THE REALITIES OF ADAPTIVE FLOOD RISK MANAGEMENT

Wai Ora – Rising to the Challenge

23 May 2018

Christchurch City Council

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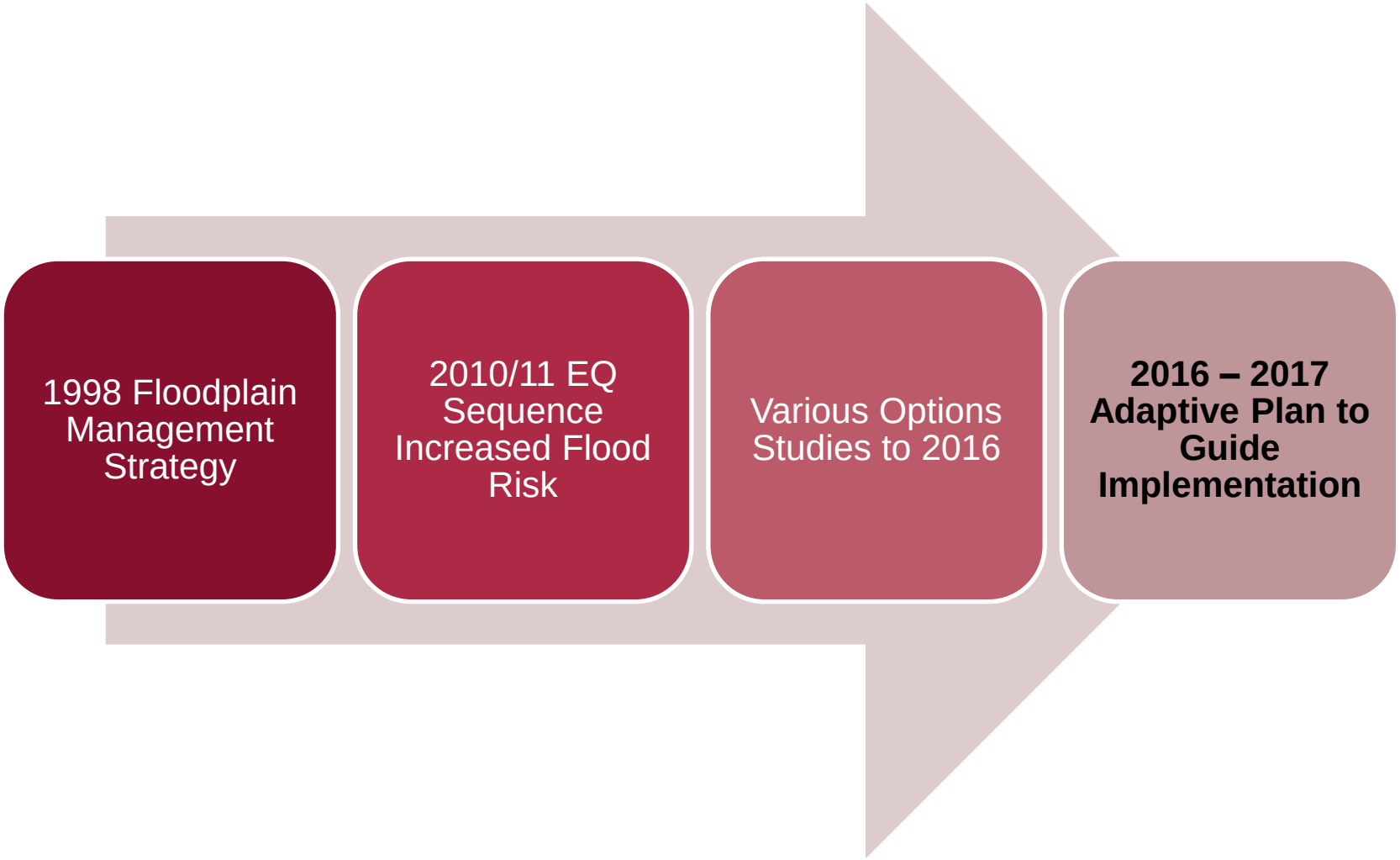
Agenda

