Geoff Williams and Jon Reed

Dynamic Adaptive Pathways Planning for a Water Resource Investment Strategy

Wellington Water

Connect Water

NIWA
Taihoro Nukurangi

anglianwater

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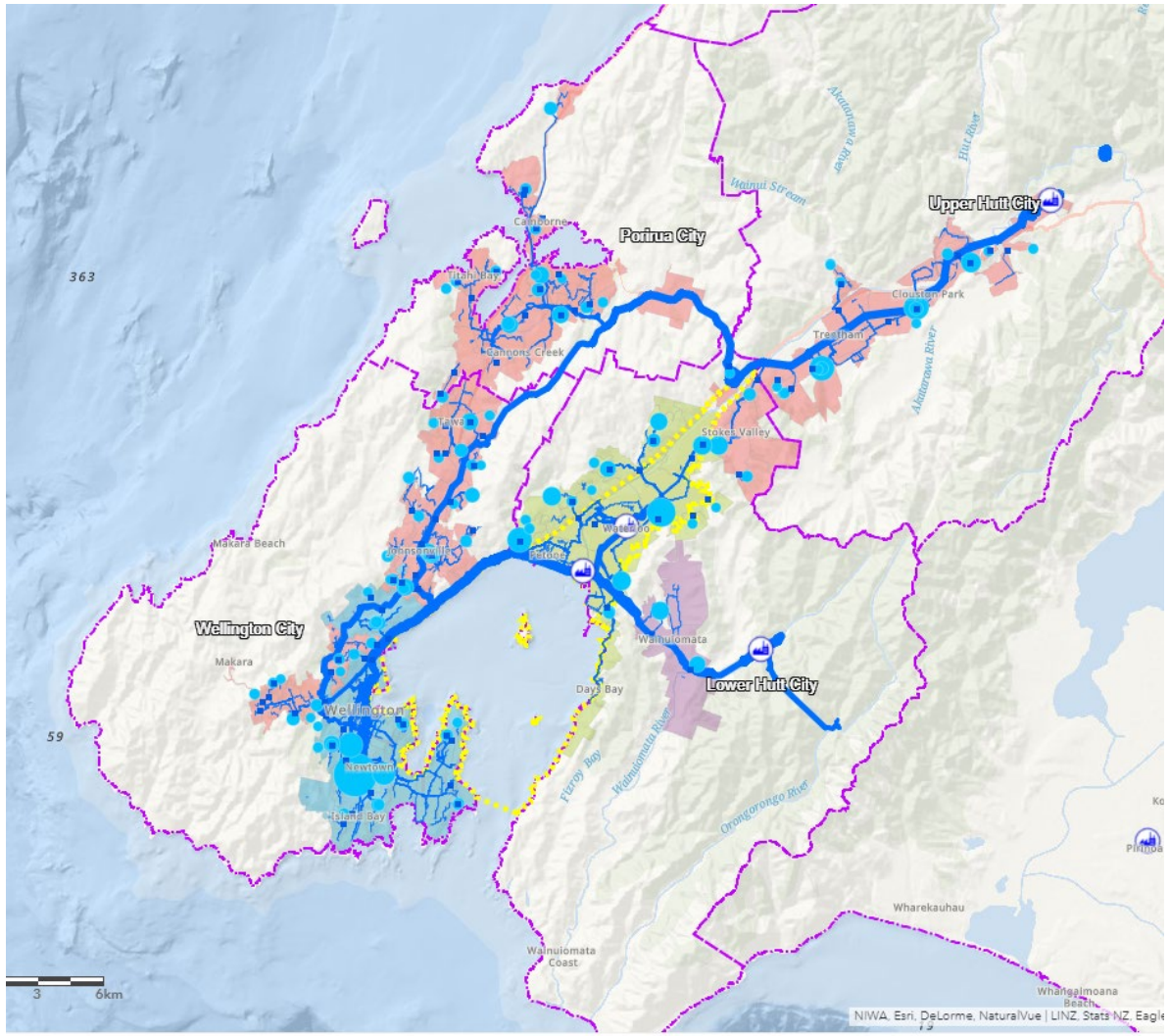
Sensitivity: General

Wellington Metropolitan Water Supply



Challenges now

Drought Level of Service

Peak demand exceeds capacity

High water loss

X

Looking ahead

Te Mana o Te Wai

Growth

Climate change and sea level rise

Community risk appetite

?

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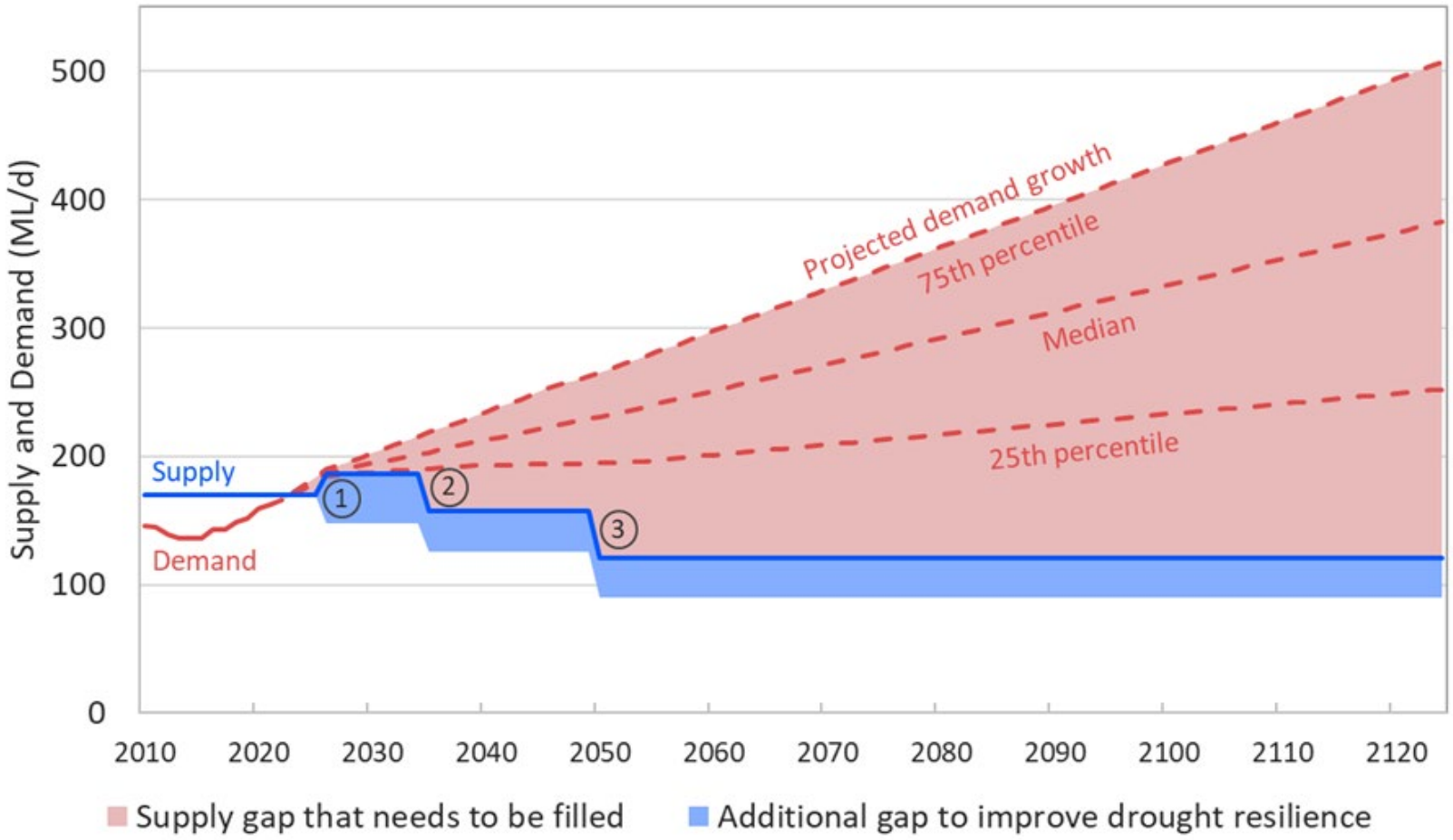
Baseline supply / demand balance



