level of service

Catchments of interest - Locations

Larger catchments



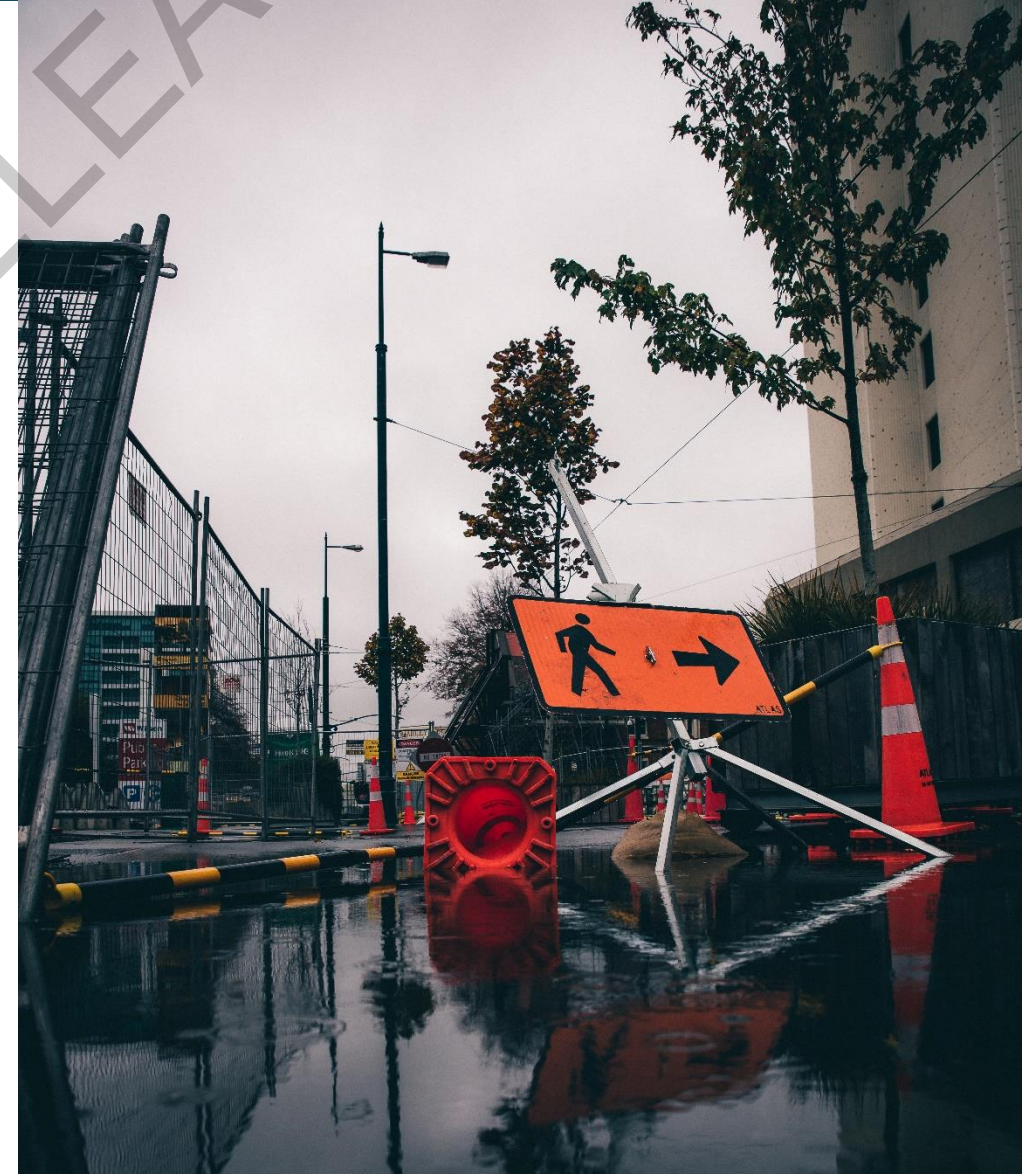
Smaller catchments



Catchments of interest

The Waohine catchment, primarily located in the Carterton District, and has the greatest proportion of people exposed to flooding with 64%. The Waiwhetu catchment currently has limited flood protection in place and has approximately 18,900 people exposed to flooding representing over 50% of the total population within the area.

The Hutt and Upper Ruamāhunga Catchments have a significant number of people exposed to flood risk (69,500 and 22,600 respectively), this represents less than 50% of the total population located within the catchment area. Both catchments also have significant flood protection schemes in place with 56 km of stop bank in the Hutt and 44 km in the Upper Ruamāhunga Catchment.