1. Purpose of the Project
2. July 2017 Floods
3. Lessons Learned

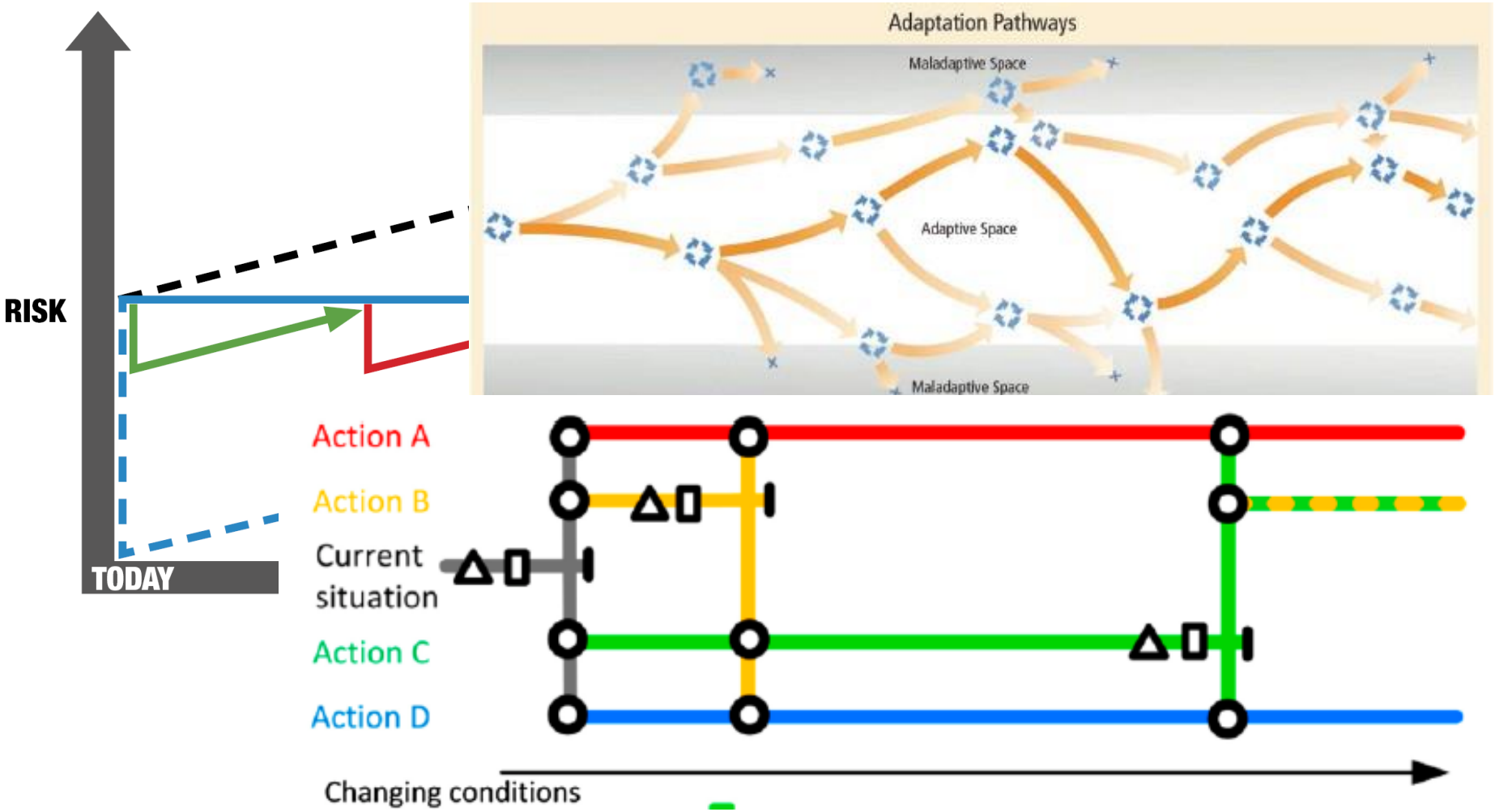
Purpose of the Project

- To develop an **adaptive plan to manage flooding** in Christchurch's Heathcote catchment

