

A Cascade of Tensions

Flood Risk Management under Climate Change

May 2023



What I'm not talking about...

- Updates to local temperature projections
- Te Tāruke-a-Tāwhiri: Auckland's Climate Plan
- What national direction is available on choice of climate future/s
- How we made the decision on what climate future/s to use
- Challenges we faced along the way
- Considerations when looking at temperature projections, including downscaling methodologies and baseline used



What I'm not talking about...

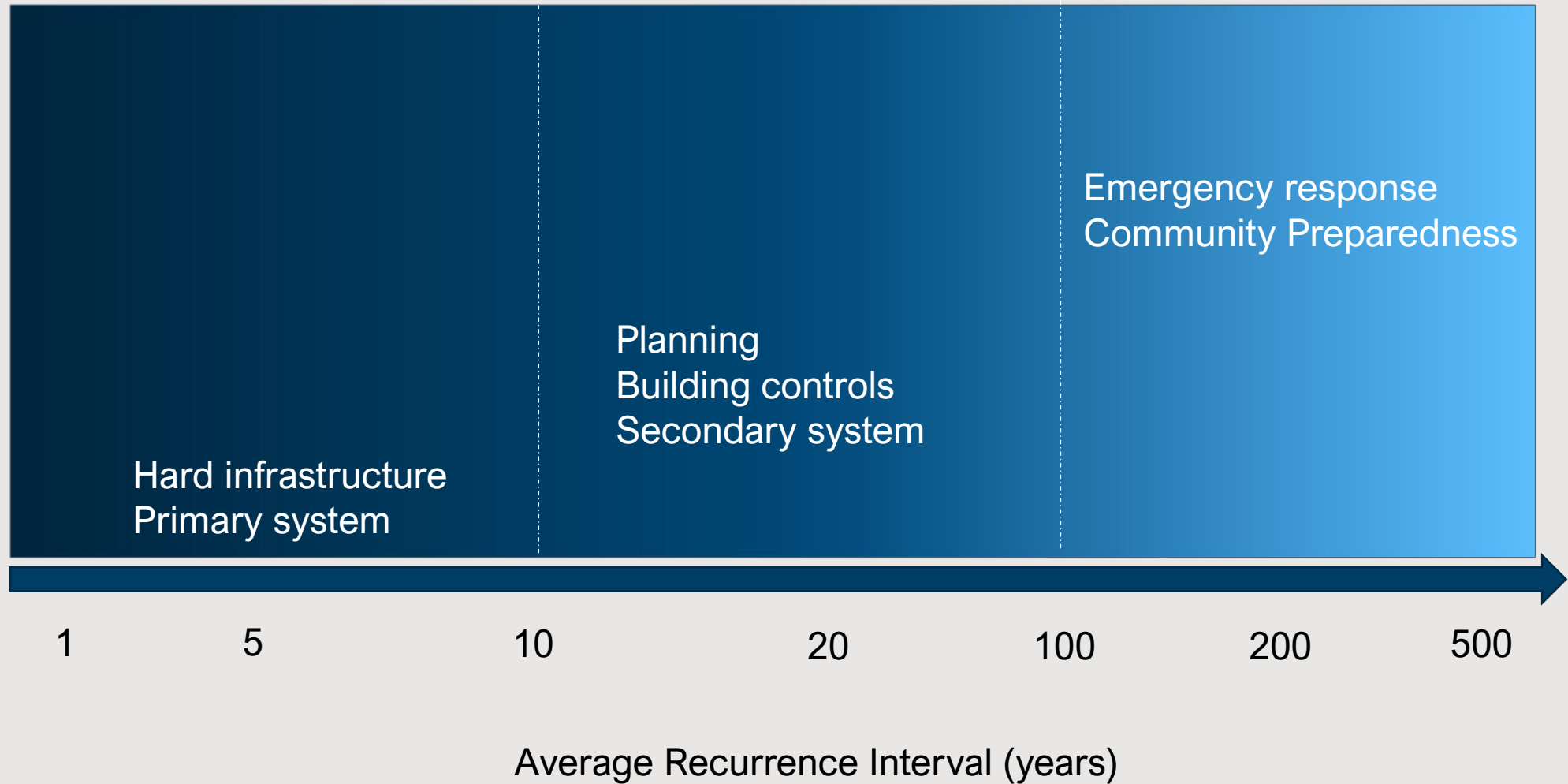
- The impact of climate change on the TP108 design storm
- The impact of different temperature assumptions on peak flow, volume, pipe design, levels of service, floodplain extent and depth
- NIWA review of these decisions
- NIWA estimates for downscaling of latest global projections to Auckland
- Temperature projections that will be available from mid next year, their limitations, and implications for MFE guidance



