

## 1.1 PLIMMERTON STORMWATER IMPROVEMENTS UPDATE

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### KAUPAPA

#### PURPOSE

The purpose of this workshop paper is to:

- provide an update on Karehana Bay and Taupo/James St flooding investigations
- provide an update on Hongoeka, School Rd and Acheron Rd stormwater investigations, and
- to seek feedback on the recommended next steps for the flood recovery projects in the Plimmerton area.

#### HE WHAKAMĀRAMA BACKGROUND

1. Plimmerton has experienced several flooding events over the past five years (2015, 2016 and 2020) with numerous residential properties requiring extensive renovations to make them fit for habitable purposes.
2. At a community meeting held in January 2021, Porirua City Council and Wellington Water committed to undertake catchment level investigations to develop options to mitigate the flooding impacts for the Karehana, Taupo/James St and Hongoeka Catchments.

##### **Karehana Bay Catchment**

3. The catchment study for the Karehana Bay catchment was completed in August 2021. In November 2021, a recommendation for the scope and budget for the Karehana catchment was presented to Council and in response the Council agreed:
  - to commit to the development of a city-wide retreat policy targeting the most vulnerable flood prone homes in Porirua, prioritising homes where there is a threat to health or safety or frequent internal flooding.
  - to progress with the Karehana catchment concept design, detailed design, and construction of the recommended scope, to provide protection from flooding of habitable floors in the 30-year flood event at an estimated cost of \$16.9m.
4. The Karehana catchment project has now completed concept design and a revised estimate provided.
5. We now require feedback on the results of this study and how to proceed.

##### **Taupo Stream/James St Catchment**

6. Concurrently, the catchment study for the Taupo/James stormwater catchment has also been progressed.
7. In June 2022, a workshop was held with Council staff, Ngāti Toa and Waka Kotahi to review the initial results of modelling and collectively review the options (long list to short list) and agreed the work scope to be developed and costed.

8. Following the June 2022 workshop, further review, modelling, high-level cost estimate and staging for the agreed work scope has been developed.
9. We now require feedback on the results of this study and how to proceed.

#### **Hongoeka Catchment**

10. Modelling of several options was done for 10-year and 100-year events (with between eight and 21 habitable floors affected), and a report prepared. However, this project has been put on hold following advice from Ngāti Toa to pause any further discussion with landowners.

#### **School Road Catchment**

11. School Rd in Plimmerton regularly floods during heavy rain and water collects at the Plimmerton School pickup area. Following feedback from neighbours, solution investigations began in 2021.
12. School Rd was originally intended to be included in the Karehana work. However, this is a separate “mini” catchment and has subsequently been treated as a separate project. Modelling has been completed, and a brief is being prepared for design and delivery.
13. This update's purpose is to provide visibility of this project.

#### **Acheron Rd Catchment**

14. Following feedback from a flood affected homeowner on Acheron Rd, solution investigations got underway in 2022.
15. Acheron Rd modelling has been completed and a brief is being developed for design and delivery.
16. This update's purpose is to provide visibility of this project.

### **NGĀ MATAPAKI ME NGĀ KŌWHIRINGA** **DISCUSSION AND OPTIONS**

17. The original starting point for stormwater target levels of service for these projects has been:
  - a. safe access to, and protection from flooding of, habitable floors in the 100-year flood event that includes the predicted impact of climate change (20% increase in rainfall intensity and future 100-year sea level rise (1m),
  - b. safe access to and protection from flooding for Commercial/Businesses in the 10-year flood event.
18. However, throughout the investigation stages of these projects, the target levels of service are not always achievable.
19. The catchments are low lying, heavily built-up and have steep, short catchments. The investigation stage of this project has been challenging.
20. The Wellington Water project director would like to take Council through the current recommendations for scope (and associated early-stage, estimated cost range) and seek your feedback on the next steps for each of the catchment areas.

### **NGĀ ĀPITI HANGA** **ATTACHMENTS**

1. **Presentation - PCC Plimmerton Stormwater Update**



**Council Workshop  
- Plimmerton  
Stormwater  
Management and  
Improvements**

*27 April 2023*



Our water, our future.

# Agenda



- Purpose (what we need from you)
- Service Goals (what we would like to achieve)
- Porirua-wide Stormwater (context of catchment challenges)
- Plimmerton Flooding - Background
- Plimmerton Flooding - Where Are We Now?
  - Karehana
  - Taupo Stream / James St
  - Hongoeka
  - School Rd
  - Acheron Rd
- Recommended Forward Plan

# Purpose of this workshop



1. To provide an update on Karehana Bay and Taupo/James St flooding investigations.
2. To provide an update on Hongoeka, School Rd and Acheron Rd Stormwater investigations.
3. To seek feedback on the recommended forward plan for flooding in the Plimmerton area.

# Service Goals

<b>Primary</b>		<p><b>We minimise the impact of flooding on people's lives and proactively plan for the impacts of climate change</b></p> <p>We are seeking a solution to reduce the number of habitable floors effected by flooding.</p>
<b>Secondary</b>		<p><b>We minimise public health risks associated with wastewater and stormwater</b></p> <p>We are seeking a solution to reduce the number of wet weather overflows onto land.</p>
<b>Secondary</b>		<p><b>We operate and manage assets that are safe for our suppliers, people and customers</b></p> <p>The solution should ensure that all public stormwater assets (existing and new) meet the Wellington Water health and safety requirements. Any existing operational risks are identified and changes to the assets are included in the design.</p>

# Porirua-wide Stormwater Programme



- North
- Hongoeka Flooding
- Karehana Park Flooding
- Taupo - Plimmerton Flooding
- School Road Flooding
- Pope St/SH59 Flooding
- Acheron Flooding
- SH59/New World Paremata Flooding
- Paremata Flooding

- West
- Te Pene Avenue OLFP obstruction
- Main Road/Waihora Park Flooding
- John St Flooding
- Whitehouse Road Flooding
- Takapuwhia Flooding
- Porirua CBD Flooding

- East
- Duck Creek Flooding
- Paremata School Flooding
- Papakowhai Flooding
- Warspite/Conclusion St/Omapere St Flooding
- Niagara St/Loongana St Flooding
- Kalingo St Flooding
- Waihora Crescent Flooding
- Matahourua Crescent and Maraeroa School Flooding
- Champion St Flooding
- Mungavin Avenue Flooding
- Martin St Flooding
- Princess St Flooding

- South
- Kenepuru Drive SW Improvements
- Wall Place Flooding
- Eskdale/Conclusion Flooding

# Plimmerton Flooding Background



- Residents of the Plimmerton area have faced significant flooding three times in the past five years; 2015, 2016 and 2020.
- In 2021 Porirua City Council and Wellington Water agreed to undertake investigations to develop mitigation options.
- At the end of 2021 \$16.9M was approved to proceed with design and construction of the Karehana Catchment Stormwater project to provide a 1 in 30 year level of service.