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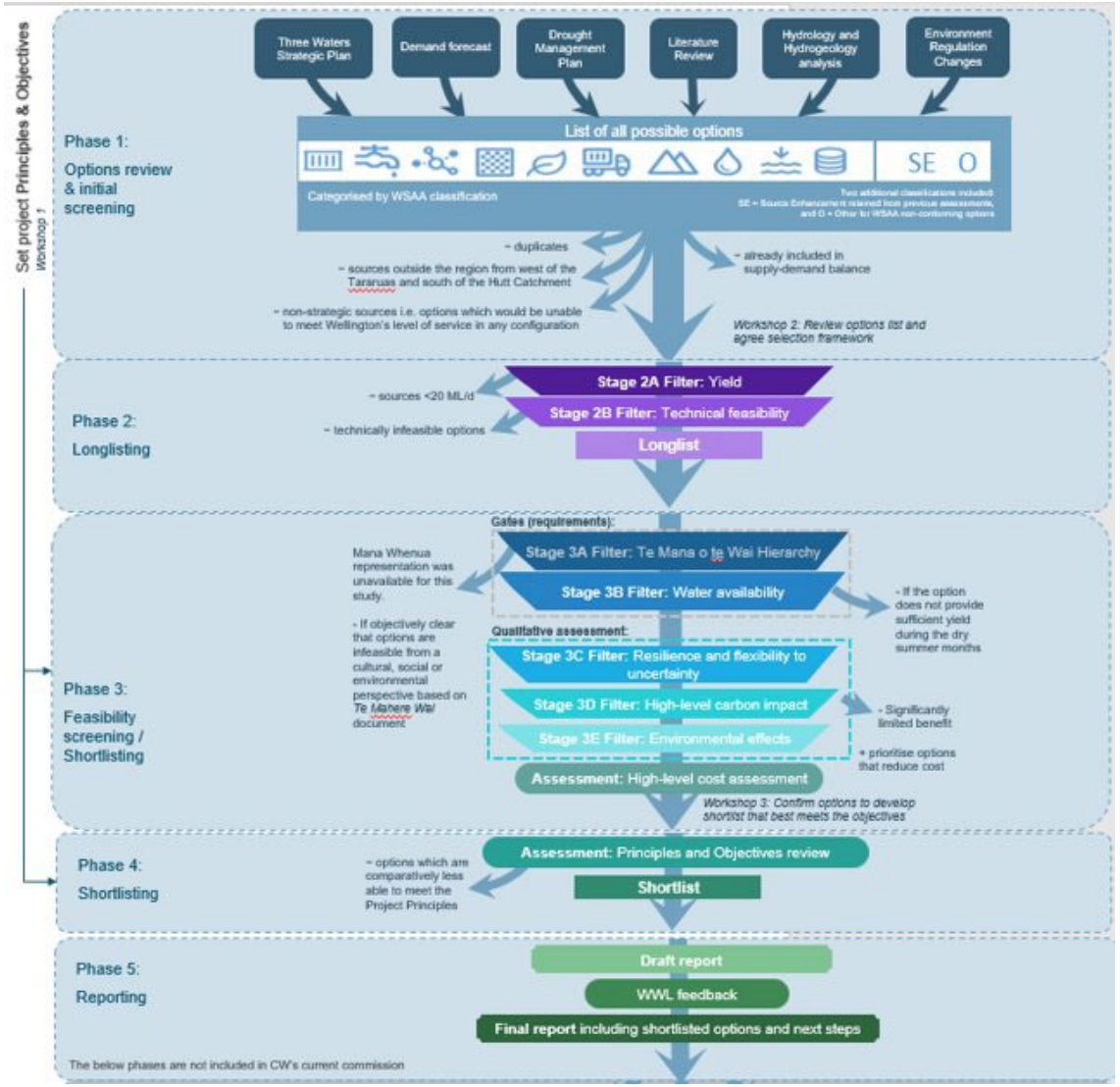
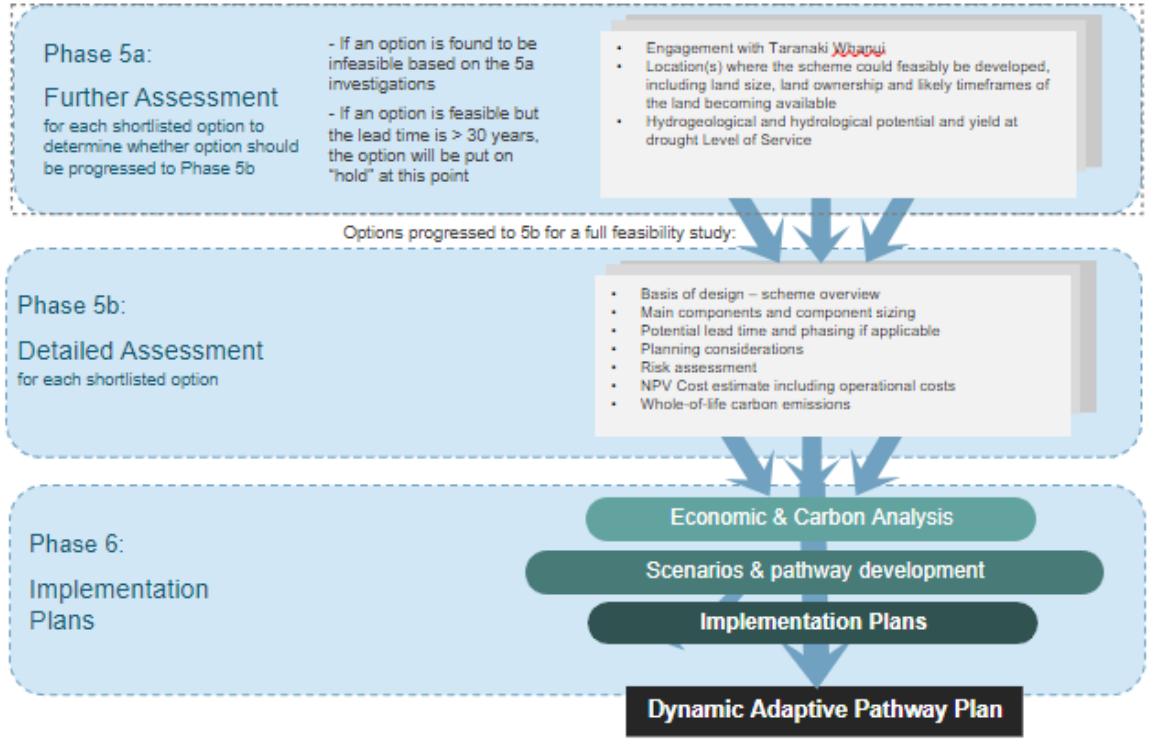
The options appraisal