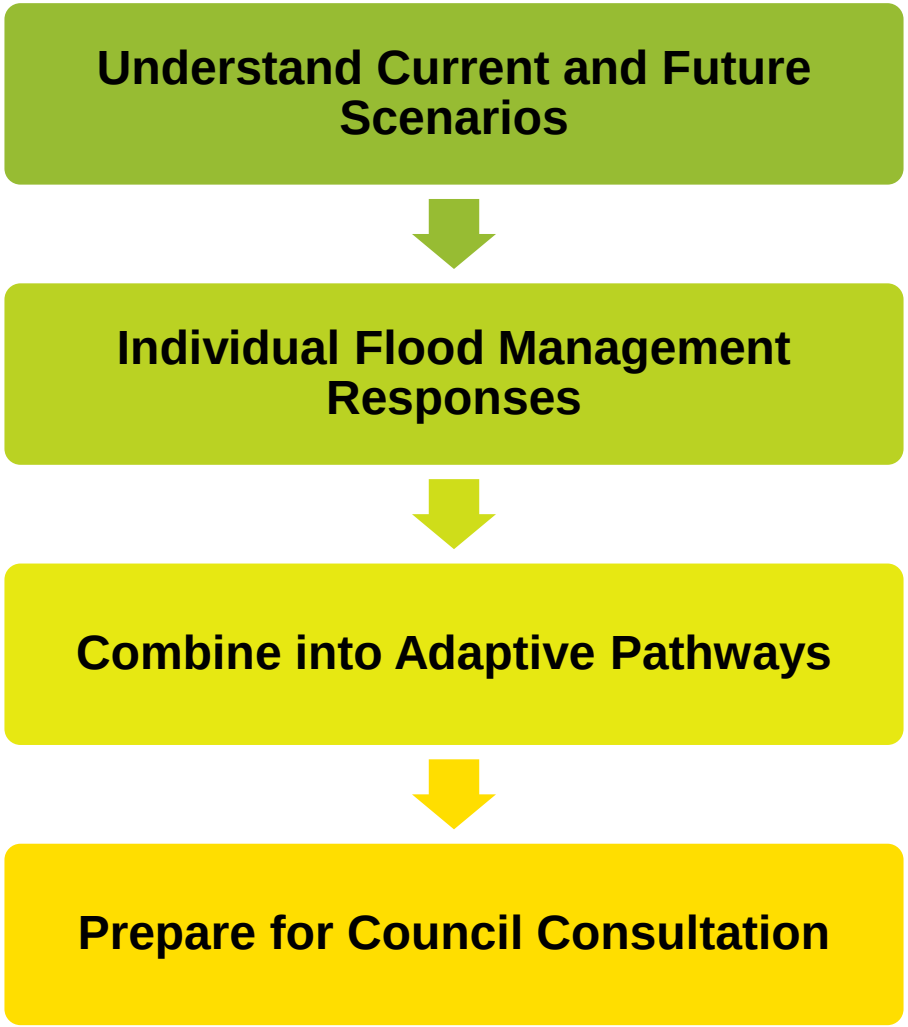


Purpose of the Project

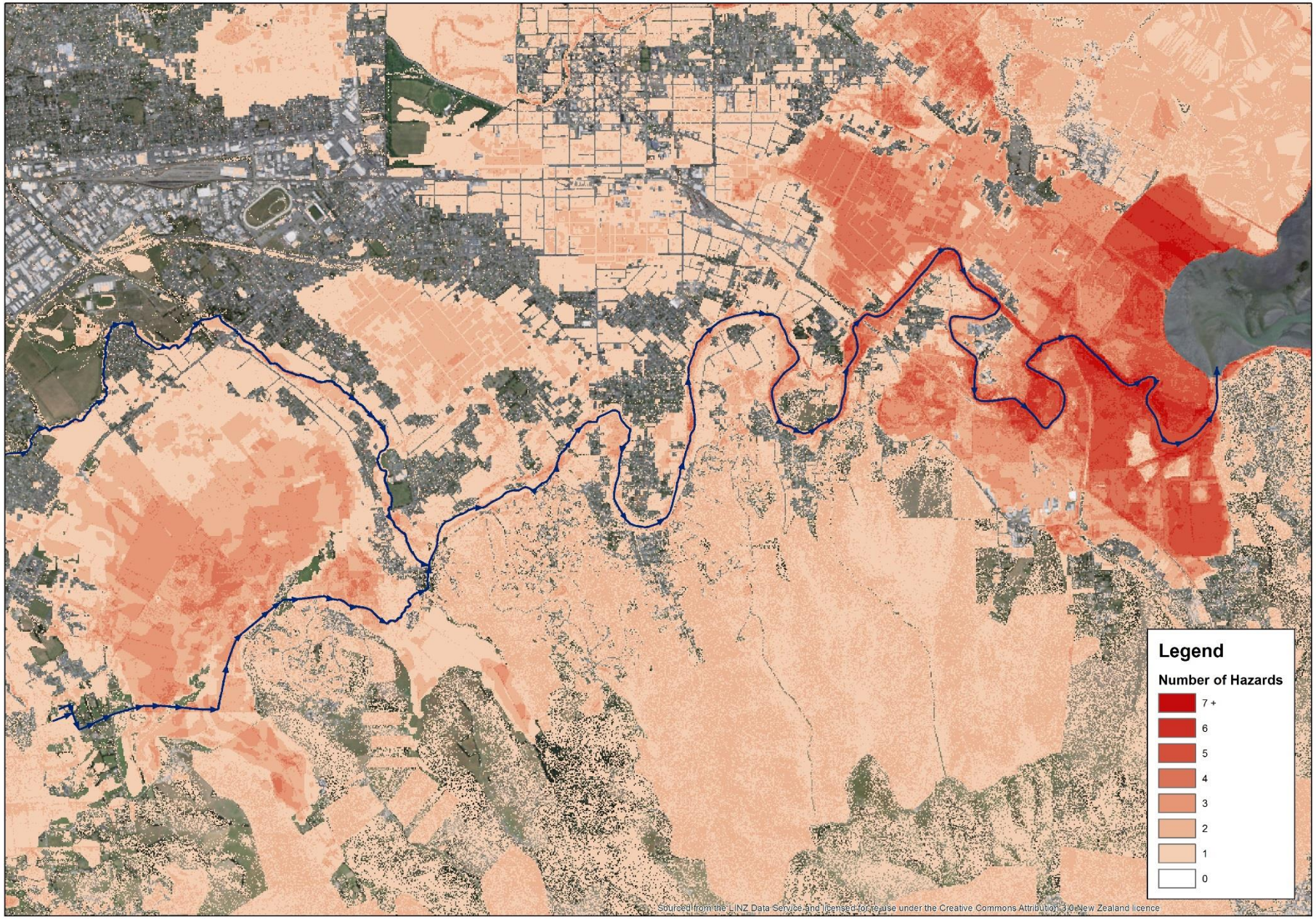
- To develop an **adaptive plan to manage flooding** in Christchurch's Heathcote catchment