# Karehana: Where we are now



November 2021: Project budget of **\$16.9m approved**. 1 in 30 year level of service agreed

Debris net construction (\$750k) in the upper catchment commencing in May 2023 (by PCC).

We have now completed the **concept design** of the main stormwater packages, including...

- Beach Morphology Study (complex outlet design)
- Detailed survey (Existing network and topography)
- Confirmed extent of channel improvements required
- Cost estimating
- Additional hydraulic modelling & packaging options vs benefits

...and are now ready to progress into the detailed design and consenting phase.

We are now seeking feedback on the following:

1. **Is the current recommended option acceptable for the level of service provided given the increased cost estimate?**
2. **Does this still make sense in the context of what we now know across Plimmerton?**

# Karehana Modelled Flooding

1 in 30 Year Event + Climate Change

30 – 40 Habitable Floors Affected



## The Challenges:

- Debris blockages and low network capacity.
- Small steep catchment
- Very developed and low-lying properties

# Original Recommendation

## Package 1

Upper Airlie Road Diversion

Upper Cluny Road Diversion

Cluny Road Diversion

New Inlet Screen in the Reserve

New Inlet Screen in the Upper Cluny Road

Gordon Road Sump Improvements

## Package 2

Airlie Rd Culvert and Outlet Improvements

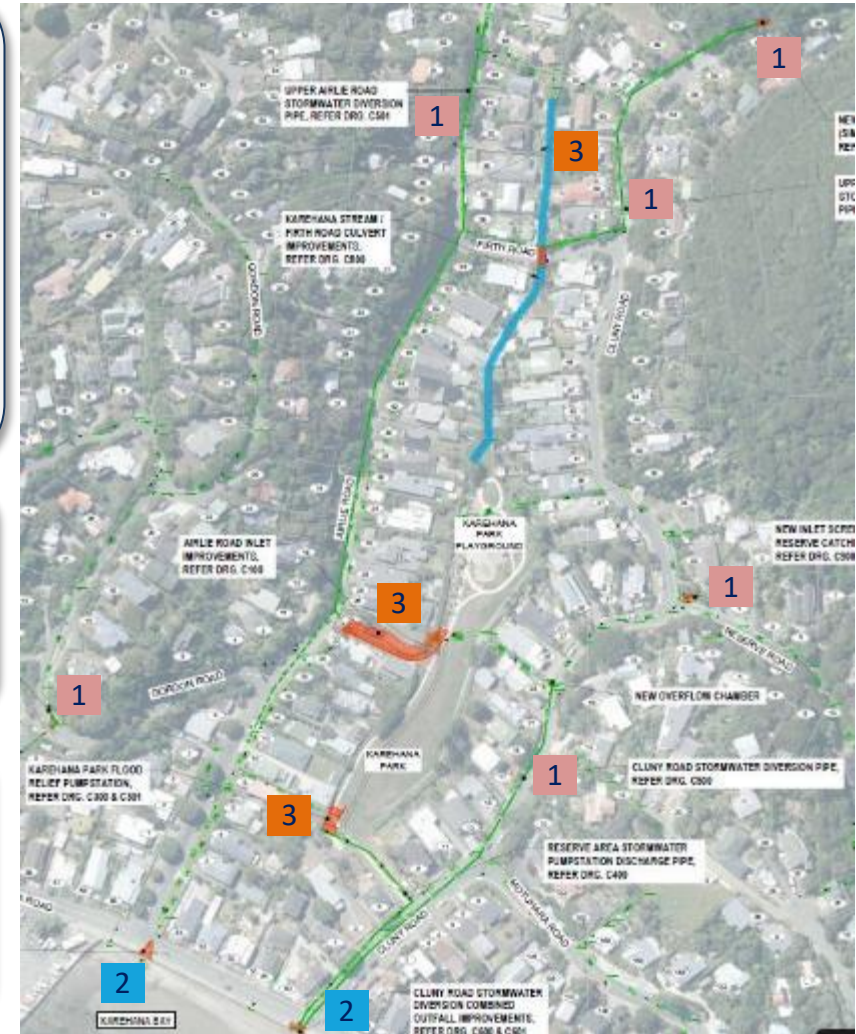
Cluny Rd Diversion Combined Outfall Improvements