Impacts of climate change
Undefended 1% AEP with RCP 8.5

2110 Regional exposure to flooding

Buildings



+12,000 (5% increase)

2110 Residential

85,000

36%



+200 (3% increase)

2110 Commercial

4,200

72%

Emergency Service Sites



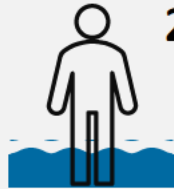
+3 (6% increase)

2110 Total

14

30%

People



+33,000 (5% increase)

2110 Population

230,000

36%

Transport



+200 km (1% increase)

2110 Road

1,200 km

21%

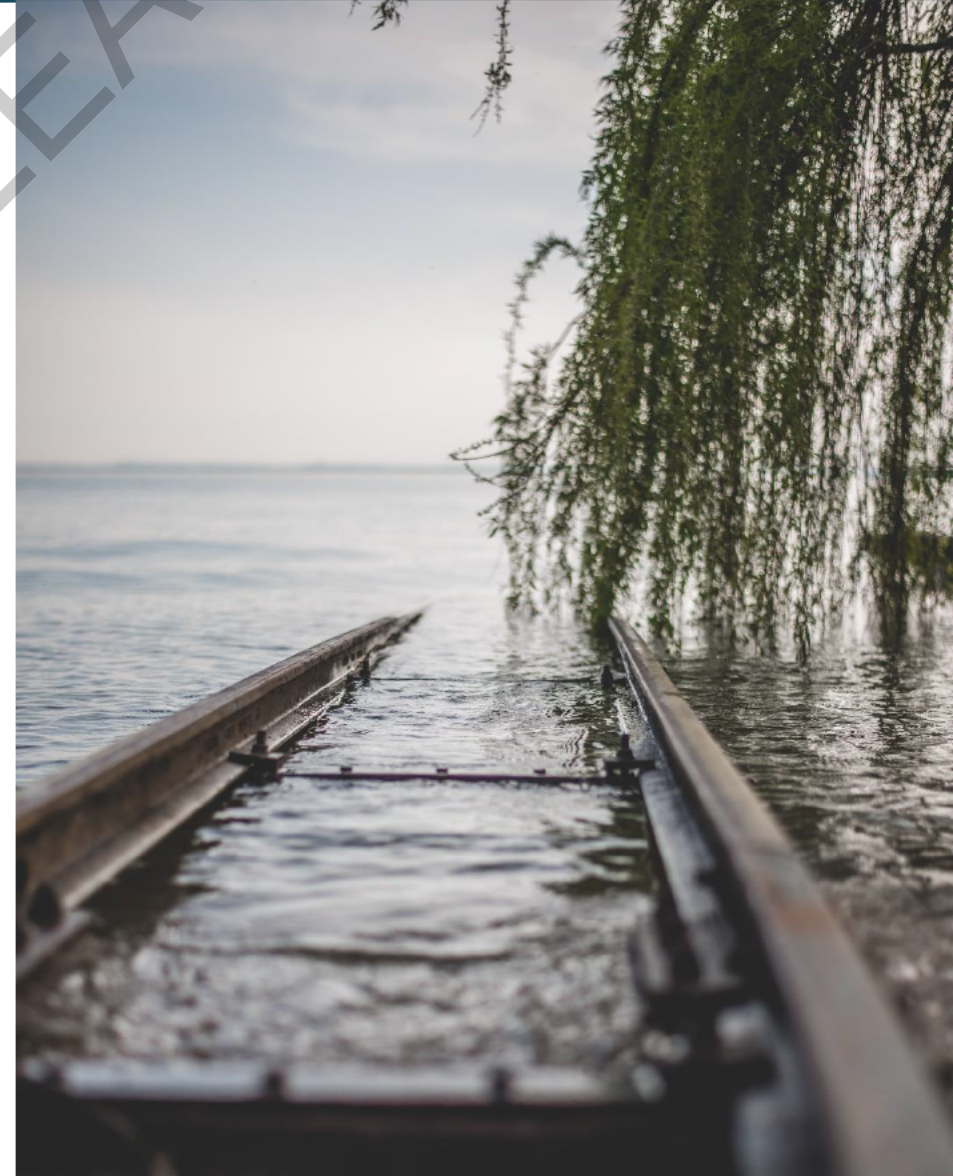


+6 km (7% increase)