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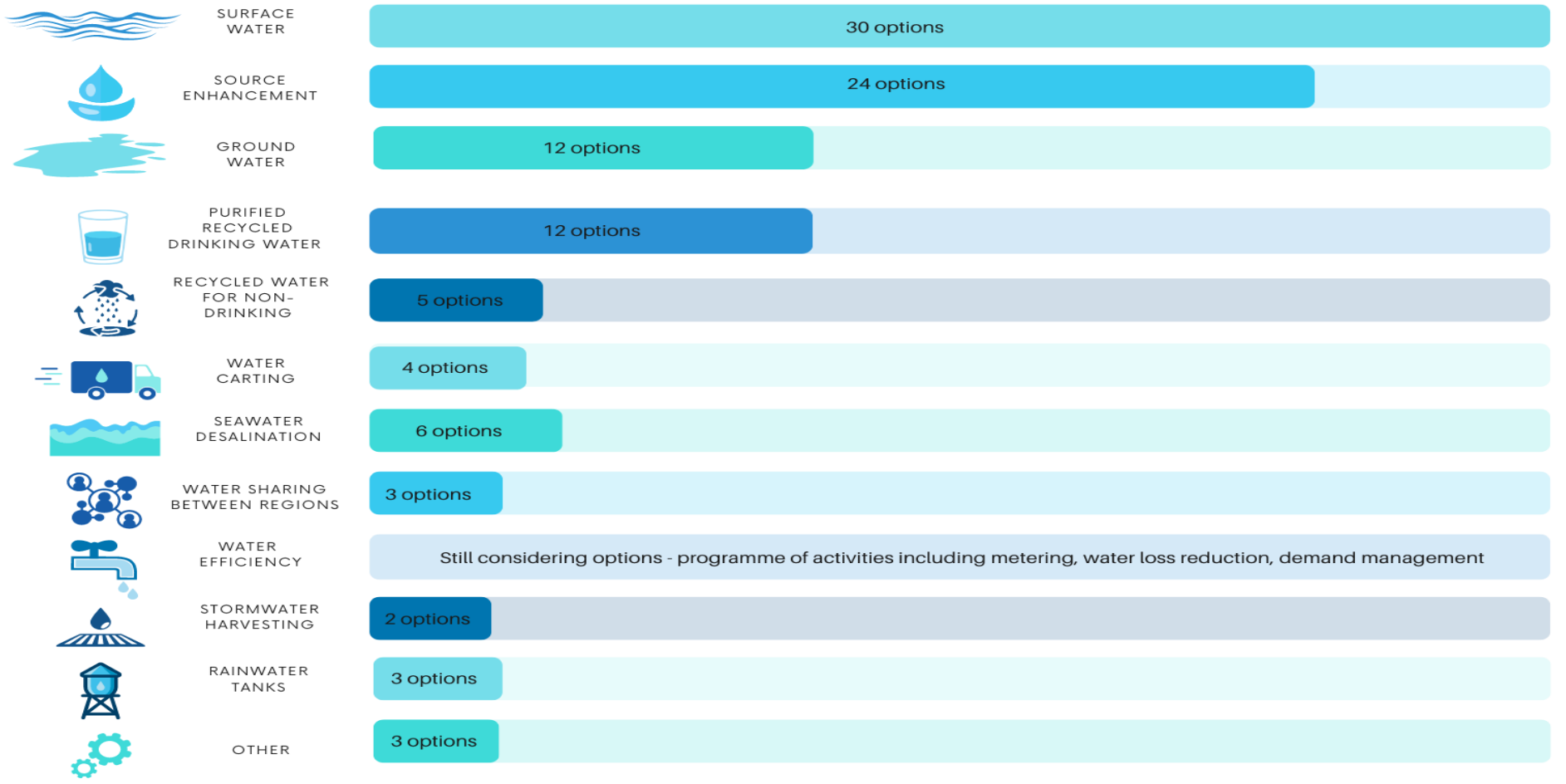
Over 100 options were considered



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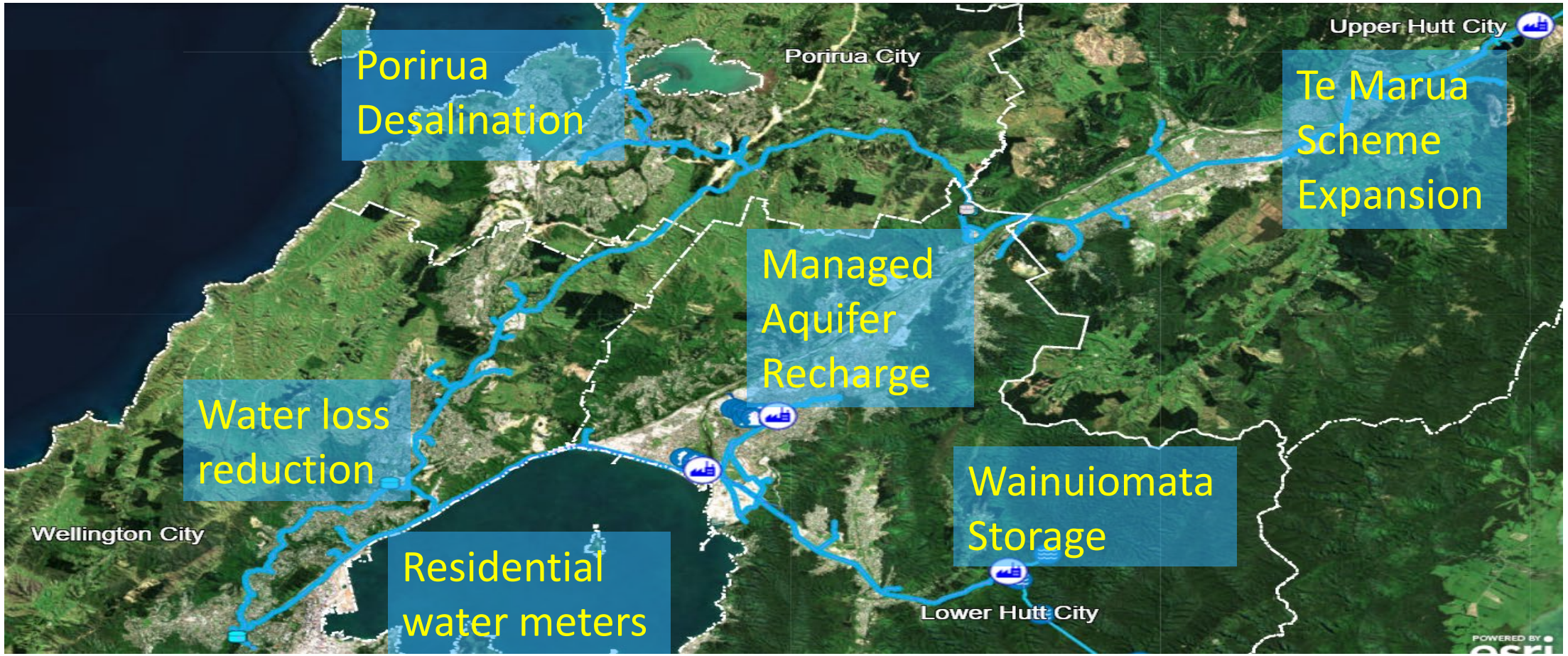
Shortlisted options