## Package 3

Karehana Park Flood Relief Pump Station and Rising Main

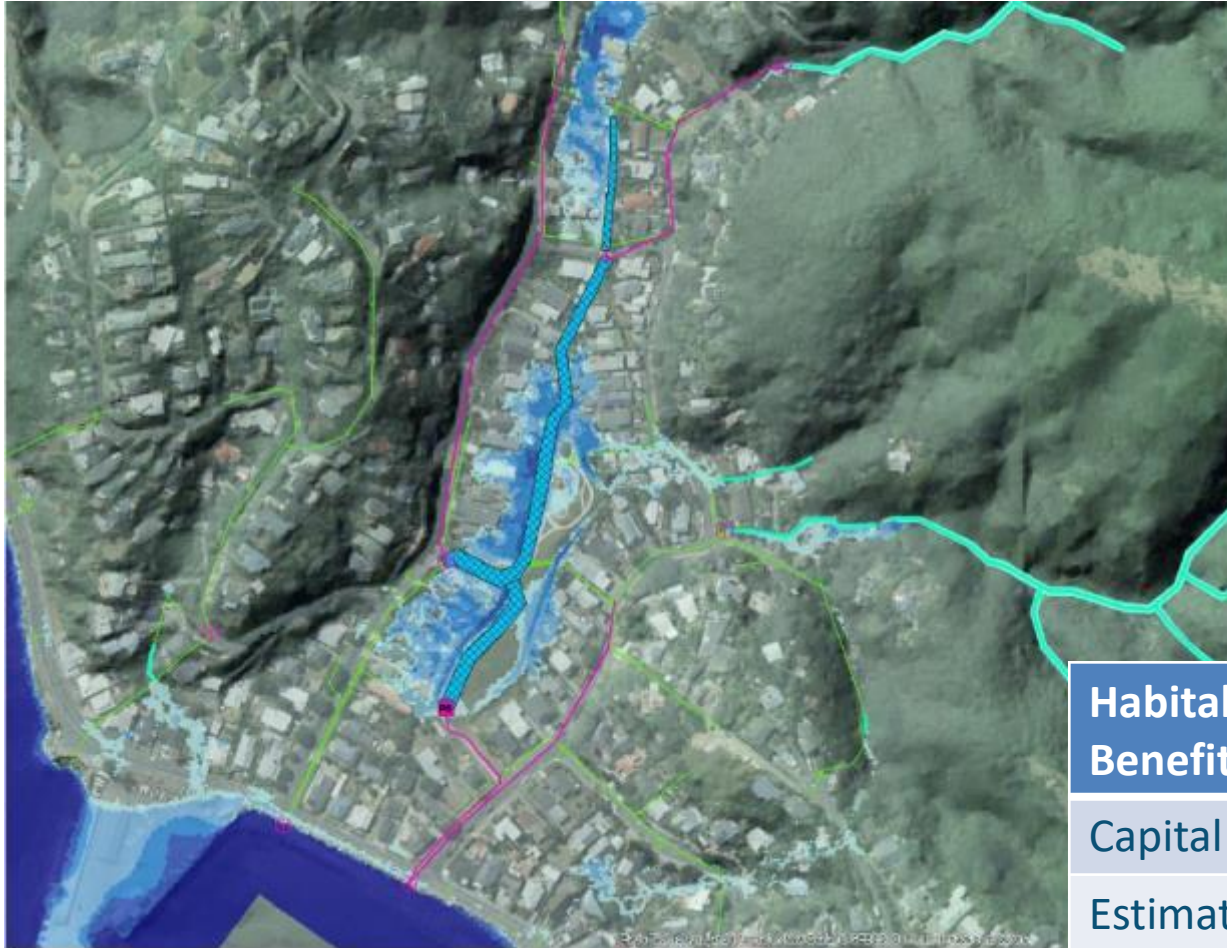
Airlie Road Inlet Improvements

Karehana Stream and Firth Rd Culvert Improvements



# Original Recommendation

## Benefits & Cost (1 in 30 yr event + climate change)



Habitable Floors Benefit	~20
Capital Estimate	\$38.5M to \$49.3M
Estimate/Floor	\$1.93M to \$2.47M

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# Current Recommendation



Includes all elements of the original recommendation **except the stream works above Karehana Park.**

Concept Design included:

- more detail of works required in each area
- specific site investigations (including a beach morphology study)
- more detailed survey work
- more modelling with this more detailed information.

The concept design concluded that there is little additional benefit from stream works above Karehana Park in a 1 in 30 year event

The current recommendation:

- reduces the cost estimate for the work
- will reduce the programme
- removes substantial very complex scope within private properties

# Current Recommendation

## Package 1

Upper Airlie Road Diversion

Upper Cluny Road Diversion

Cluny Road Diversion

New Inlet Screen in The Reserve

New Inlet Screen in the Upper Cluny Road

Gordon Road Sump Improvements

## Package 2

Airlie Rd Culvert and Outlet Improvements

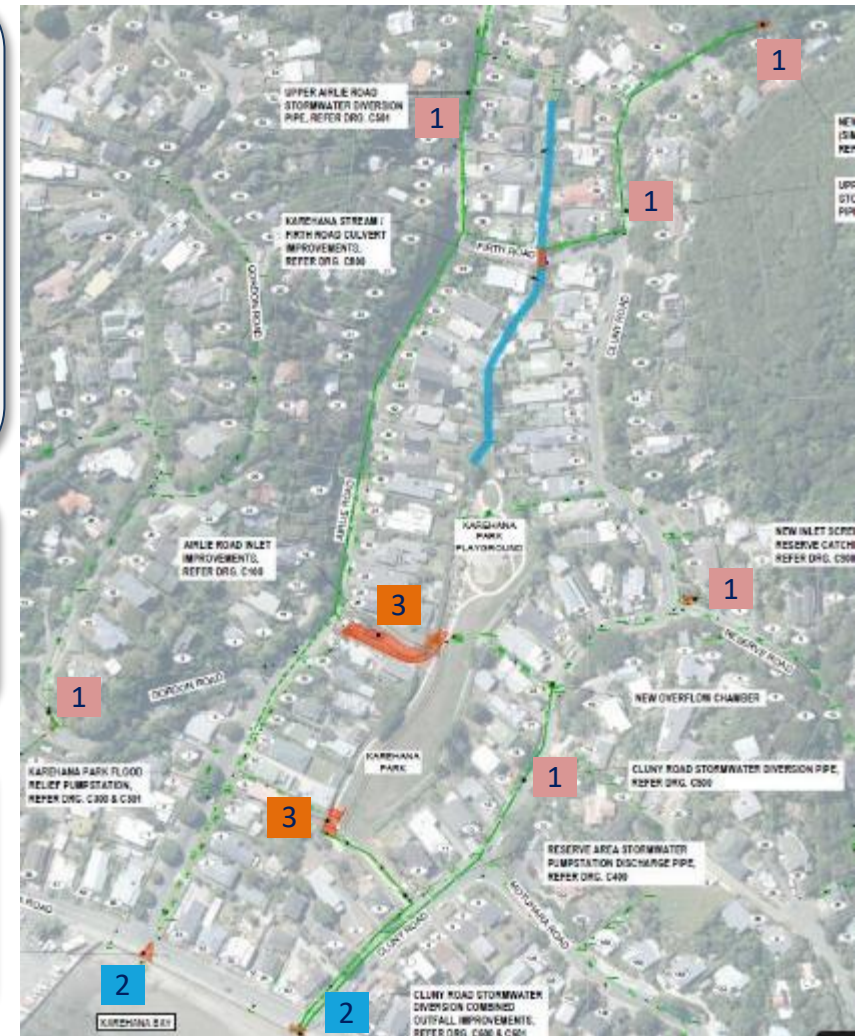
Cluny Rd Diversion Combined Outfall Improvements