2110 Rail

46 km

24%

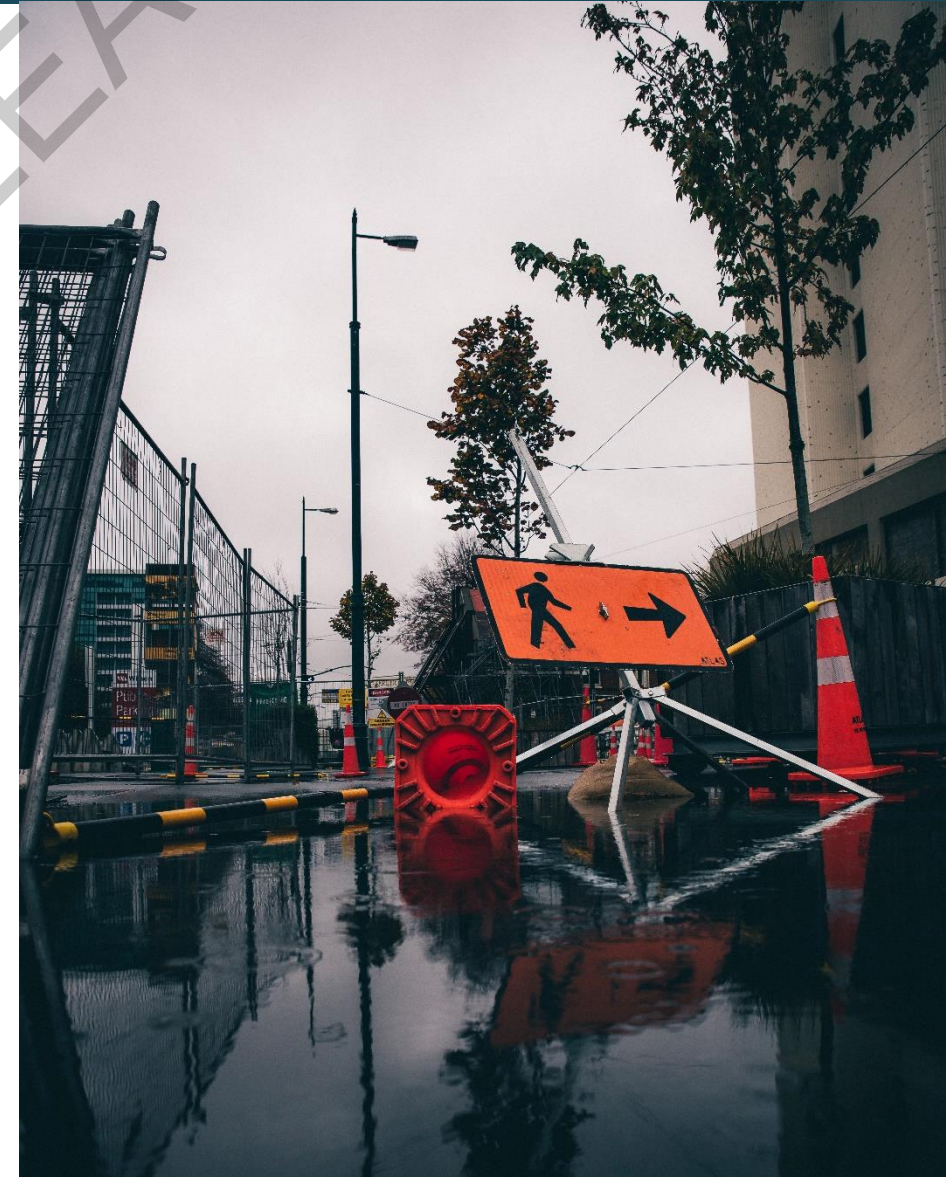


Percentages relevant to regional total

Exposure with population projections

When applying the population projections provided by Stats NZ, the number of people exposed to flooding across the Wellington Region by 2110 in the undefended scenario could increase further to approximately 260,000.

| Area Name | 2022 1% AEP Undefended | 2110 1% AEP Undefended |
|--------------------------|---------------------------|---------------------------|
| Carterton District | 7,800 | 10,700 |
| Kapiti Coast District | 27,900 | 34,800 |
| Lower Hutt City | 68,000 | 83,500 |
| Masterton District | 23,000 | 28,400 |
| Porirua City | 5,700 | 8,600 |
| South Wairarapa District | 12,600 | 13,400 |
| Upper Hutt City | 25,400 | 40,100 |
| Wellington City | 26,200 | 37,100 |