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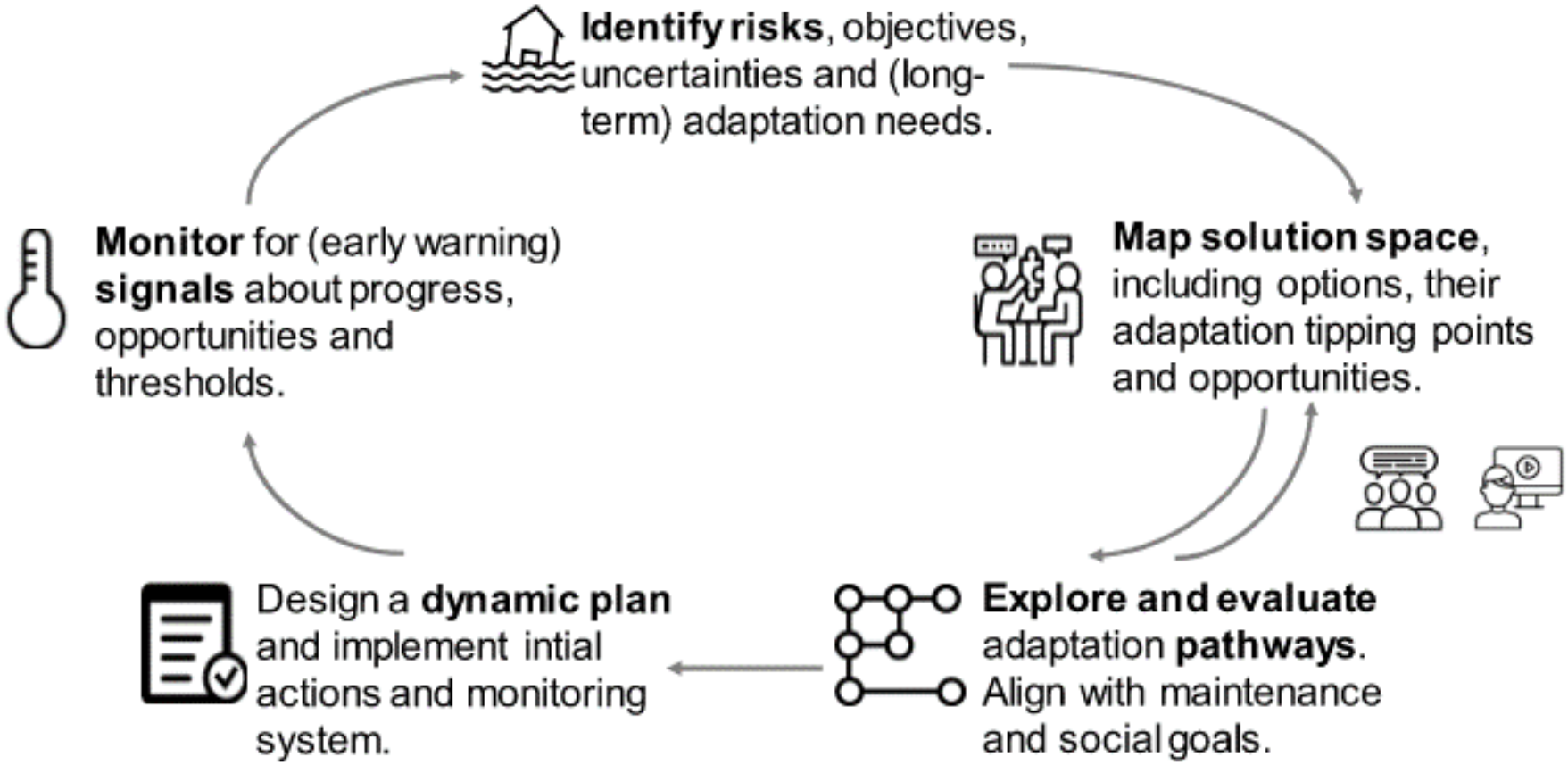
Dynamic Adaptive Pathway Planning (DAPP)



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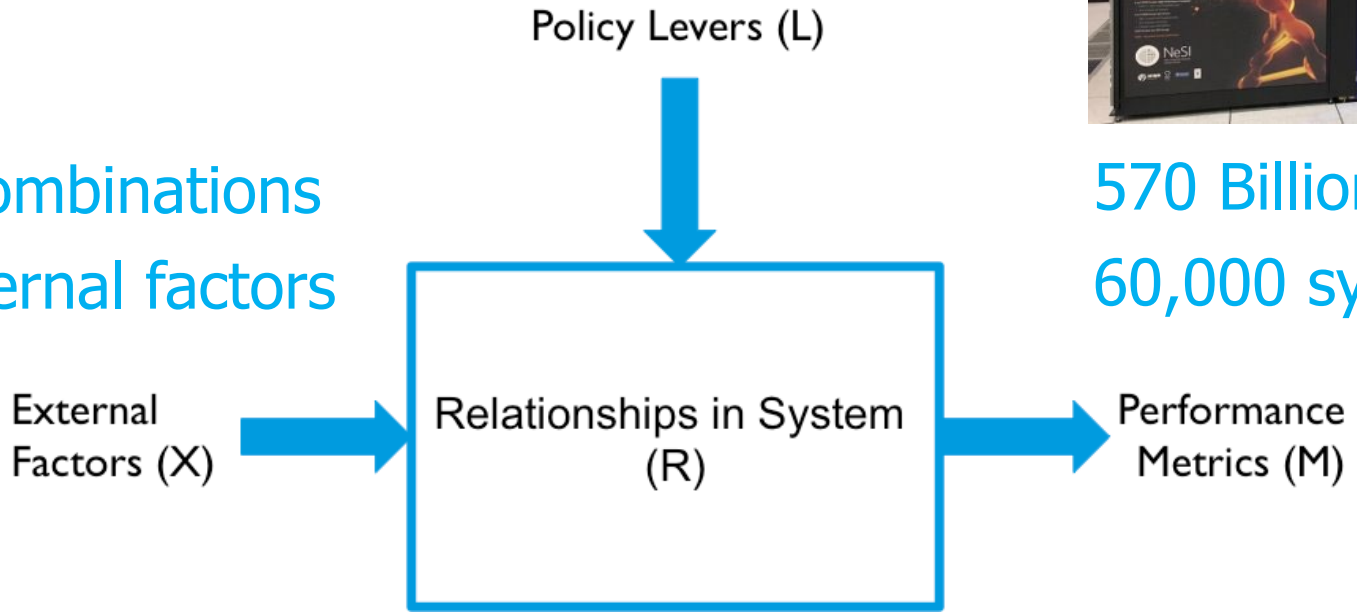
DAPP supported by Robust Decision Making