## Package 3

Karehana Park Flood Relief Pump Station and Rising Main

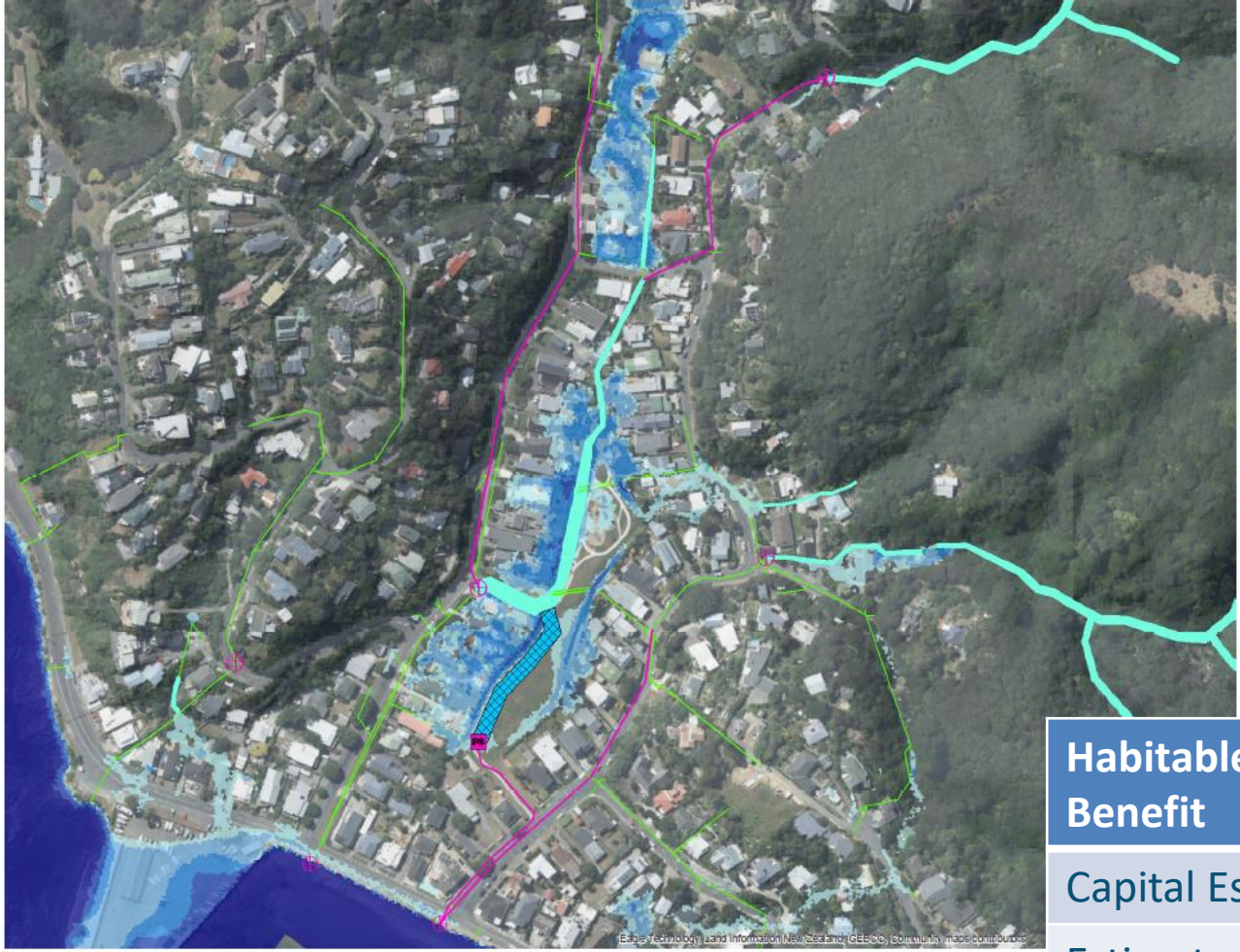
Airlie Road Inlet Improvements

~~Karehana Stream and Firth Rd Culvert Improvements~~



# Current Recommendation

## Benefits & Cost (1 in 30 yr event + climate change)



Habitable Floors Benefit	~20
Capital Estimate	\$21.5M to \$27.5M
Estimate/Floor	\$1.08M to \$1.38M

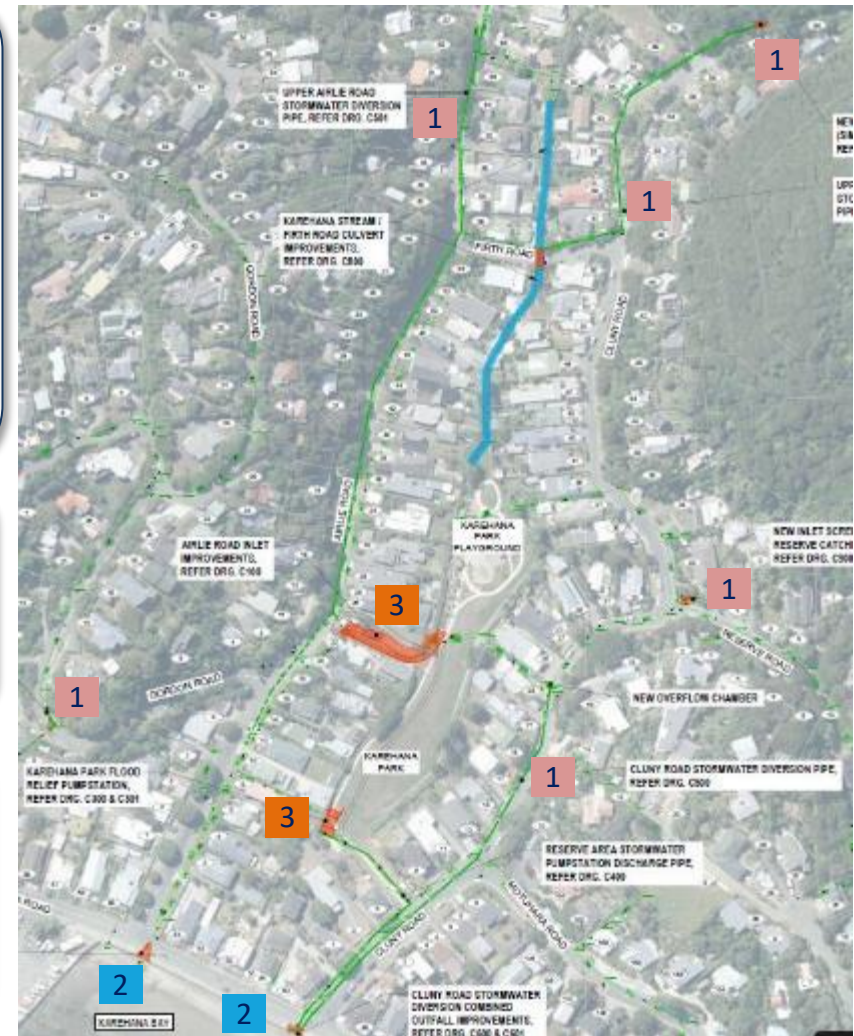
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# Alternative 1 (Less cost)

- Package 1**
- Upper Airlie Road diversion
  - Upper Cluny Road Diversion
  - Cluny Road Diversion
  - New inlet screen in the Reserve
  - New inlet screen in the Upper Cluny Road
  - Gordon Road Sump Improvements

- Package 2**
- Airlie Rd Culvert and Outlet Improvements
  - ~~Cluny Rd Diversion~~
  - Cluney Rd Outfall Upgrade

- Package 3**
- Karehana Park Flood Relief Pump Station and Rising Main
  - Airlie Road Inlet Improvements
  - ~~Karehana Stream and Firth Rd Culvert Improvements~~





# Alternative 1: Benefits & Cost



(1 in 30 yr event + Climate Change)



Habitable Floors Benefit	~15
Capital Estimate	\$17.8M to \$22.8M
Estimate/Floor	\$1.19M to \$1.52M

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# Alternative 2 (Minimum Option)