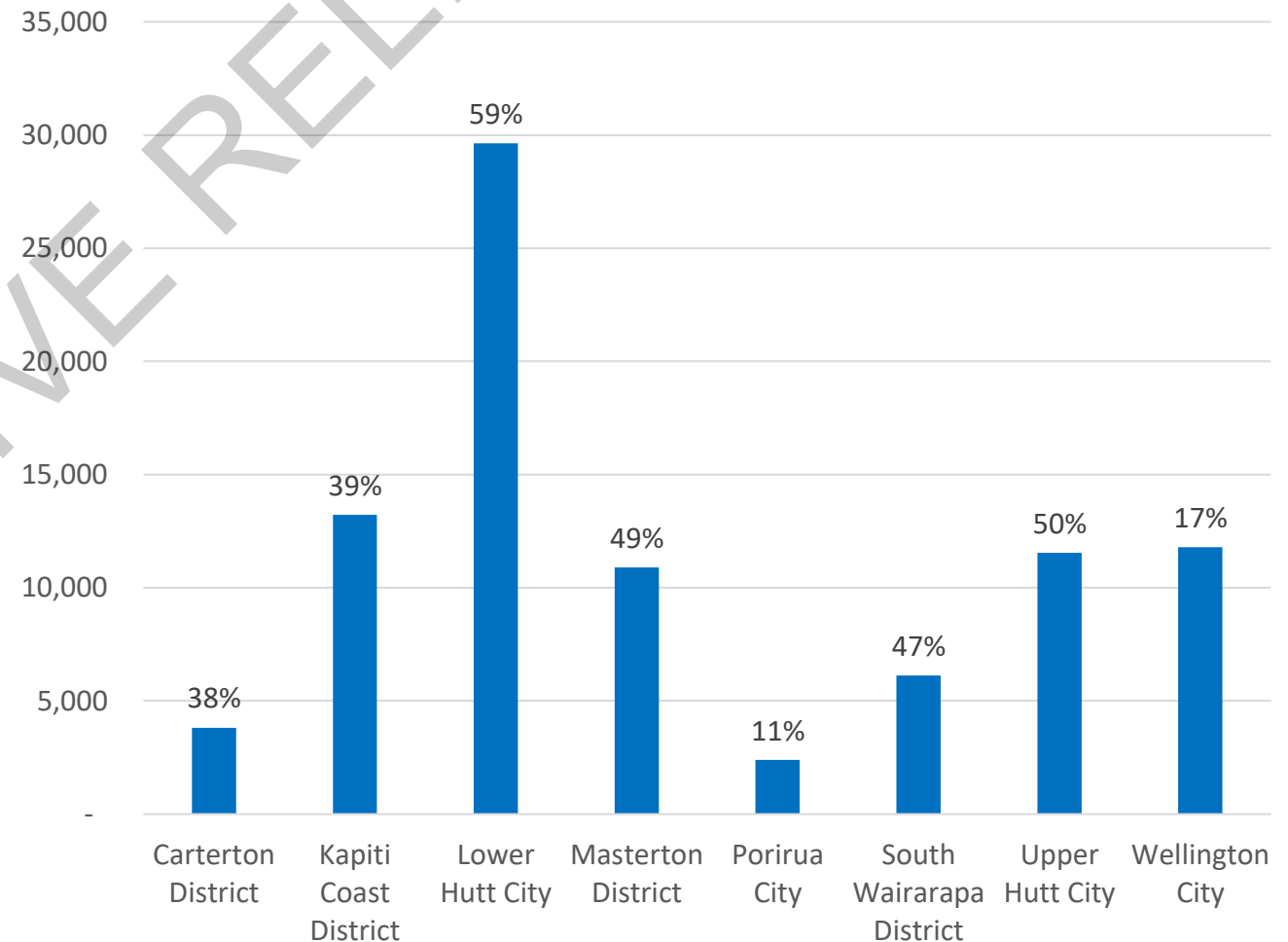


Summary by Territorial Local Authority

By 2110, both the South Wairarapa and Masterton Districts have nearly 50% of all buildings exposed to flooding, (approximately 6,100 and 10,900 respectively). This represents approximately 60% of the commercial buildings in South Wairarapa and 70% of commercial buildings for Masterton. Both councils have nearly 50% of all residential buildings exposed to flooding by 2110.

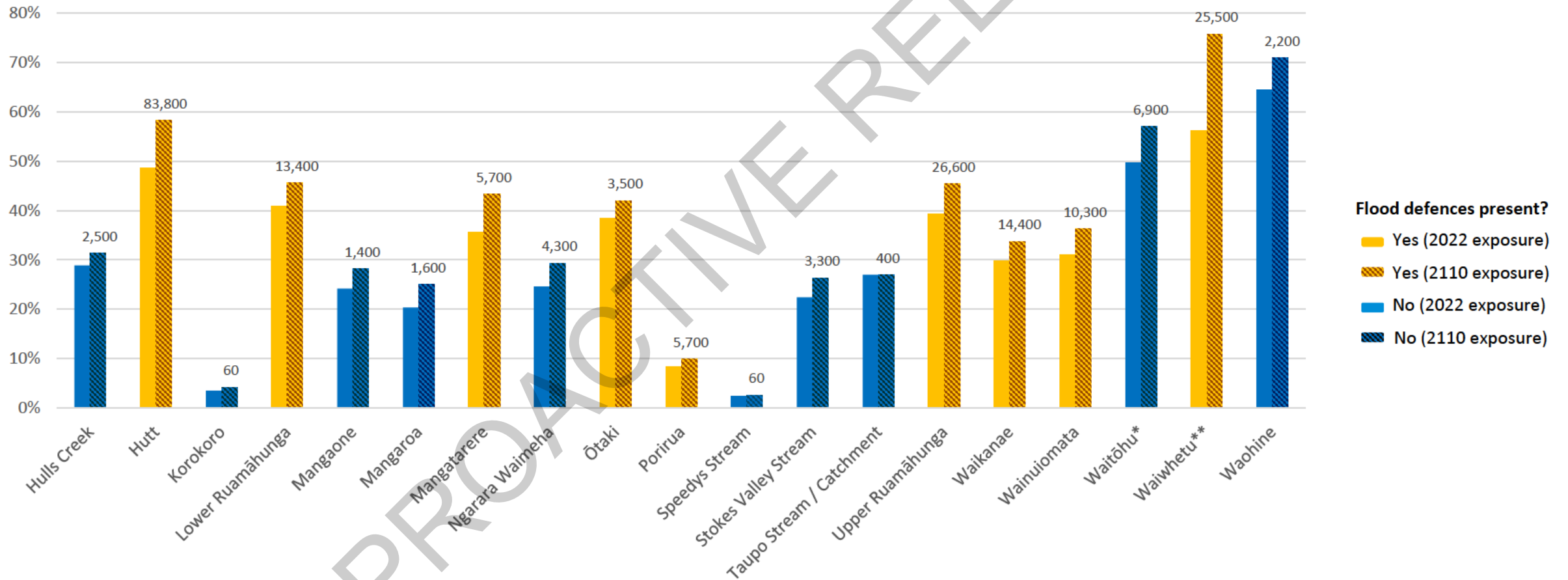
Approximately 90% of all commercial buildings located in Lower Hutt City are exposed to flooding and over half of the residential buildings are exposed.