Project Plan

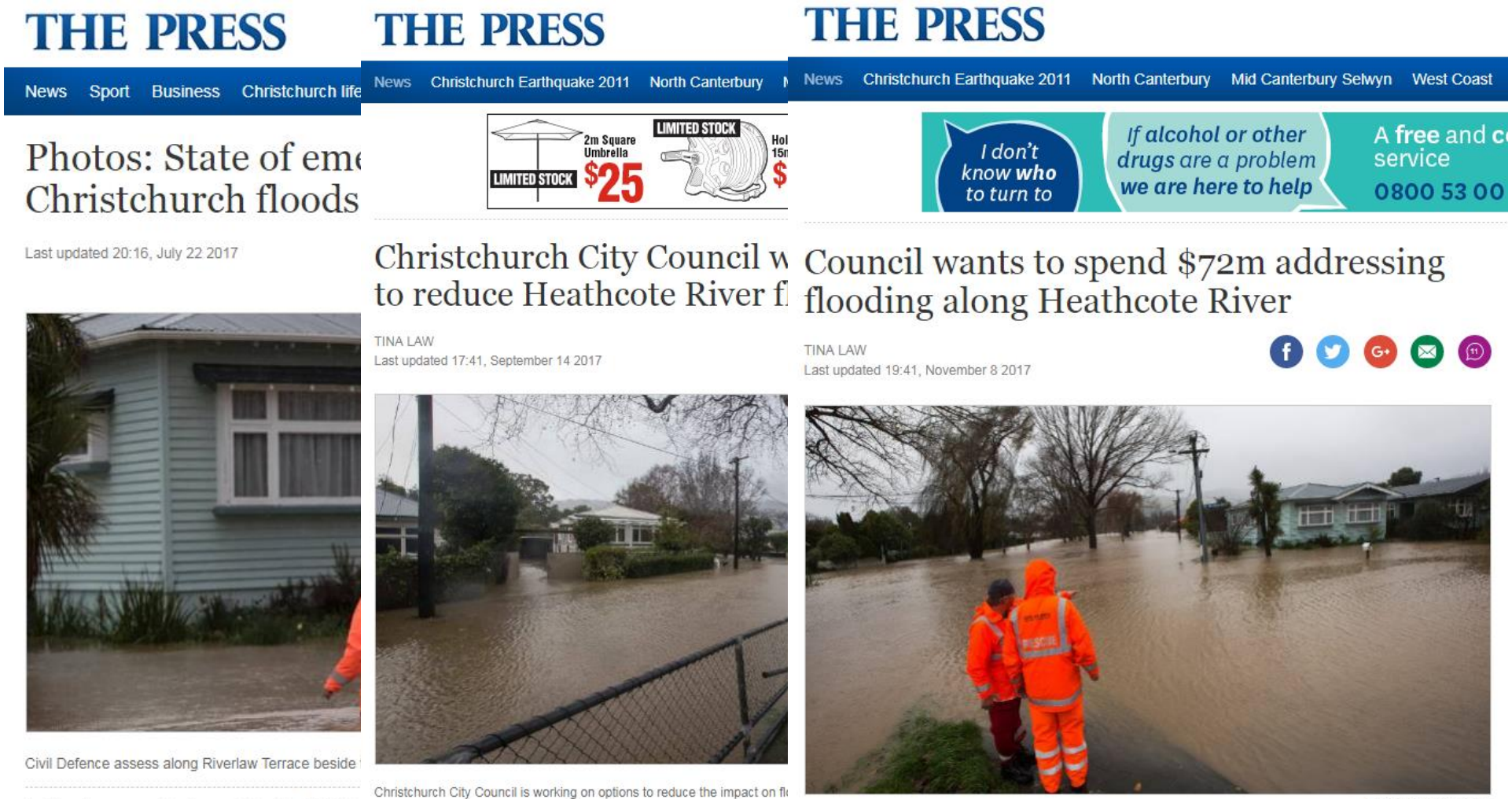


The Heathcote Catchment



July 2017 Flooding

- Project was towards the end of testing individual options when….