## Package 1

~~Upper Airlie Road Diversion~~

~~Upper Cluny Road Diversion~~

Cluny Road Diversion

~~New Inlet Screen in the Reserve~~

~~New Inlet Screen in the Upper Cluny Road~~

Gordon Road Sump Improvements

## Package 2

Airlie Rd Culvert and Outlet Improvements

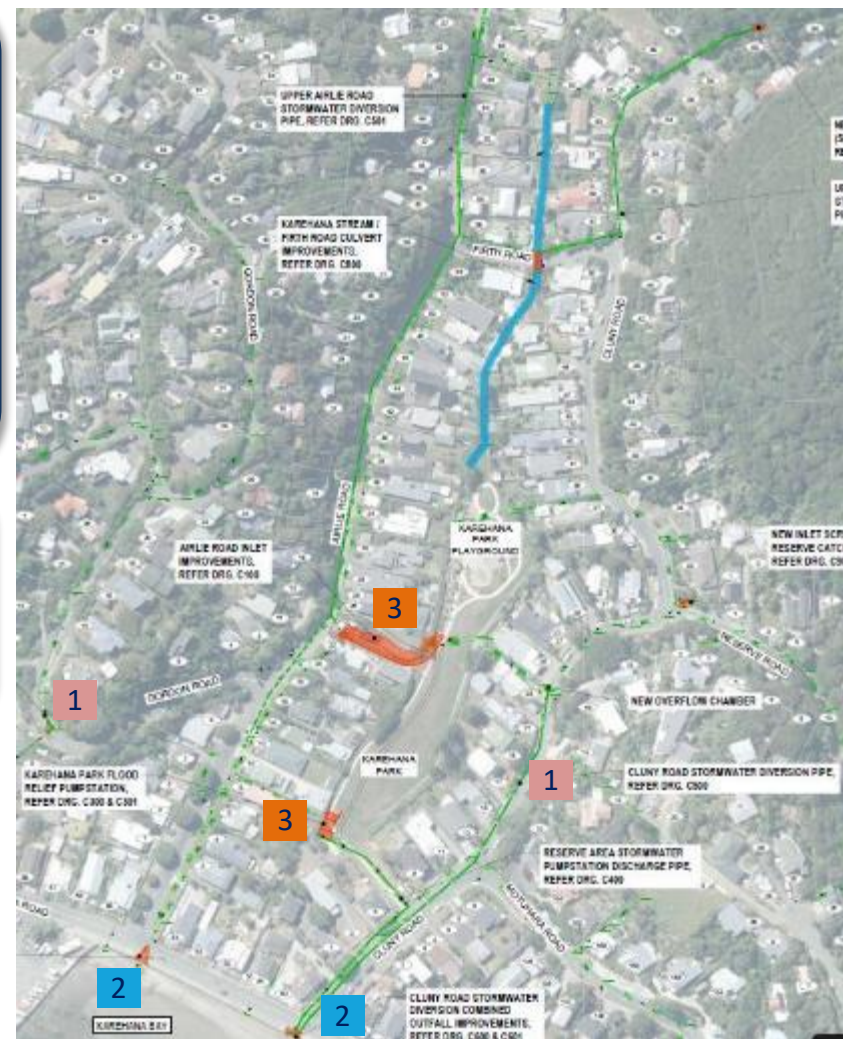
Cluny Rd Diversion Combined Outfall Improvements

## Package 3

Karehana Park Flood Relief Pump Station and Rising Main

Airlie Road Inlet Improvements

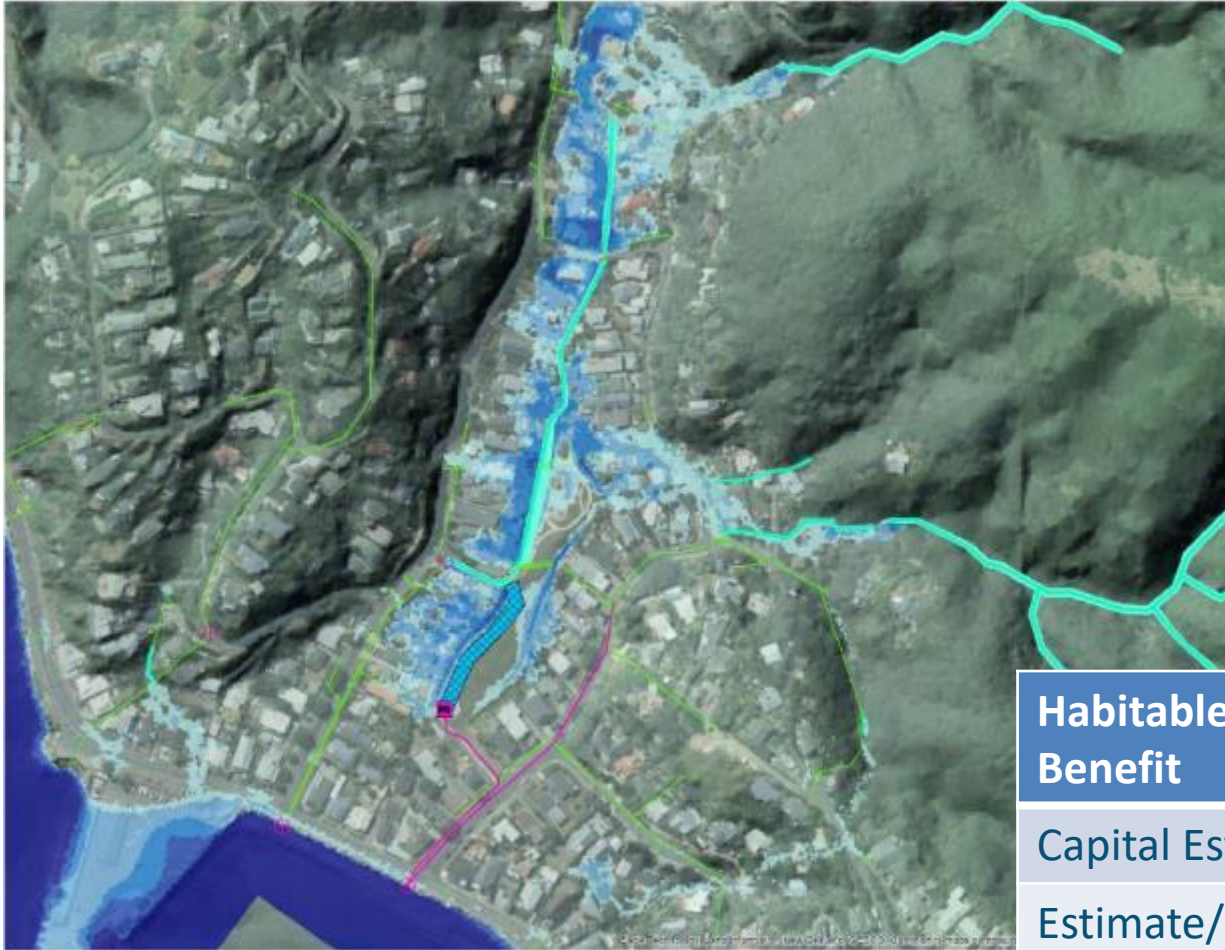
~~Karehana Stream and Firth Rd Culvert Improvements~~



# Alternative 2: Benefits & Cost



(1 in 30 yr event + Climate Change)



<b>Habitable Floors Benefit</b>	<b>~10</b>
Capital Estimate	\$15.8M to \$20.2M
Estimate/Floor	\$1.58M to \$2.02M

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# Karehana Options Benefits & Estimates



Current approved funding is 16.9m.