9 actions and
13 Pathways

576 combinations
of external factors

570 Billion days of stress test
60,000 system failure points



Sustainable Yield Model
(supported by NIWA)

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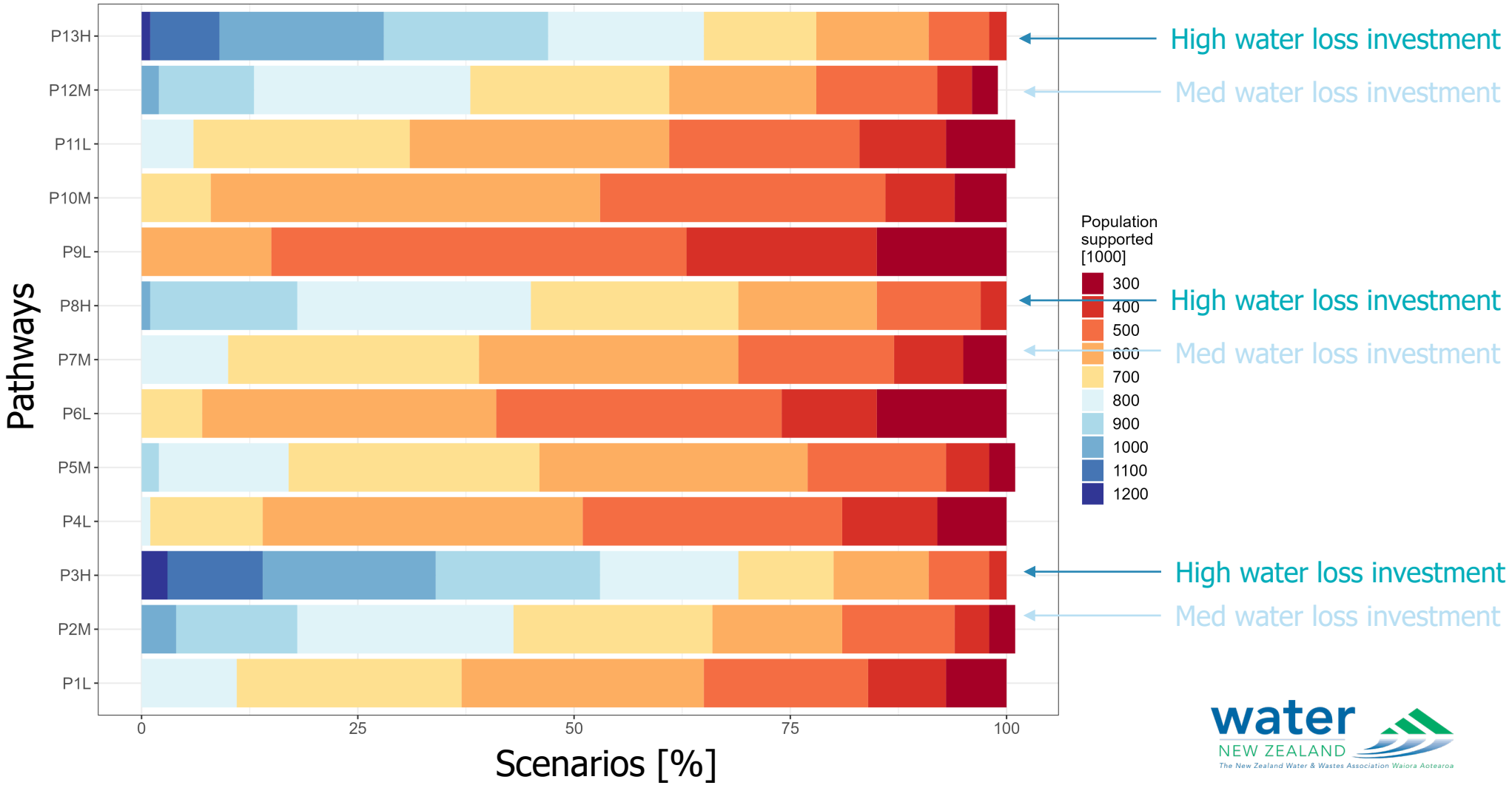
Pathway success overview



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Quantifying external effects

External factor	Variation explained
Environmental regulation	**60%**
Sea level rise	10%
Residential PCD	9%
Climate change	4%
Other	17%