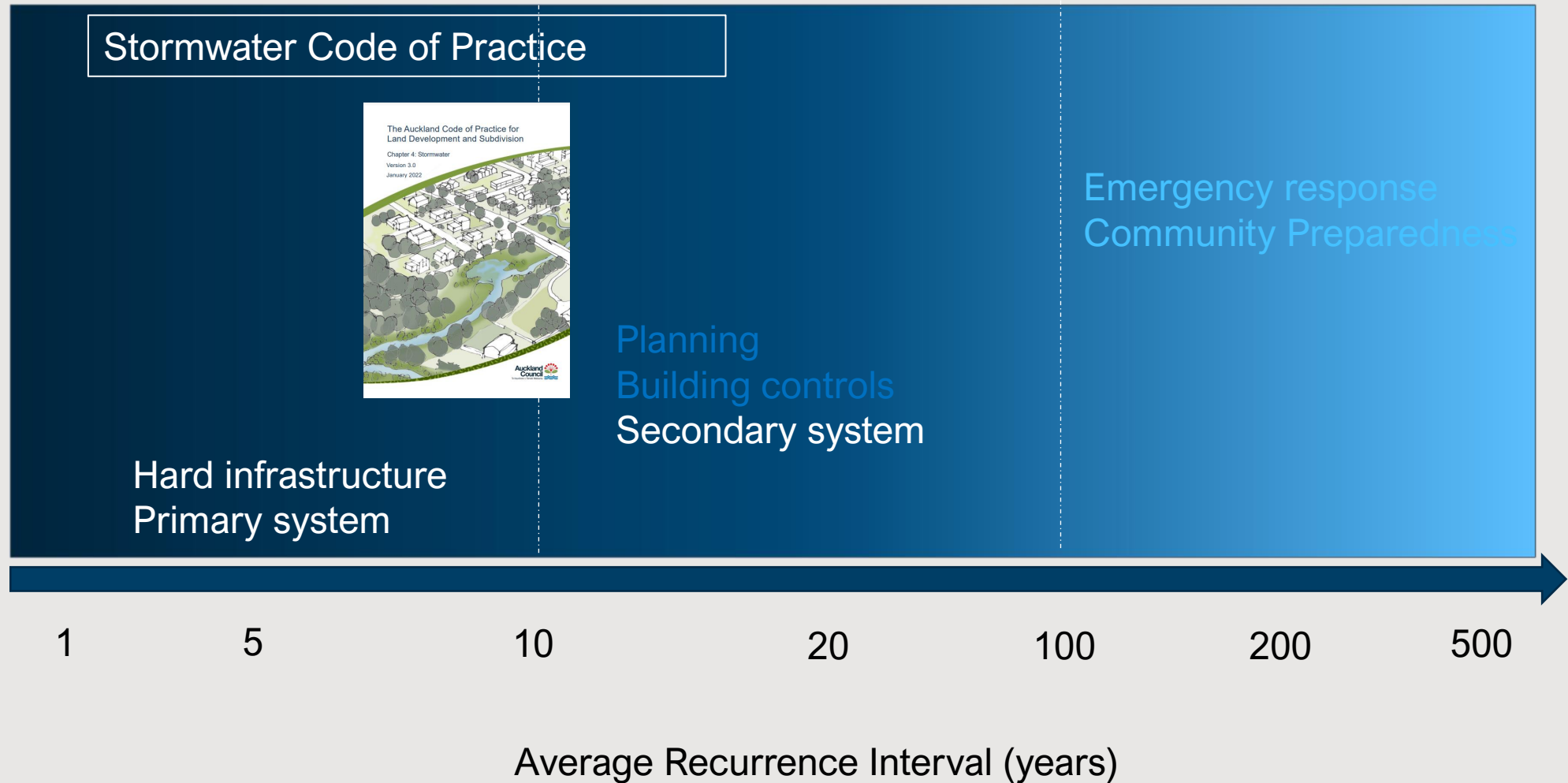
Flood Risk Management controls



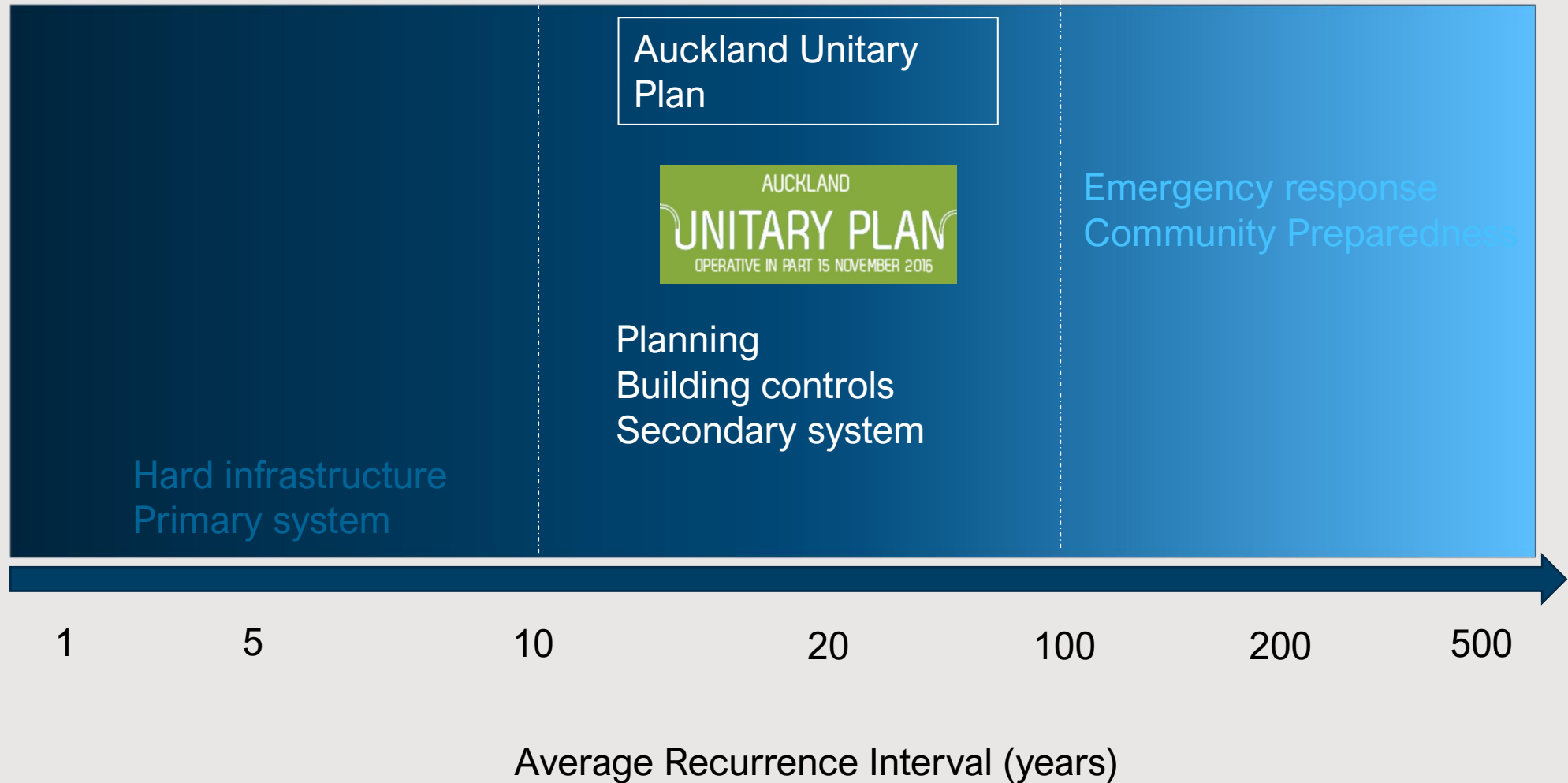
Flood risk management controls



Flood risk management controls



Flood risk management controls



How is climate change considered?



These controls assume a stationary future



Today



Stationary Future
Maximum fixed demand
Fixed future rainfall
Maximum impervious area