	Original Recommended	Current Recommended	Alternative 1	Alternative 2	Do Nothing
Approximate Habitable Floors Benefitted	~20	~20	~15	~10	0
Level of Service	1-in-30-year	<b>1-in-30-year</b>	1-in-30-year	1-in-30-year	Current
Current Capital Estimate	\$38.5m to \$49.3m	<b>\$21.5m to \$27.5m</b>	\$17.8m to \$22.8m	\$15.8m to \$20.2m	-
Capex Cost per floor	\$1.9m to \$2.5m	<b>\$1.1m to \$1.4m</b>	\$1.2m to \$1.5m	\$1.6m to \$2m	-

# Karehana Recommendation



The current recommended option includes:

All elements of the original recommendation except the stream works above Karehana Park.

- The current capital estimate for the works is \$21.5m to \$27.5m (at concept design phase).
- Current approved funding for the project is \$16.9m
- It is expected this will benefit approximately 20 homes in a 1 in 30 year event.

## Question

- Are you in favour of proceeding with the current recommended option?

# Taupo/James St - Where we are now?



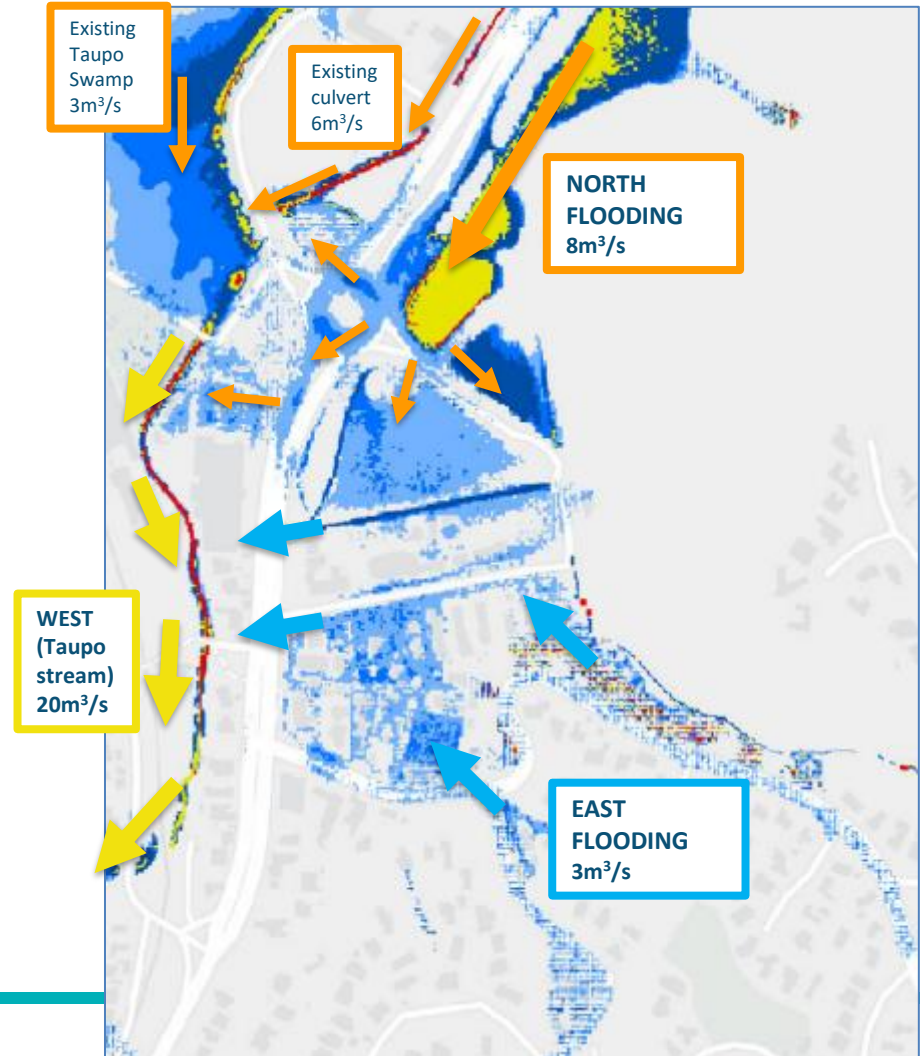
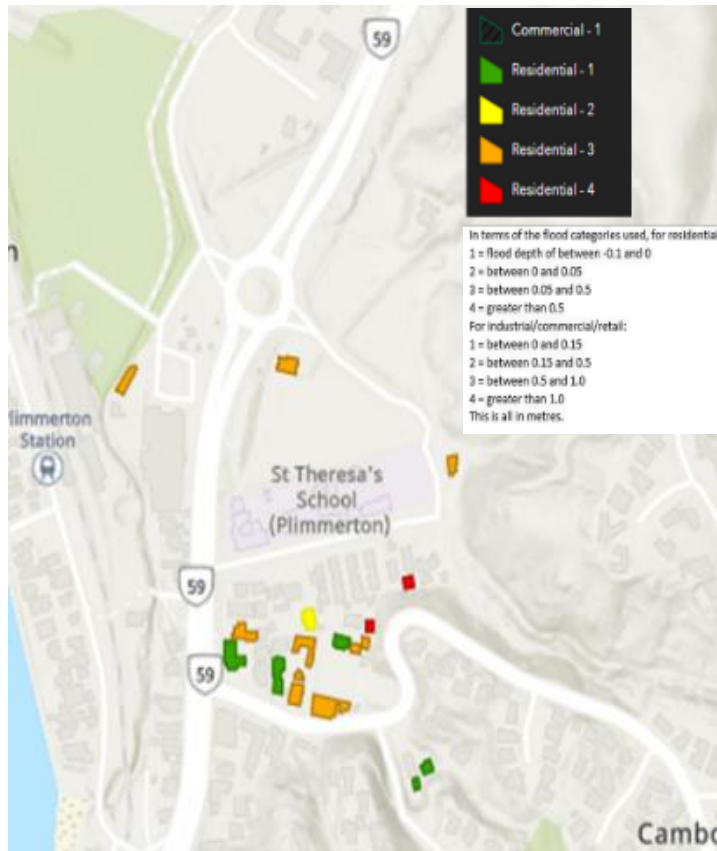
- June 2022 Long list to short list to preferred direction workshop:
  - Improve + additional SH59 cross drainage
  - James St Triangle (inlet & outlet) improvements
  - Camborne Hill (overland flow) diversions
- We have refined flood modelling and damage assessments (this presentation).
- We have prepared high-level work packages, cost estimates and recommended stages (this presentation).
- Taupo / James St currently has nil approved funding.