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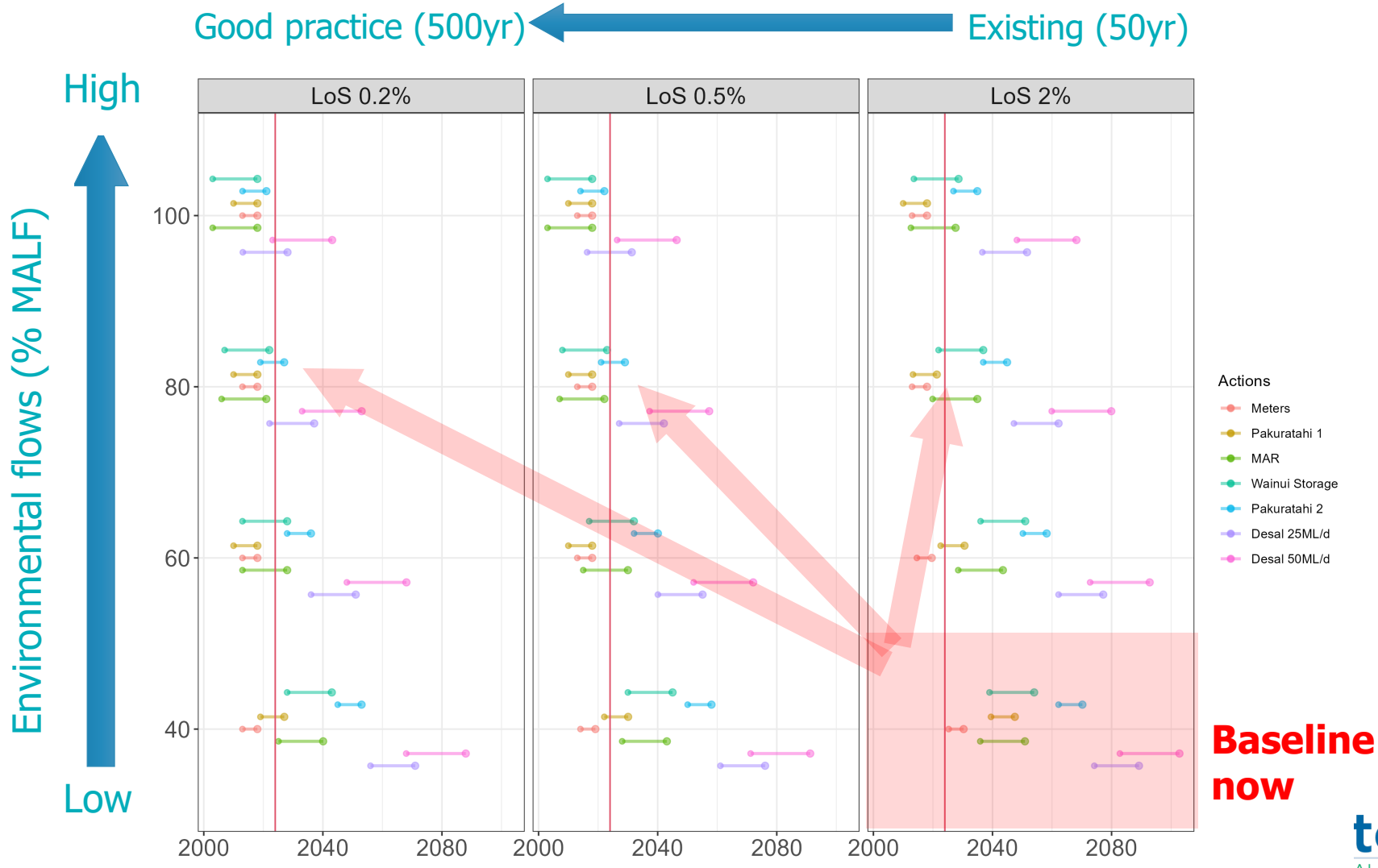
Influence of MALF and LoS



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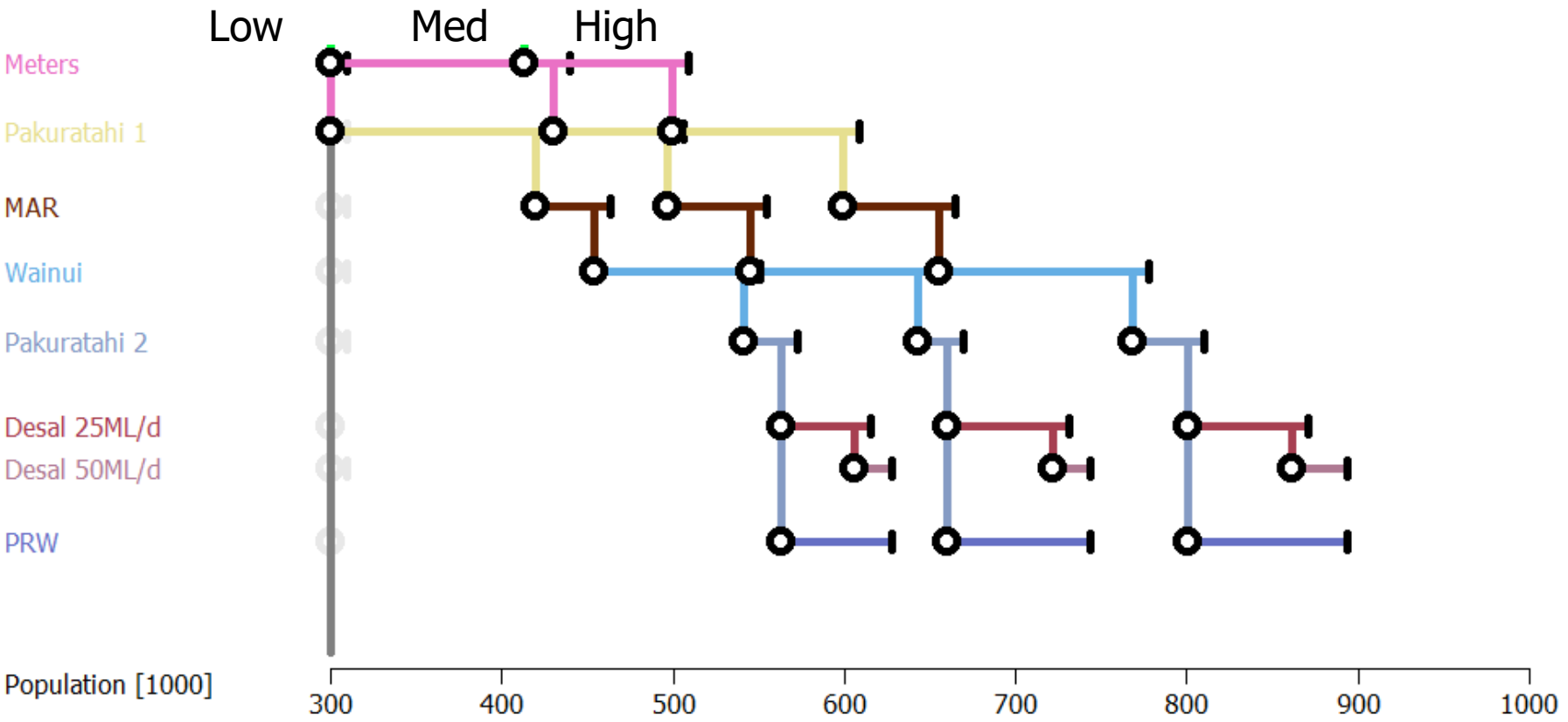
Implementation plan



25%ile growth scenario	2023	2042	NA	NA	NA	NA	NA
50%ile growth scenario	2023	2031	2052	2075	2097	2120	NA
75%ile growth scenario	2023	2027	2035	2043	2051	2060	2068

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Monitoring and triggers

Backwards looking i.e. are we still on plan?	Forward looking i.e. forecasting plan changes
Population (Census…)	
Water demand: • Peak demand (in summer/winter) • Winter demand • Demand in dry/wet years	
Leakage reduction	New connections/a proxy variable to forecast demand increase
Metering progress	
Yield from new supply options (compared to modelled yield in SYM)	External factors • precipitation anomaly • groundwater levels • temperature increase • sea level rise