Count and % of total buildings exposed to flooding in 2110
(using 1% AEP undefended scenario)



Catchments of interest change in exposure between 2022 and 2110

Percentage and count of population exposed to flooding across the catchments of interest showing change from 2022 to 2110 (using the undefended 1% AEP scenario)



Count indicating population exposed to flooding based on number of residential buildings exposed.

*Population exposed is potentially an overestimate as buildings may have been incorrectly assumed as 'residential'
 **Flood defences are present however not to the 1% AEP level of service

Summary of catchments

The Waiwhetu and Mangaroa catchments of interest have the greatest increase in the number of people exposed to flooding between now and 2110 with increases of 34% and 23% respectively.

The Waiwhetu catchment has a GWRC scheme in place with associated flood defences but not providing a 1% AEP plus climate change standard. As opposed to the Mangaroa catchment which has a management scheme, but no current defences in place.

The impacts of climate change do not result in any new catchments having significant increases in flood exposure. Climate change is therefore expected to exacerbate issues that are already being experienced across the region.



Exposed catchments

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Summary of top 10 catchments with the greatest number of people exposed to flooding with GWRC Scheme

The Waiwhetu catchment has the greatest increase in the number of people exposed between the present day and 2110 with a 34% increase (~6,500 people). Followed by the Mangatarere catchment with a 21% increase (~1,000 people).

All other catchments have between 10 and 20 % increase in the number of people exposed.

| Catchment name | TLA | Rural / urban | 2022 1% AEP Undefended | 2110 1% AEP Undefended | Difference between present day and 2110 | |
|------------------|--|---------------|---------------------------|---------------------------|--|------------|
| | | | | | Count | % increase |
| Hutt | Upper Hutt City, Lower Hutt City | Urban | 70,000 | 83,300 | 13,300 | 19% |
| Upper Ruamāhunga | Masterton District, Carterton District | Rural | 23,000 | 26,600 | 3,600 | 16% |
| Waiwhetu | Lower Hutt City | Urban | 19,000 | 25,500 | 6,500 | 34% |
| Waikanae | Kapiti Coast District | Rural / Urban | 12,700 | 14,400 | 1,700 | 13% |
| Lower Ruamāhunga | South Wairarapa | Rural | 12,000 | 13,400 | 1,400 | 12% |
| Wainuiomata | Lower Hutt City | Rural / Urban | 8,800 | 10,300 | 1,500 | 17% |
| Waitōhu* | Kapiti Coast District | Rural / Urban | 6,000 | 6,900 | 900 | 15% |
| Porirua | Wellington City, Porirua City | Urban | 4,800 | 5,700 | 900 | 19% |
| Mangatarere | Carterton District | Rural | 4,700 | 5,700 | 1,000 | 21% |
| Ngarara Waimeha | Kapiti Coast District | Rural / Urban | 3,600 | 4,300 | 700 | 19% |

*Population exposed is potentially overestimated as buildings may have been incorrectly assumed as 'residential'

Summary of top 10 catchments with the greatest number of people exposed to flooding without GWRC scheme

Out of the catchments without a GWRC scheme, the Wellington catchment has the greatest number of people exposed to flooding in both the present day and through to 2110. The Tinui catchment has the greatest increase in exposure from the present day through to 2110 with a 50% increase in the number of people exposed (~200 more people).

| Catchment name | TLA | Rural / urban | 2022 1% AEP No Stop banks Population | 2110 1% AEP No Stop banks Population | Difference between present day and 2110 | |
|----------------|-------------------------------|---------------|--|--|--|------------|
| | | | | | Count | % increase |
| Wellington | Wellington City | Urban | 20,000 | 21,800 | 1,800 | 9% |
| Eastbourne | Lower Hutt City | Rural | 2,200 | 2,400 | 200 | 9% |
| Karori | Wellington City | Rural | 1,800 | 2,000 | 200 | 11% |
| Coast | Wellington City, Porirua City | Rural | 1,500 | 1,700 | 200 | 13% |
| Pauatahanui | Wellington City, Porirua City | Rural / Urban | 700 | 700 | - | 0% |
| Makara | Wellington City | Rural | 600 | 700 | 100 | 17% |
| Whareroa | Kāpiti Coast | Rural / Urban | 500 | 600 | 100 | 20% |
| Tinui | Masterton District | Rural | 400 | 600 | 200 | 50% |
| Motuwaireka | Masterton District | Rural | 400 | 500 | 100 | 25% |
| Waikakariki | Kāpiti Coast | Rural / Urban | 500 | 500 | - | 0% |
| Paremata | Porirua City | Urban | 500 | 500 | - | 0% |