# Taupo Modelled Flooding + Damage



1 in 30 Year event = 20-25 Habitable Floors affected



# Taupo Stages and High-level Costs

Stage	Cost
<b>Design &amp; Consenting</b>	\$2-\$3m
<b>1 East – reduce overland flow from Camborne</b> <ul style="list-style-type: none"> <li>Greys Rd pipework upsizing</li> <li>James St intakes + outlets upsizing</li> </ul>	\$10-\$16m
<b>2 West - widen Taupo stream for increased north flow</b> <ul style="list-style-type: none"> <li>Stream bank widening</li> <li>Two vehicle bridges</li> <li>Three pedestrian bridges</li> </ul>	\$14-\$22m
<b>3 North - direct north east flow under SH59 to Taupo stream</b> <ul style="list-style-type: none"> <li>Two new box culverts under SH59 + Ulric St</li> <li>Domain retention bund</li> </ul>	\$14-\$22m
<b>Total</b>	<b>\$40-\$63m</b>





# Taupo Recommendation



**Need to spend full \$40-\$63m to resolve flooding of 20-25 floors + SH59 road.**

## **Recommendation:**

- Commit to **\$2-3m** for design and consenting of all stages.
- Commit to **\$10-16m** for Stage 1 East to resolve Camborne overland flow through Greys Rd / James St properties.
- Stage 2 West (\$14-22m) and Stage 3 North (\$14-22m) physical works may be paused for consideration by the new water entity.

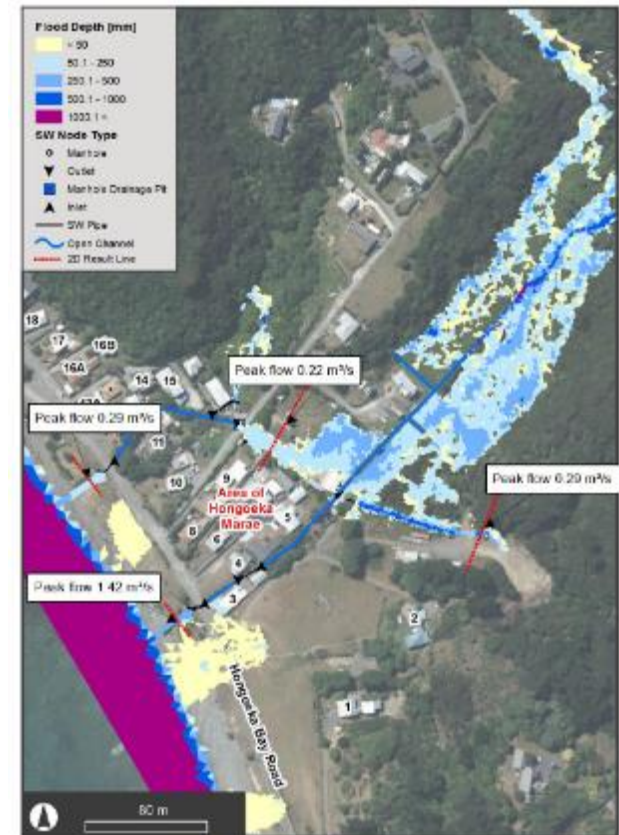
## **Questions:**

- Do we carry on with the recommendation = **\$2-3m Design + \$10-16m Stage 1 East?**
- Or do we carry on with only design and consenting for all stages = **\$2-3m?**
- Or do we **stop?**

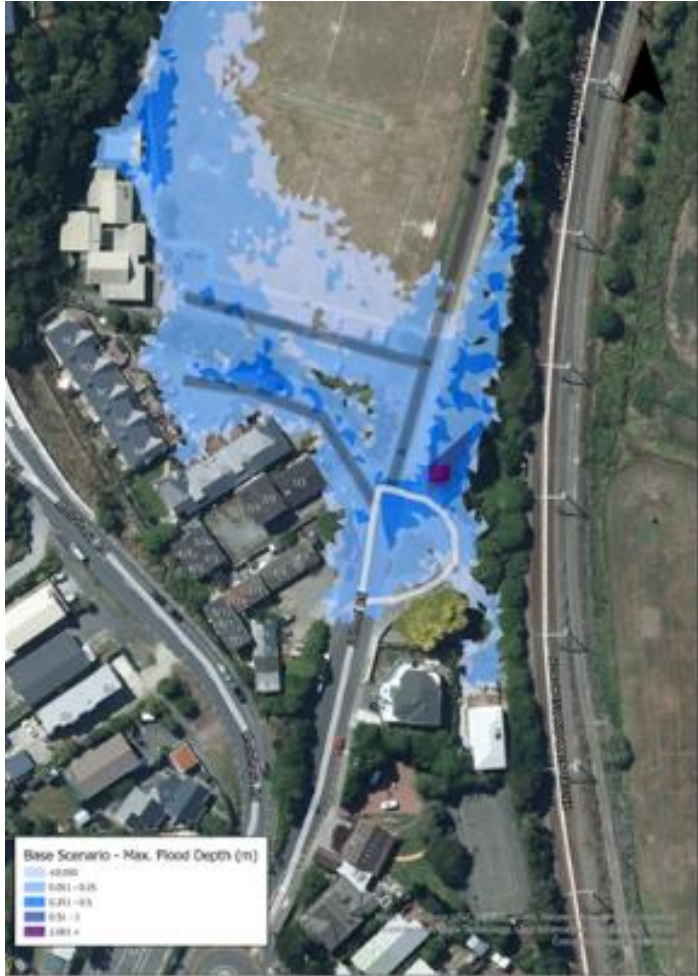
# Hongoeka

## ON HOLD

- The two small streams that drain the steep upper catchments converge in a flat swampy area immediately upstream of the marae.
- A well-defined channel conveys water from the lower end of the swamp through the marae to culverts that discharge into Hongoeka Bay.
- Modeling of several options was done for 10yr and 100yr events (with between 8 and 21 habitable floors affected), and a report prepared.
- Currently the options are indicating that between 3 and 6 floors could benefit from the options in a 10-year rainfall event.
- The report has been provided to PCC and Ngāti Toa.
- No decisions have been made on these modeled options, no estimates have been prepared and no consultation with Ngāti Toa on this (under instruction from PCC).
- **Given the nature of land ownership in this catchment we do not recommend progressing these options until we are able to engage with PCC and Ngāti Toa.**



# School Rd Flooding



1 in 30 Year event = 0 Habitable Floors Affected

ISSUE: Flooding of school pick-up area, leading to health and safety risk.