Demand side

Supply side

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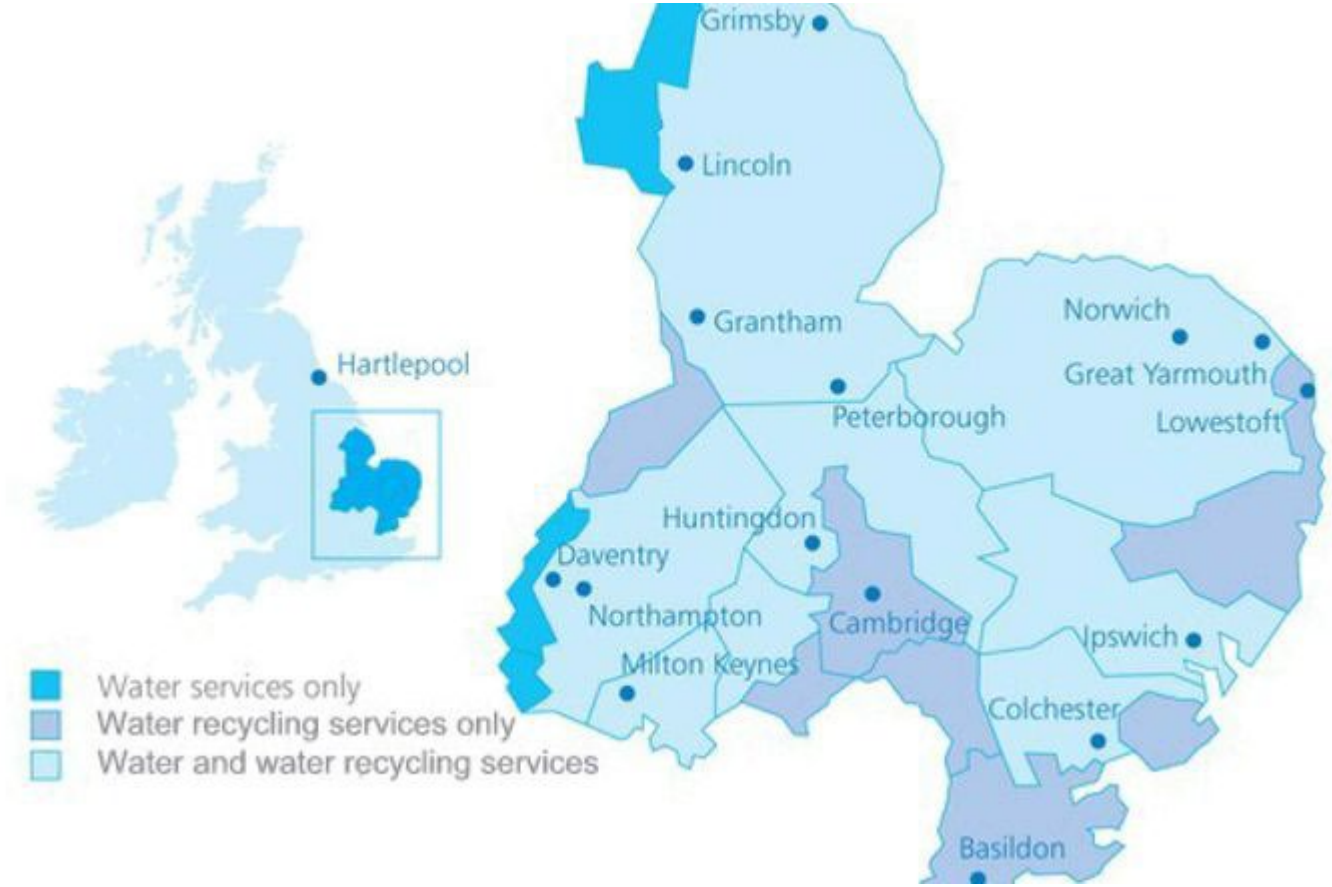
Anglian Water



- 7 million customers
- One of the driest regions of the UK
- Environmental drivers
- 4 different water supply companies in the region

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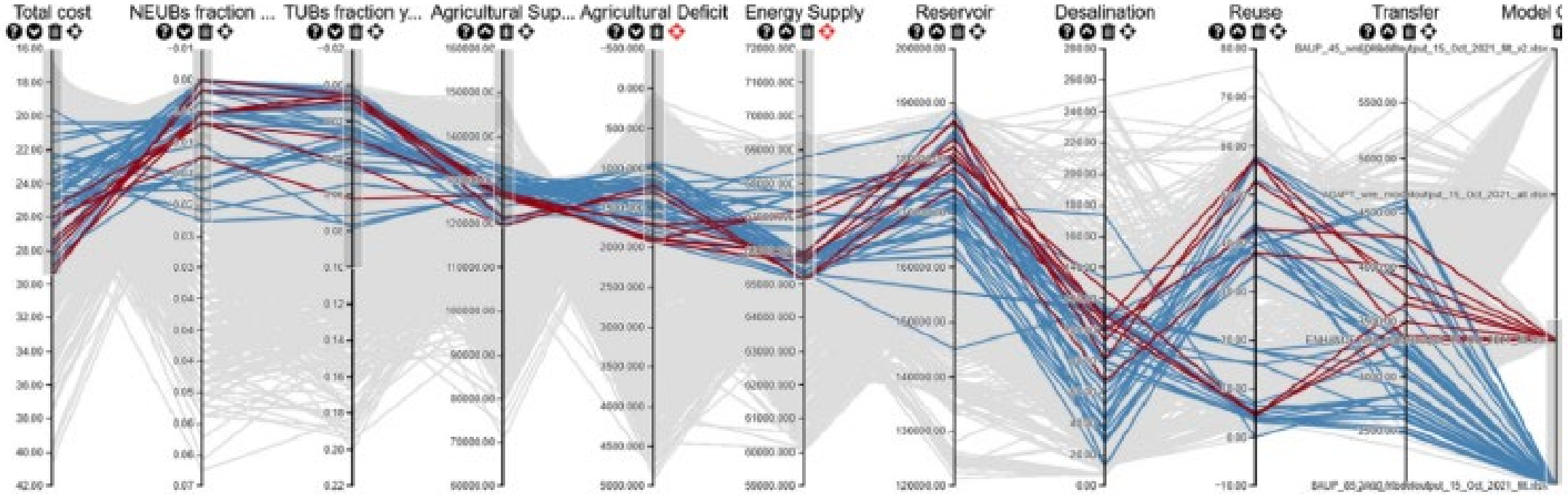