THE PRESS

News Sport Business Christchurch life

Photos: State of eme
Christchurch floods

Last updated 20:16, July 22 2017

Civil Defence assess along Riverlaw Terrace beside

THE PRESS

News Christchurch Earthquake 2011 North Canterbury

2m Square Umbrella LIMITED STOCK $25 LIMITED STOCK

Christchurch City Council w
to reduce Heathcote River f

TINA LAW
Last updated 17:41, September 14 2017

Christchurch City Council is working on options to reduce the impact on fl

THE PRESS

News Christchurch Earthquake 2011 North Canterbury Mid Canterbury Selwyn West Coast

I don't know who to turn to

If alcohol or other drugs are a problem we are here to help

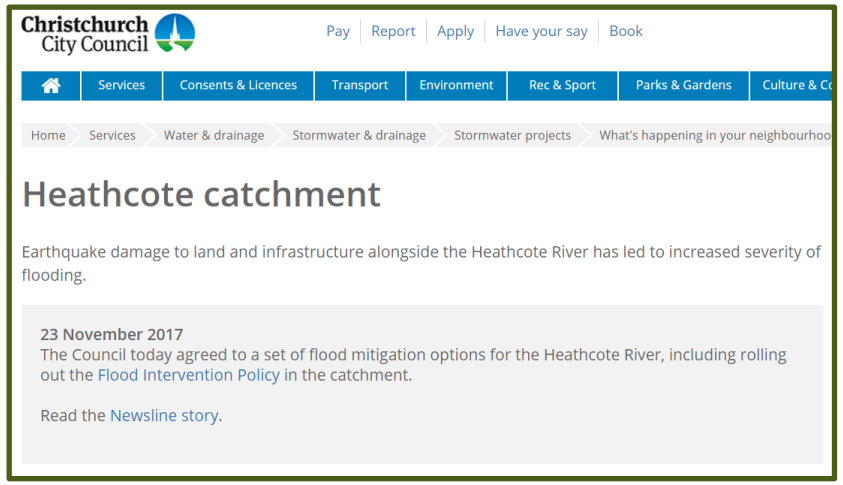
A free and c service
0800 53 00

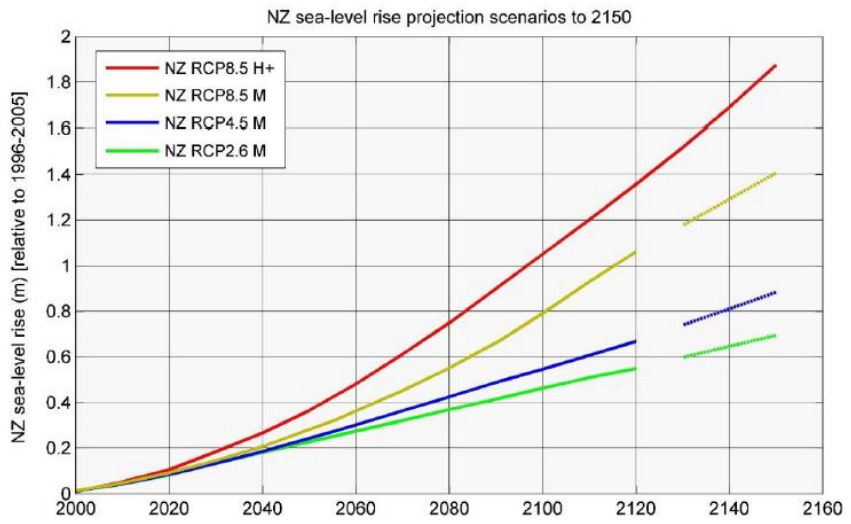
Council wants to spend $72m addressing flooding along Heathcote River