Future growth

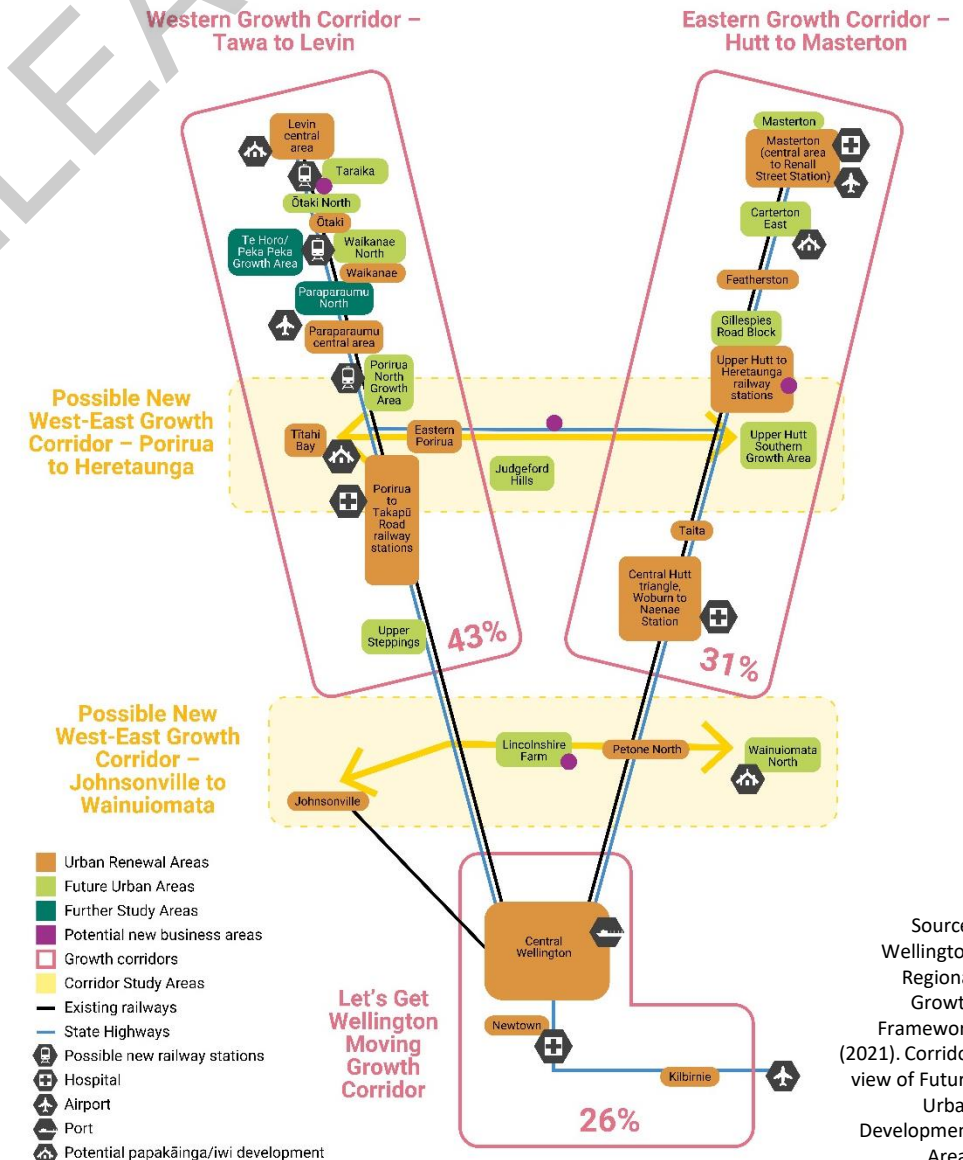
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Wellington Regional Growth Framework

The Wellington Regional Growth Framework (WRGF) is a spatial plan to provide councils and iwi in the region with an agreed regional direction for growth and investment.

The Framework identifies how the Greater Wellington Region could accommodate a future population of 780,000 and an additional 100,000 jobs in the next 30 years. This would represent an additional 200,000 people living in the region.

| Corridor | Number of anticipated dwellings | % of dwellings across the region |
|--|---------------------------------|----------------------------------|
| Wester corridor (Tawa to Levin) | 38,100 | 43% |
| Eastern corridor (Lower Hutt to Masterton) | 27,200 | 31% |
| LGWM / Wellington City corridor | 22,700 | 26% |
| Total | 88,000 | 100% |



Source: Wellington Regional Growth Framework (2021). Corridor view of Future Urban Development Areas

Future growth areas

Currently, the Ōtaki, Masterton and Wainuiomata future urban areas have the largest number of people exposed to a 1% AEP flooding with just over 1,000 people exposed in the 1% AEP defended scenario.