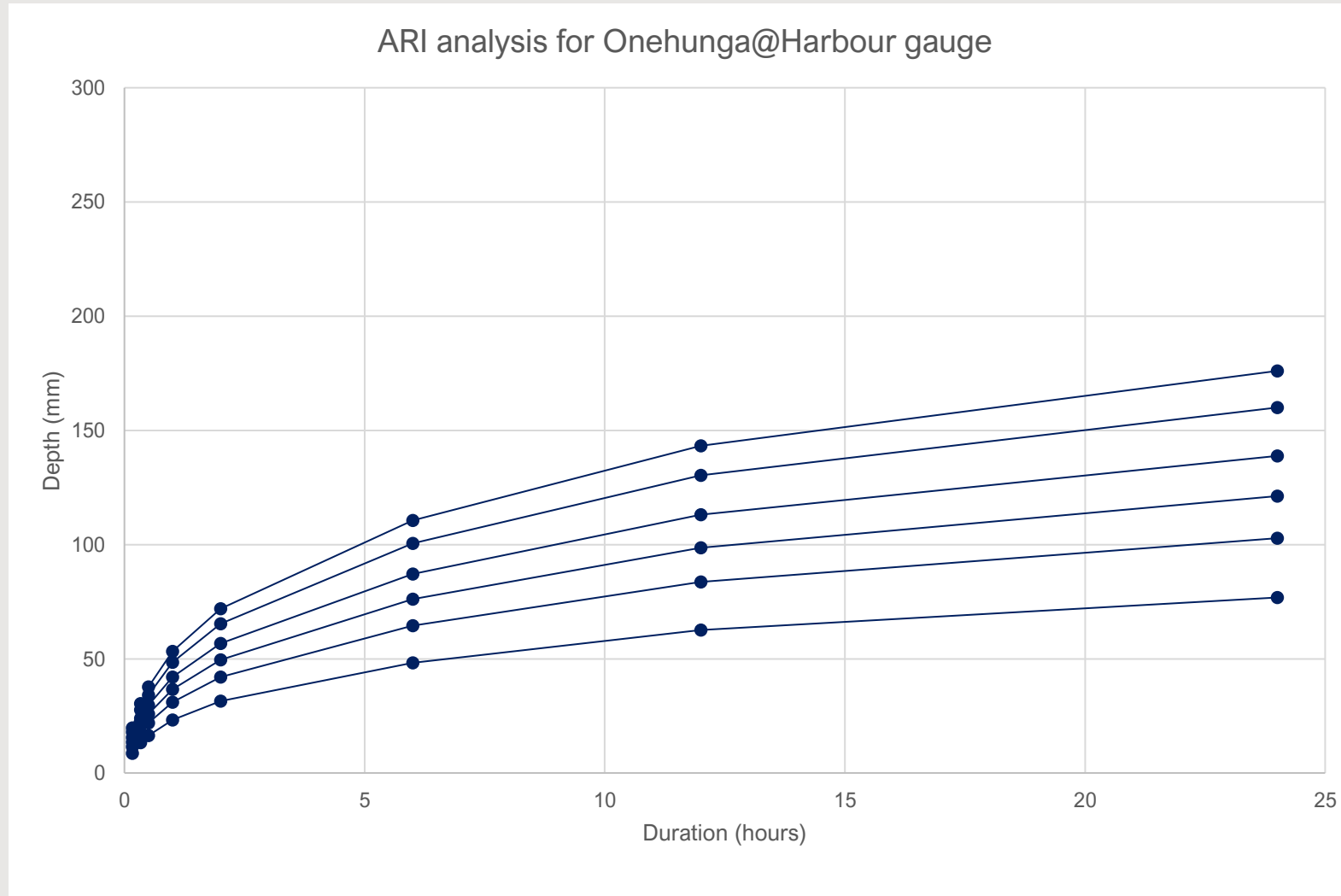
Extreme rainfall



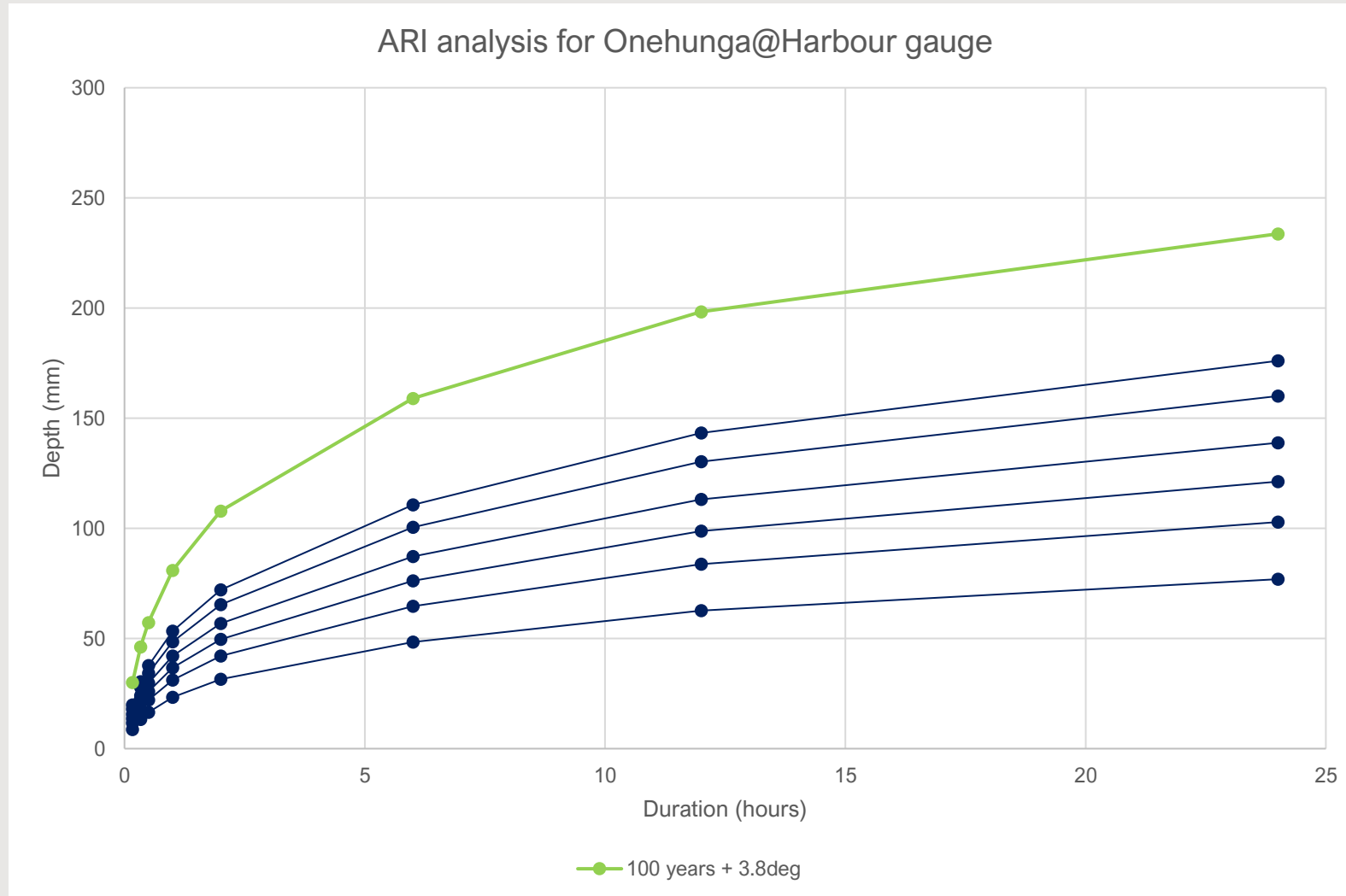
Extreme rainfall is changing in ways we cannot accurately foresee