TINA LAW
Last updated 19:41, November 8 2017

A Successful Outcome

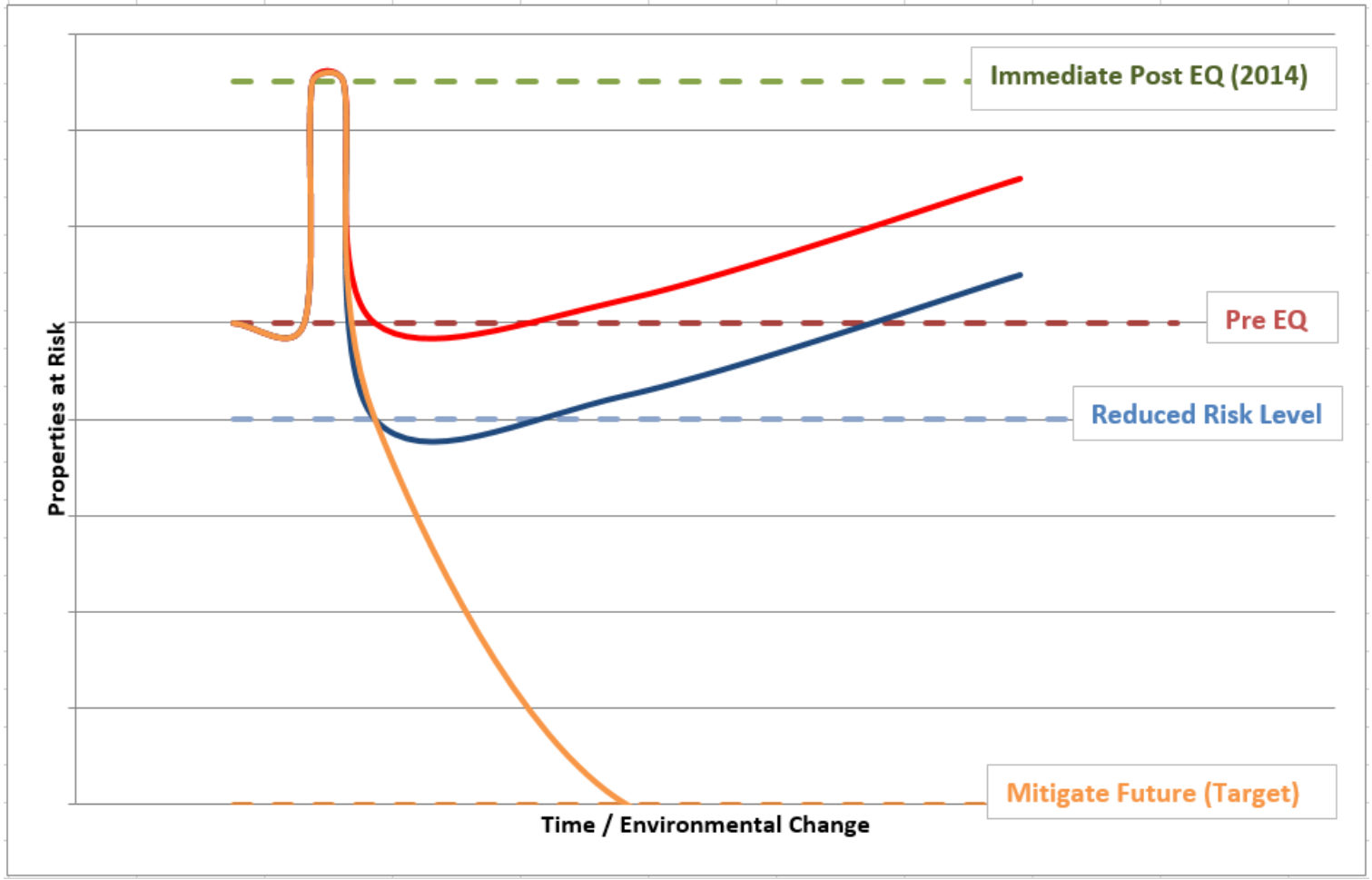
- Substantially reduce flooding in current climate, and some way into the future
- Climate change may occur relatively slowly, but influential events can occur suddenly
- Plans in place assists implementation when opportunities arise



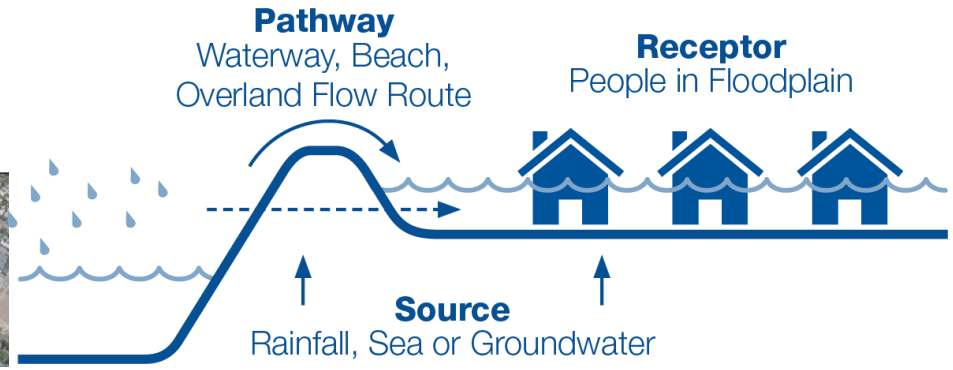


Setting Objectives For The Plan

- What is a tolerable level of flood risk?