As at present day, in 2110 the Ōtaki, Masterton and Wainuiomata future urban areas continue to have the greatest number of people exposed to a 1% AEP flood event. Masterton and Wainuiomata experience only a 30% increase in exposure from present day to ~1,300 people each.

| TLA | Future growth areas* | 2022** Population | 2110** Population |
|---------------------------------------|----------------------|-------------------|-------------------|
| Carterton | Carterton | 900 | 1,200 |
| Kāpiti | Ōtaki | 2,500 | 3,000 |
| | Paraparaumu | 10 | 15 |
| | Peka | 100 | 150 |
| | Waikanae | 600 | 700 |
| Lower Hutt | Wainuiomata | 1,300 | 1,500 |
| Masterton | Masterton | 1,000 | 1,300 |
| Porirua | Plimmerton | 3 | 3 |
| | Takapuwhia | 300 | 350 |
| | Whitby | 3 | 3 |
| Upper Hutt City | Pinehaven | 200 | 200 |
| | Te Marua | 300 | 400 |
| Wellington City / Porirua City | Churton Park Granada | 400 | 500 |

*includes future study areas, future urban areas and Potential Pakapainga/Iwi Development

Urban renewal areas

The Lower Hutt urban renewal area has the greatest number of buildings exposed to flooding in the present day and through to 2110, which increases by 25% at 2110 (~3,400 buildings).

The Waikanae urban renewal area has the greatest increase in the number of buildings exposed between now and 2110 with approximately a 40% increase in the number of buildings exposed.

| TLA | Urban renewal area | 2022* Population | 2110* Population |
|--------------------------|--------------------|------------------|------------------|
| Kāpiti Coast District | Ōtaki | 2,100 | 2,300 |
| | Paraparaumu | 2,400 | 2,700 |
| | Waikanae | 1,300 | 1,800 |
| Lower Hutt City | Lower Hutt | 38,600 | 48,000 |
| | Stokes Valley | 2,200 | 2,500 |
| Masterton District | Masterton | 6,700 | 7,900 |
| Porirua City | North Wellington | 2,300 | 2,800 |
| | Porirua | 1,500 | 1,700 |
| South Wairarapa District | Featherston | 1,900 | 2,200 |
| Upper Hutt City | Upper Hutt | 5,900 | 6,900 |
| Wellington City | Johnsonville | 900 | 1,000 |
| | Wellington | 7,100 | 7,700 |

Catchments of Interest

From a regional growth perspective, the following catchments will need to be carefully considered to ensure that new development and its residents are not at risk.

- **Ōtaki, Masterton and Wainuiomata future urban areas.**
- **Lower Hutt urban and Waikanae urban renewal areas.**

Further development in areas which already have a high exposure to flooding should be carefully considered to ensure increasing development does not further exacerbate flood exposure over time.

Green field development should aim to avoid all flood hazard areas and brown field development should not result in an increase in exposure and vulnerability and aim to help mitigate flood risk.