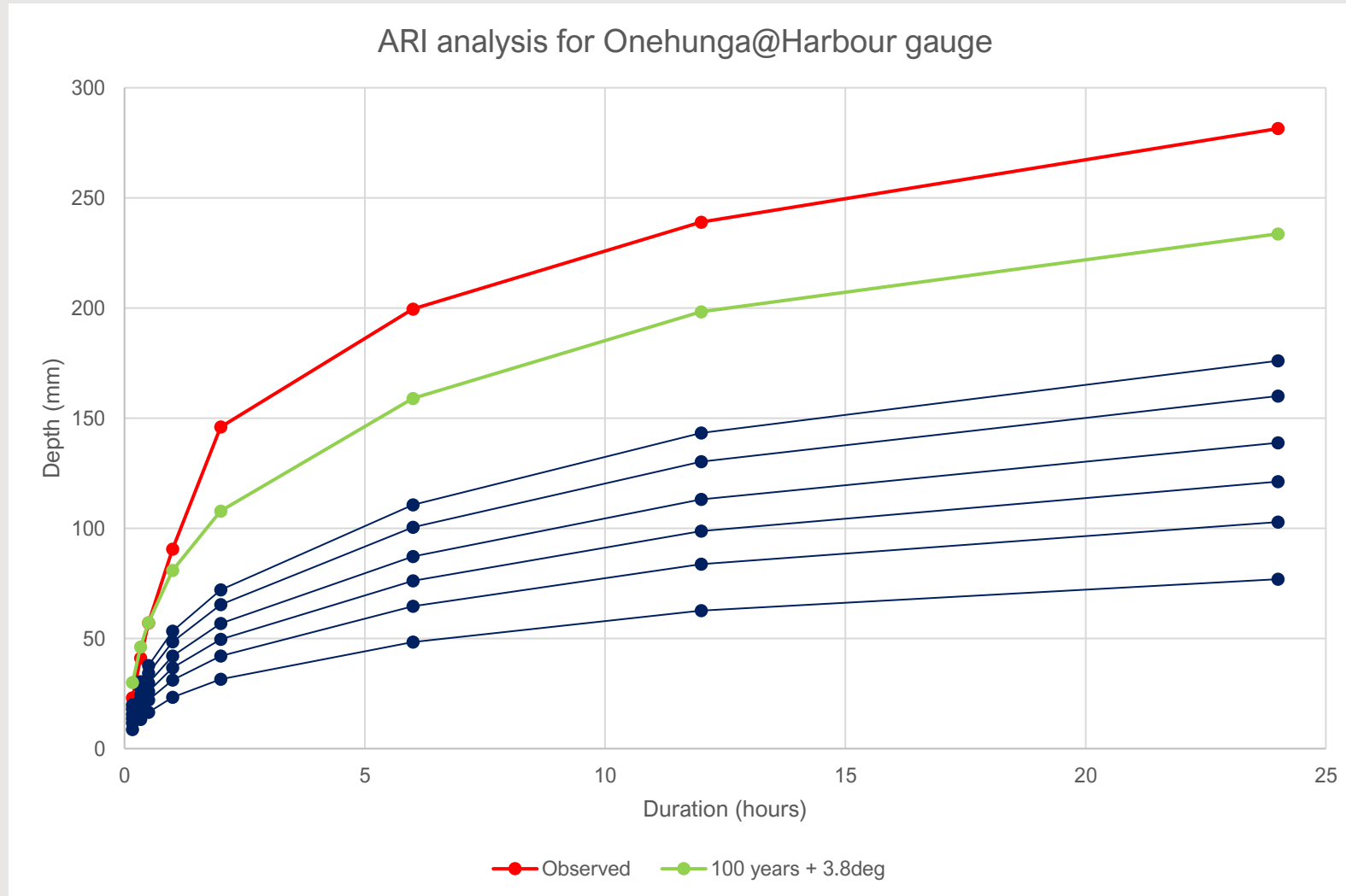
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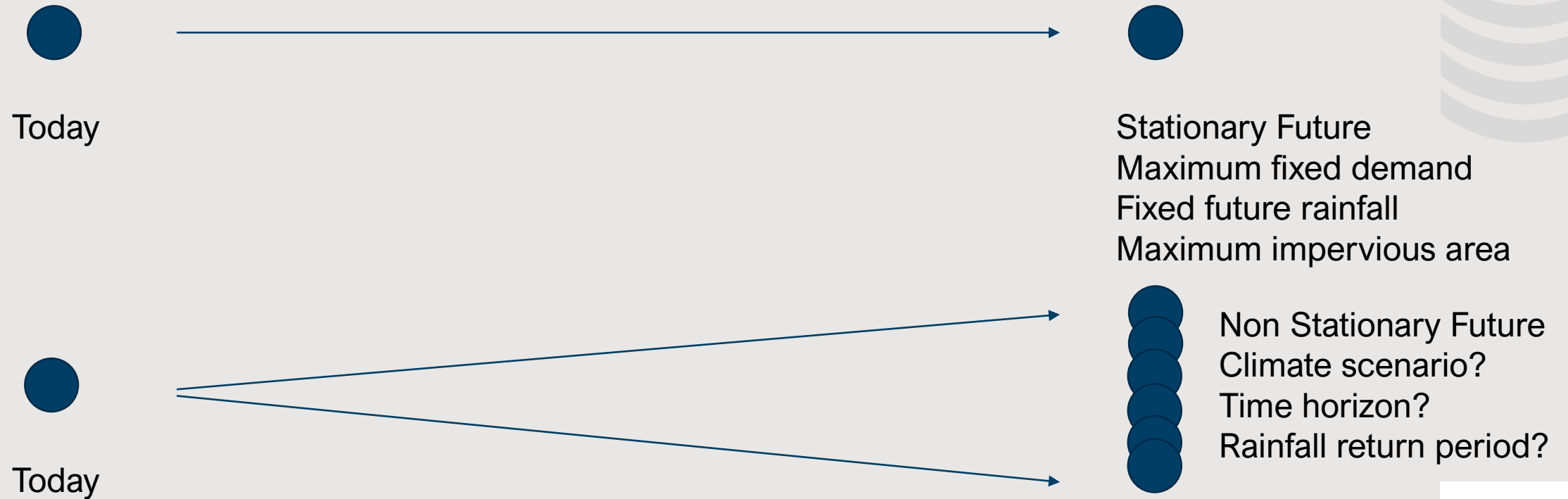
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The future is non stationary