Source: University of Manchester, 2021

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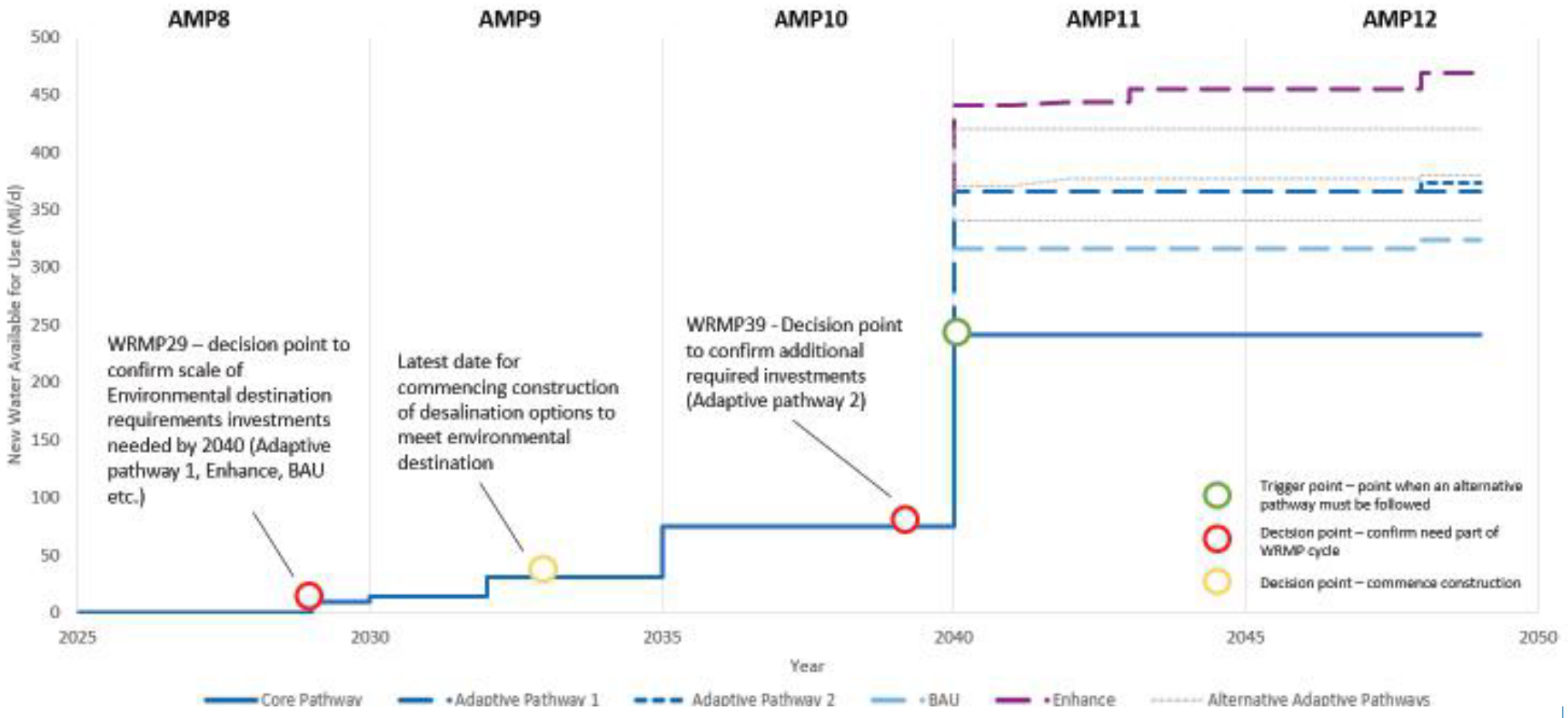
Anglian Water's adaptive plan



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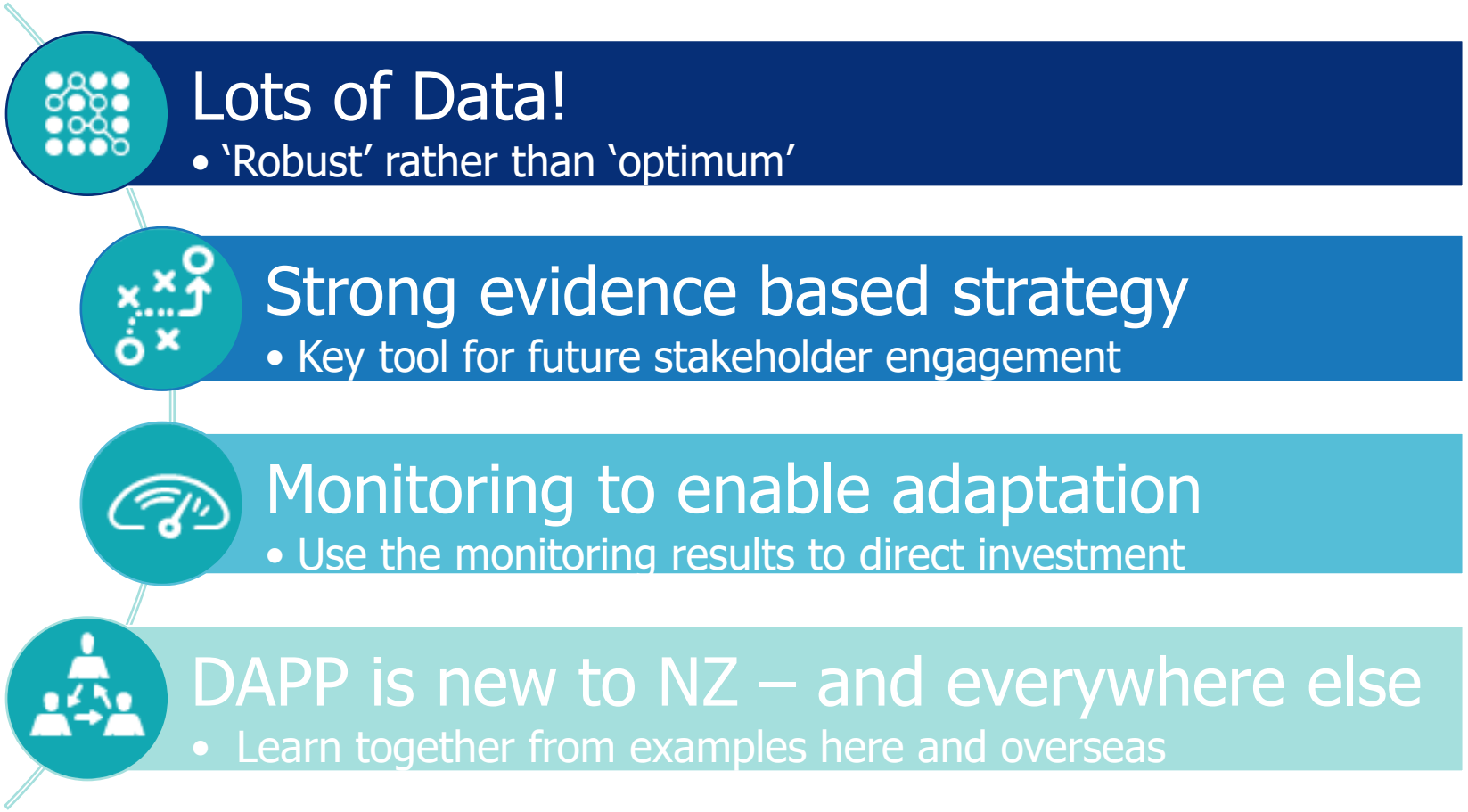
Conclusions



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Acknowledgements

Geoff Williams – Wellington Water

Jon Reed, Raphael Menke & Emma Benn – Beca

Judy Lawrence – PS Consulting & Te Herenga Waka, Victoria University of Wellington

Shailesh Singh – NIWA

Geoff Darch – Anglian Water

Alistair Allan – WSP

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Pātai?