Options Development

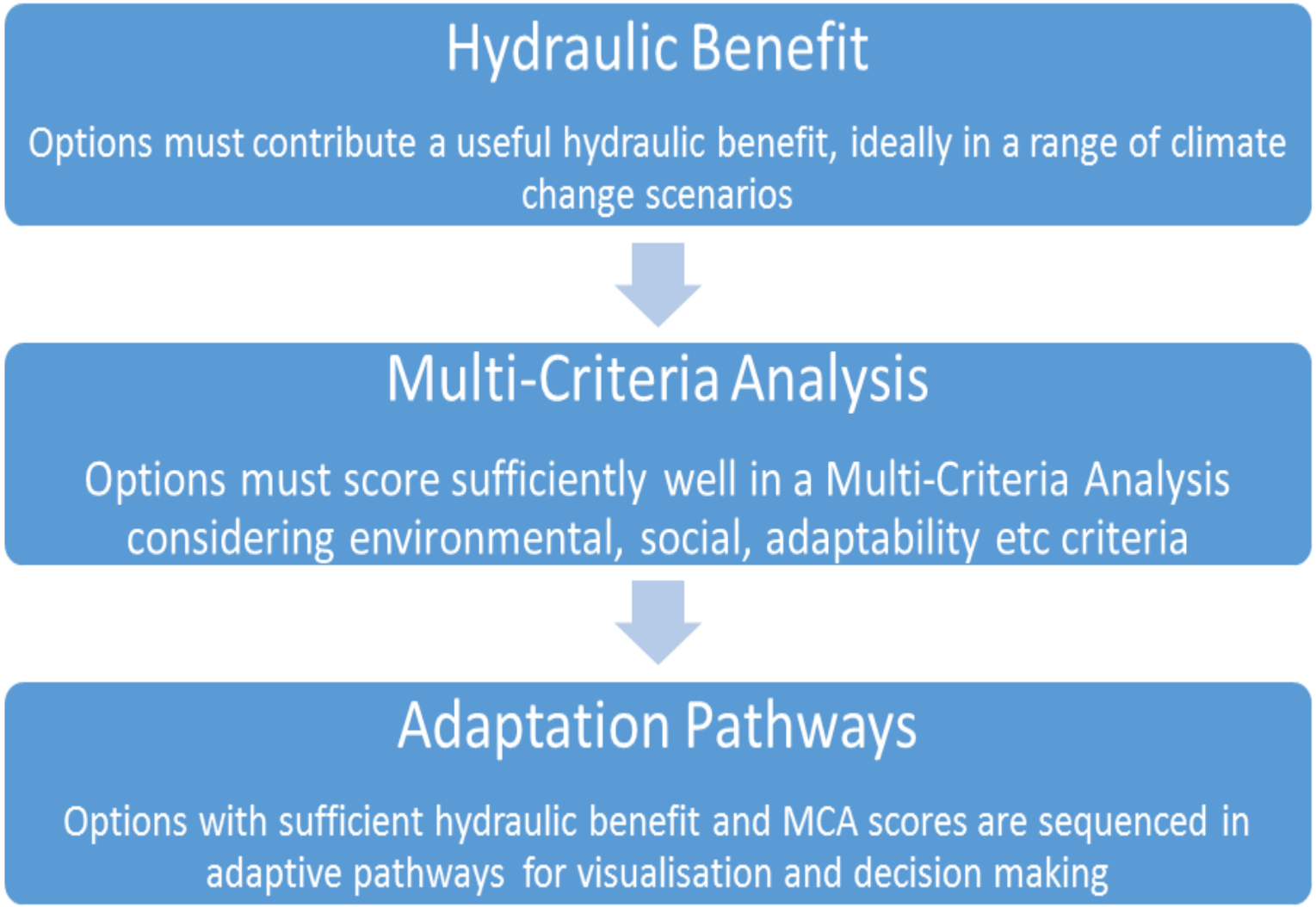


Multi-Criteria Analysis

Positive
Slight Positive
Neutral
Slight Negative
Negative

Outcome	Criteria	Flood Intervention Policy	Room for the River	Further Upstream Storage	River Mouth Pump Station	Dredging	Bypass Culverts	Stopbanks (and Floodwalls)	Individual Property Protection
Environment	Ecology	0	+1	-1	-1	-2	-1	-1	0
	Landscape	0	+2	0	-2	0	0	-2	-1
	Heritage and Culture	0	+1	-1	0	-1	0	0	0
	Community Impact	0	-2	-1	-2	0	0	-2	-1
	Construction	-1	-1	-1	-2	-1	-2	-2	-2
Long Term Sustainability	Long Term Hydraulic Sustainability	+2	+2	+2	+2	-1	-1	0	-1
	Degree of Adaptability	0	+2	+2	+1	+1	0	-2	+1
Risk	Legal Risk	+1	-2	-1	-2	-1	-1	-1	-2
	Time Frame Risk	+2	+2	+1	+2	0	0	-1	-2
	Robustness	+2	+2	+1	+1	0	+1	-1	0
Multi-hazards	Impact of Multi-hazards	+2	+2	0	+1	+1	-1	-1	+1

A Decision-Making Framework for Adaptation



Adaptive Pathways

Decreasing Preference

	Sea Level Rise / Rainfall for RCP 4.5	RCP 4.5	RCP 8.5
Baseline	Upper Heathcote Storage	FIP	
Pathway 1	Upper Heathcote Storage	FIP	Dredging
Pathway 2	Upper Heathcote Storage	FIP	Dredging
Pathway 3	Individual Property Protection		
Pathway 4	River Mouth Pump Station combined with: • IPP; or • Stopbanks from Eastern Terrace to Hansen Park		• IPP; and/or • Extend/raise stopbanks/IPP
Pathway 3	Stopbanks from Hansen Park to Radley Street		Extend/raise stopbanks?