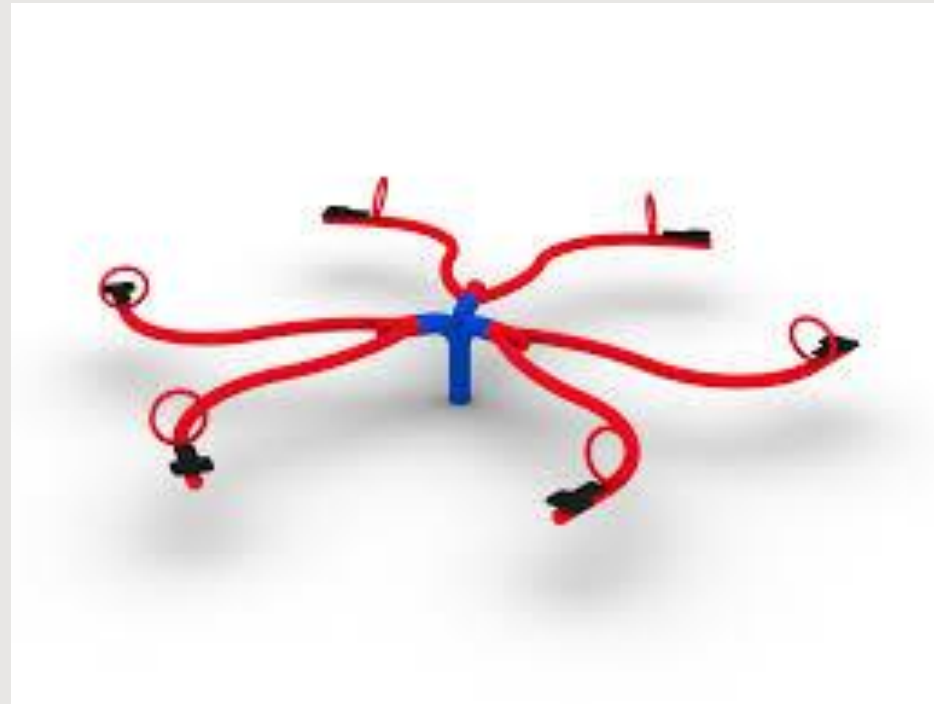
What does this mean for us?



It's really hard

Urgency to act vs
uncertainty and lack of
guidance

Climate mitigation vs
adaptation



Community expectations
today and in future?

Multiple actors, multiple
owners of stormwater assets

Current tools not fit for
purpose – do we retrofit or
start again?