Manging Flood Risk

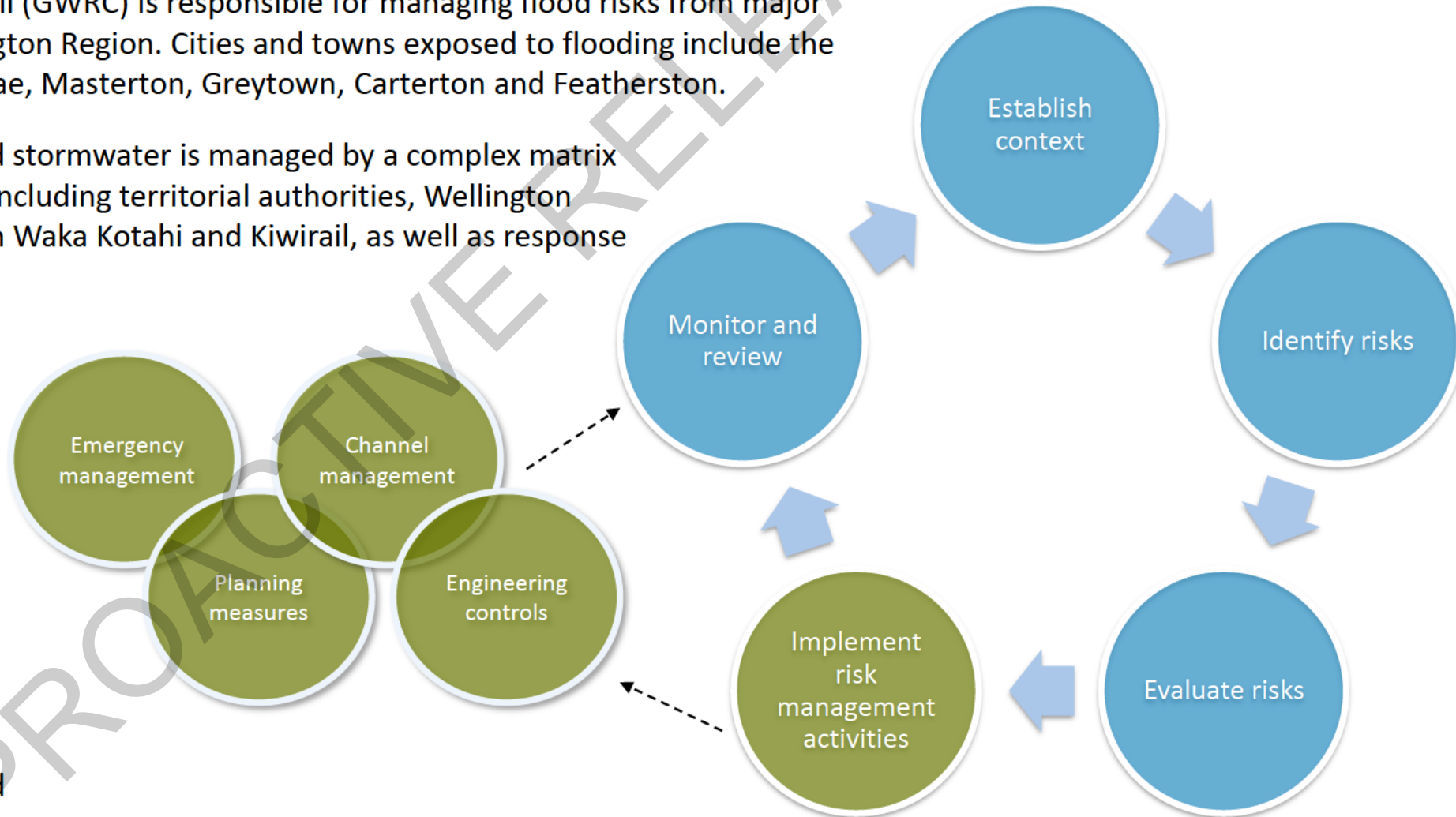
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Flood risk management in the Wellington Region

Greater Wellington Regional Council (GWRC) is responsible for managing flood risks from major rivers that flow through the Wellington Region. Cities and towns exposed to flooding include the Hutt Valley, Porirua, Ōtaki, Waikanae, Masterton, Greytown, Carterton and Featherston.

Flood risk from smaller streams and stormwater is managed by a complex matrix of local government organisations including territorial authorities, Wellington Water, and other asset owners such as Waka Kotahi and Kiwirail, as well as response agencies like WREMO and FENZ .

GWRC is responsible for flood hazard modelling and advice, floodplain management plans and flood protection schemes, as well as flood protection works and erosion control activities across the region. Through strong flood risk management focus led by the Flood Protection Department, GWRC provides regional leadership, and coordination on all matters of flood and erosion hazard management.



Future challenges

What we're seeing now?



Increasing Expectations - As rainfall events and flood incidents increase in frequency communities' expectations for flood and erosion risk management is increasing and their risk tolerance is decreasing.



Soft engineering - Over the past twenty years the control approach to river management has shifted to developing and implementing softer, greener and more natural solutions to flood risk management.



Asset Management - Systems & processes for the management of assets are increasing in complexity and thoroughness. High consequence assets such as stop banks and water retaining structures are requiring a more rigorous process to be applied.



Ecological Improvements - Awareness and approaches are being adapted to better protect the environment.



Integrated Planning - Risk management processes are constantly evolving and seeking ways to integrate to achieve wider benefits.



Digital & Data - Flood risk management is data intensive and takes place in a rapidly evolving technology landscape.



What we're likely to see in future?



Retreat - Managed retreat from flood hazard zones is likely to become an increasingly viable risk management option for both flood and erosion hazards. At present this is costly, and complicated to effectively implement.



Insurance retreat - Insurance retreat is starting to become more prevalent across the country. Areas impacted by frequent flooding are likely to become increasingly expensive or uninsurable.



Integration - Integration with other water hazard management such as coastal and stormwater flooding.



National focus - As flood incidents increase in severity and frequency an increasing national focus is anticipated to be placed on the management of flood and erosion risk



Emergency Management - A greater focus on flood forecasting and emergency requirement will be required to deal with the increased frequency, unpredictability and severity of flood incidents.



Co-Governance - We are likely to see Mana Whenua become more intimately involved in flood and erosion risk management activities.



Te Mana O Te Wai - we are likely to see increased tensions between protecting people and enhancing the environment, while not wholly incompatible, compromises will need to be reached.

KEY POINTS

- Flooding is our most frequent and devastating natural hazard.
- Our region is at significant risk.
- GWRC plays a critical role in managing flood risk.

- 200,000 people approximately 31% of our region is at risk of flooding now.
- 230,000 people approximately 36% of our region will be at risk of flooding in 2110.
- Further growth could increase this to 260,000.

- Climate change is increasing the frequency, severity and unpredictability of flood events.

This report has been prepared for the exclusive use of our client Greater Wellington Regional Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.