Sea Level Rise / Rainfall for RCP 4.5	+0m / +0%	+0.25m / +7.4%	+0.5m / +11.2%	+0.75m / +14.4%	+1.0m / +16%
RCP 4.5	Current	2050	2090	>2120	
RCP 8.5	Current	2040	2070	2090	2120

Adaptive Pathways

Decreasing Preference

Baseline	Upper Heathcote Storage				
Pathway 1	FIP				
Pathway 2					
Pathway 3					
Sea Level Rise / Rainfall for RCP 4.5					
RCP 4.5					
RCP 8.5					

Decreasing Preference

Baseline	Upper Heathcote Storage			
	FIP			
	Dredging	?	?	X
Pathway 1	Individual Property Protection			
Pathway 2				
Pathway 3				
Pathway 4				
Sea Level Rise / Rainfall for RCP 4.5				
RCP 4.5				
RCP 8.5				

Decreasing Preference

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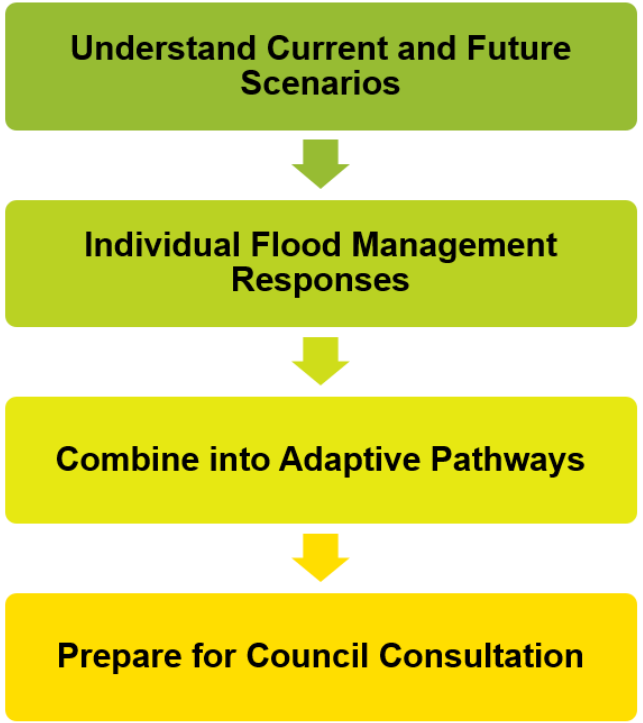
RCP 8.5	Current	2040	2070	2090	2120

Where Are We Now?

- Project has paused until wider Council work is progressed:
  - What is tolerable level of flood risk?
  - Could this vary across the city?
  - What would changing land use look like?



Summary

- Understanding flood responses prior to an event so works were approved in a timely manner
- Confidence that these responses fit within an adaptive management plan
- Demonstration of “theory into practice” which is informing wider debate
- More detail in paper on:
  - Integrating information on other hazards
  - Hydraulic modelling increments of climate change
  - Usefulness of extreme climate change scenarios

May 29, 2018

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