We need to consider what each of these controls is used for



Floodplains and overland flow paths

- How we use our land
- How we manage risk to life and damage to assets
- Timeframe -> in perpetuity
- Potential impacts -> high



Primary system

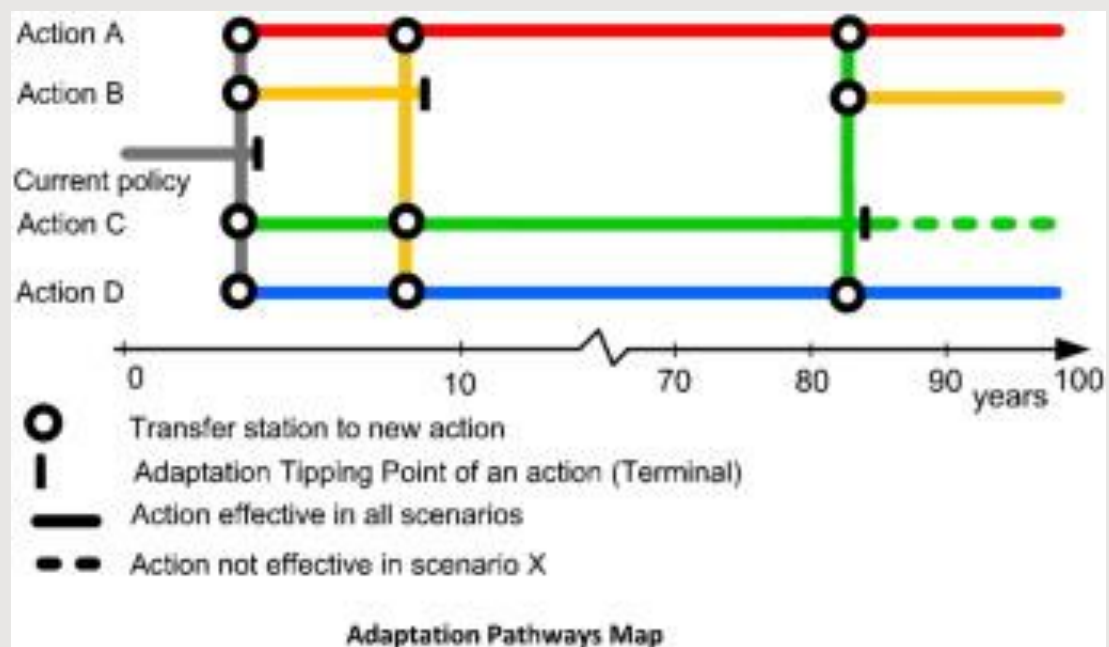
- How we manage nuisance flooding
- Timeframe -> lifetime of asset
- Potential impacts -> nuisance



Dynamic Adaptive Pathways?



Dynamic Adaptive Pathways



Dynamic Adaptive Pathways

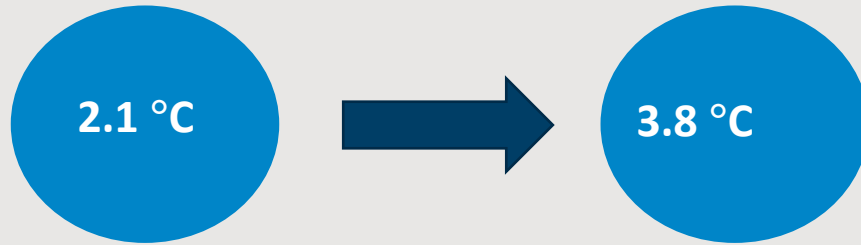
- Hard to do at a stormwater asset level
- Consider system as a whole and suite of risk management tools
 - Hard infrastructure
 - Secondary system
 - LOS reduction
 - Land use changes
- Need defined outcomes



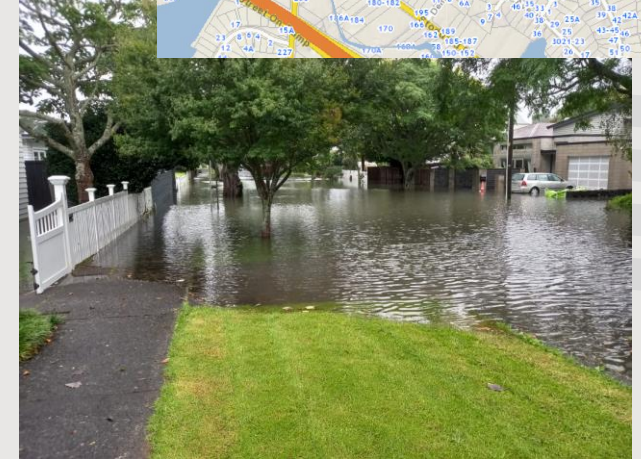
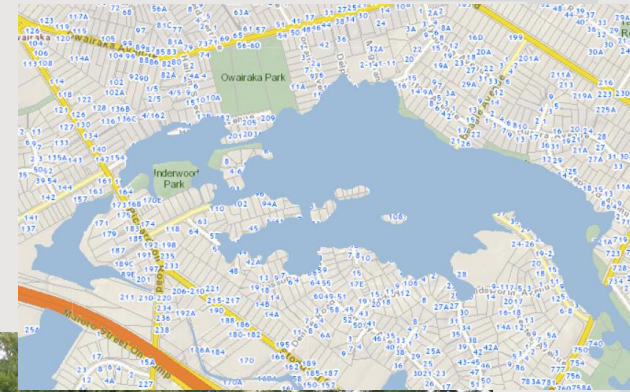
The Way Forward