Recommended solution is minor pipe realignment and sump upgrades.

Options Assessment:

- Other options had minimal increases in benefit for increasing costs.
- Therefore, while the recommended solution does not have the highest benefit it does have the best cost benefit and reduces the health and safety risk at the school entrance.
- Improvement to the Beach Rd outlet has not yet been designed or assessed but can be considered in the next phase of the School Rd works.

# School Rd: Benefits & Cost



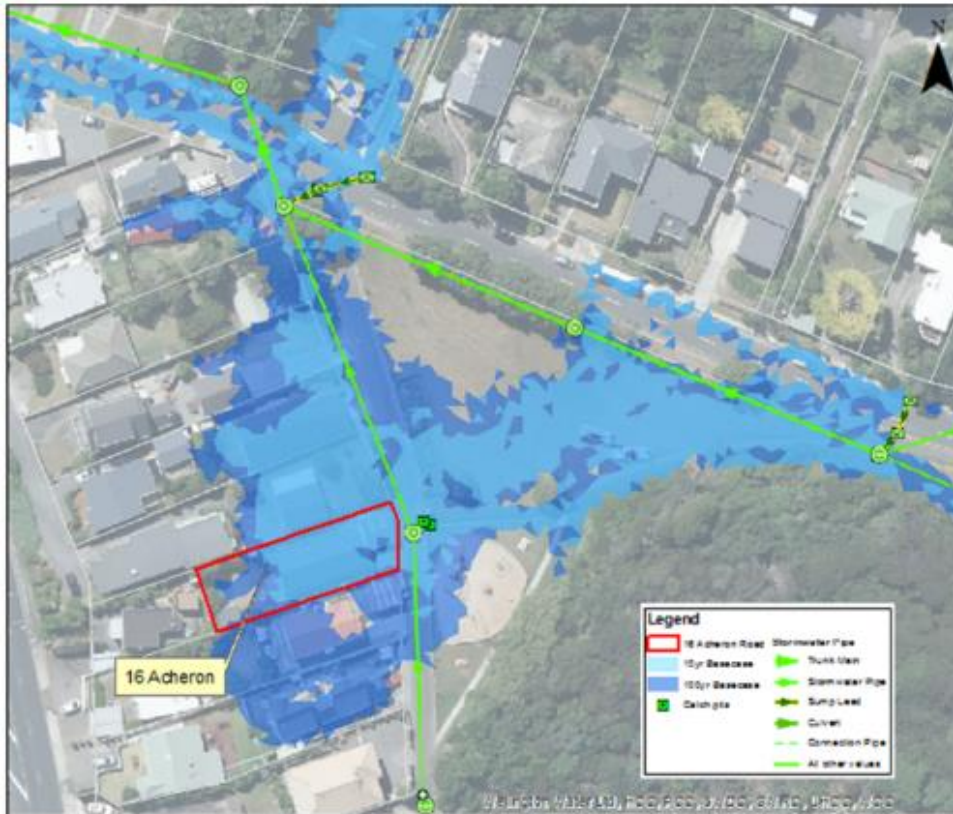
Recommended solution is minor pipe realignment and sump upgrades.

COST: \$300,000

Benefits include:

- Reduced ponding depth in school pick up area
- Reduces the health and safety risk at the school entrance
- Reduced depth and extent of property flooding to 6 School Rd

# Acheron Rd Flooding



ISSUE: Debris blockage and low network capacity (multiple pipes with less than annual rainfall event capacity) leading to frequent property flooding (up to 8 properties) and a habitable floor flooding event at least every 3-6 years.

10 Year event = up to 2 habitable floors affected and up to 4 additional non-habitable buildings (e.g. garages)



100 Year event = up to 4 habitable floors affected and up to 7 additional non-habitable buildings (e.g. garages) + playground



# Acheron Rd: Benefits & Cost



Recommendation – detention basin within park designed for a 1:10 yr event with climate change

COST: \$700,000

Habitable Floors Benefit	2 habitable and 3 non-habitable floors in a 10-year event
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Other benefits include:

- Property flooding reduce from ~5 to 0 in 10-year event and none on road.
- Reduced depths and extent of property flooding in a 100-year event.
- Decreased maintenance and clean-up of park after events

Disbenefits

- Reduction in amenity to the park due to change in flat area
- Increased ponding depth in park during flooding (H&S risk)

# Sub-catchment Recommendations



## Hongoeka

It is recommended that the hold on the project for WWL remains until land ownership issues are resolved or Porirua City Council are happy to proceed.

## School Rd

Proceed with design and delivery through the WWL PMO, as a “business as usual” project.

Estimated works is \$300k

## Acheron Rd

Proceed with design and delivery through the WWL PMO, as a “business as usual” project.

Estimated works is \$700k

# Recommended Cashflow



	LOS	Benefits	Total	FY22/23	FY23/24	FY24/25	FY25/26	FY26/27
Approved Capex Funding			\$20,000,000	\$10,000,000	\$10,000,000			
PROJECT ESTIMATES								
Karehana (Current Recommended)	1 in 30yr	20+ Habitable floors	\$26,000,000	\$1,000,000	\$5,000,000	\$10,000,000	\$10,000,000	
School Rd	1 in 30yr	Reduce school risk	\$300,000		\$300,000			
Acheron Rd	1 in 10yr	5+ Habitable floors	\$700,000		\$700,000			
Hongoeka	HOLD							
Taupo / James (full scope)	1 in 30yr	20-25 floors Reduce school risk SH59 flooding	\$63,000,000	\$250,000	\$6,000,000	\$12,000,000	\$22,000,000 <i>(possibly pause 1 year)</i>	\$22,000,000 <i>(possibly pause 1 year)</i>
TOTAL			\$90,000,000	\$1,250,000	\$12,000,000	\$22,700,000	\$32,000,000	\$22,000,000

All values are 2023 dollars excl. GST & future escalation

Before  
Water  
Reform

After  
Water  
Reform



# Recommended Way Forward



It is recommended that:

- Hongoeka remains on hold.
- School Rd and Acheron Rd proceed with design and delivery.
- Karehana proceed with design and delivery of the current recommended option.
- Taupo Stream / James St proceeds with design & consenting of all works and delivery of Stage 1 works (Stages 2 & 3 works paused for consideration by the new entity).

It should be noted that:

- the recommendations address the risk of frequent flooding but not for all habitable floors.
- all these catchments have a limited level of service which will continue to be under more pressure as we see the impacts of climate change.
- there will still be maintenance and operational costs once/if these solutions are implemented.

# Thank You