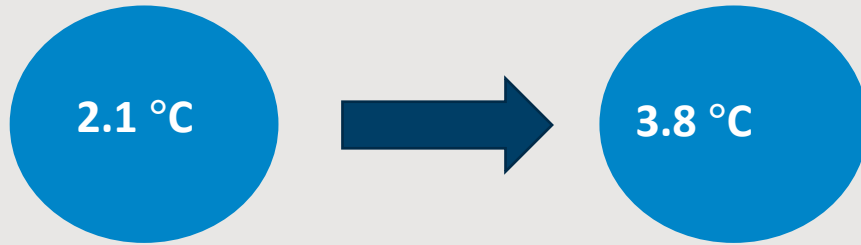
Recommendations – Floodplains



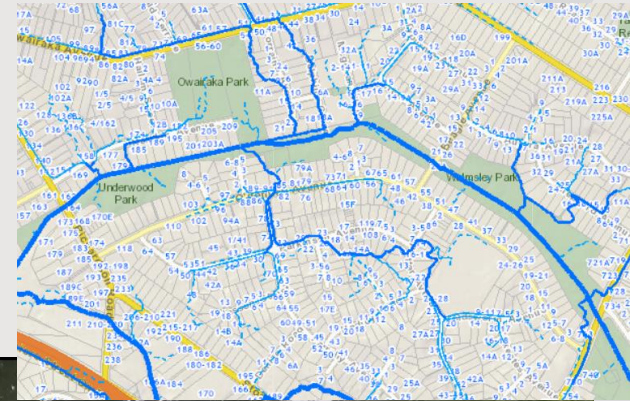
- Is this high enough?
- Consider the different uses of floodplains
 - Baseline and an intermediate scenario
 - PMF



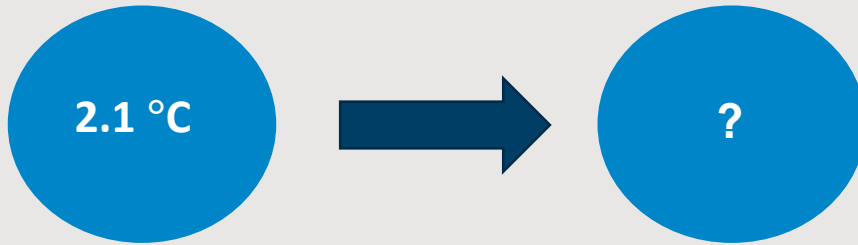
Recommendations – Secondary system



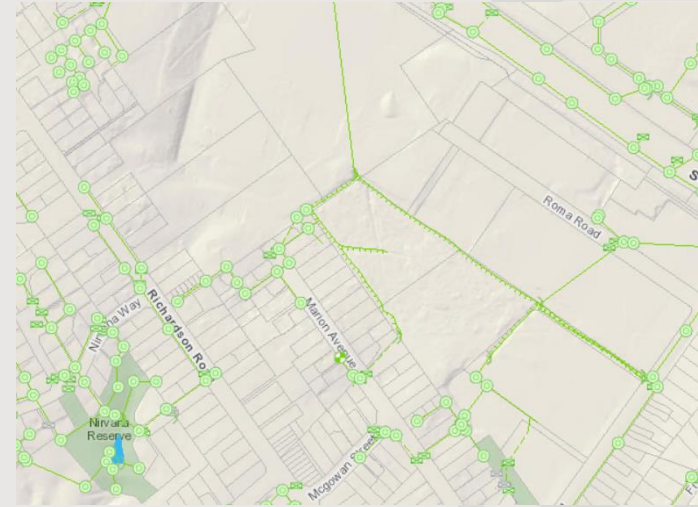
- Guidance needed on overland flow path design



Recommendations – Primary system



- Retain 2.1deg as interim approach
- Additional work needed to ascertain minimum design criteria



A more transformational change is required

- Are we just tinkering around the edges here?
- Go back to basics
 - Don't develop in floodplains
 - Elevate the importance of secondary systems
 - Stop trying to 'engineer our way' out of flood risk
 - System and outcomes thinking
 - Understand impact of exceedance events



Conclusions

See layout menu for other options



Conclusions

- Traditional operational tools are set up for a stationary future
- Flood risk is managed through infrastructure design and landuse planning
 - Different timeframes
 - Ability to reverse or adapt decisions are different
- Our above ground systems are critical for resilience
- National direction required



Thank you

Nick Brown, Nancy Baines, Cheryl Bai, Petra Pearce, Greer Lees, Mahesh Patel, Hansol Lee

Jahangir Islam

Richard Donnelly

Fiona.macdonald@aucklandcouncil.govt.nz

021 390 781



Thank you

