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A RESILIENCE BASED ASSESSMENT METHOD FOR PRIMARY STORMWATER MANAGEMENT SYSTEMS URBAN FLOOD CONTROL

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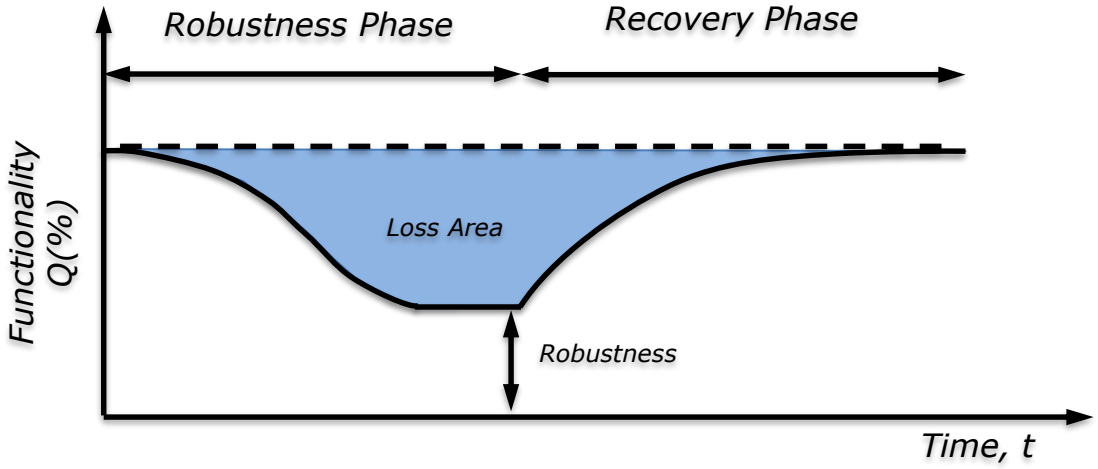
National SCIENCE Challenges
RESILIENCE TO NATURE'S CHALLENGES

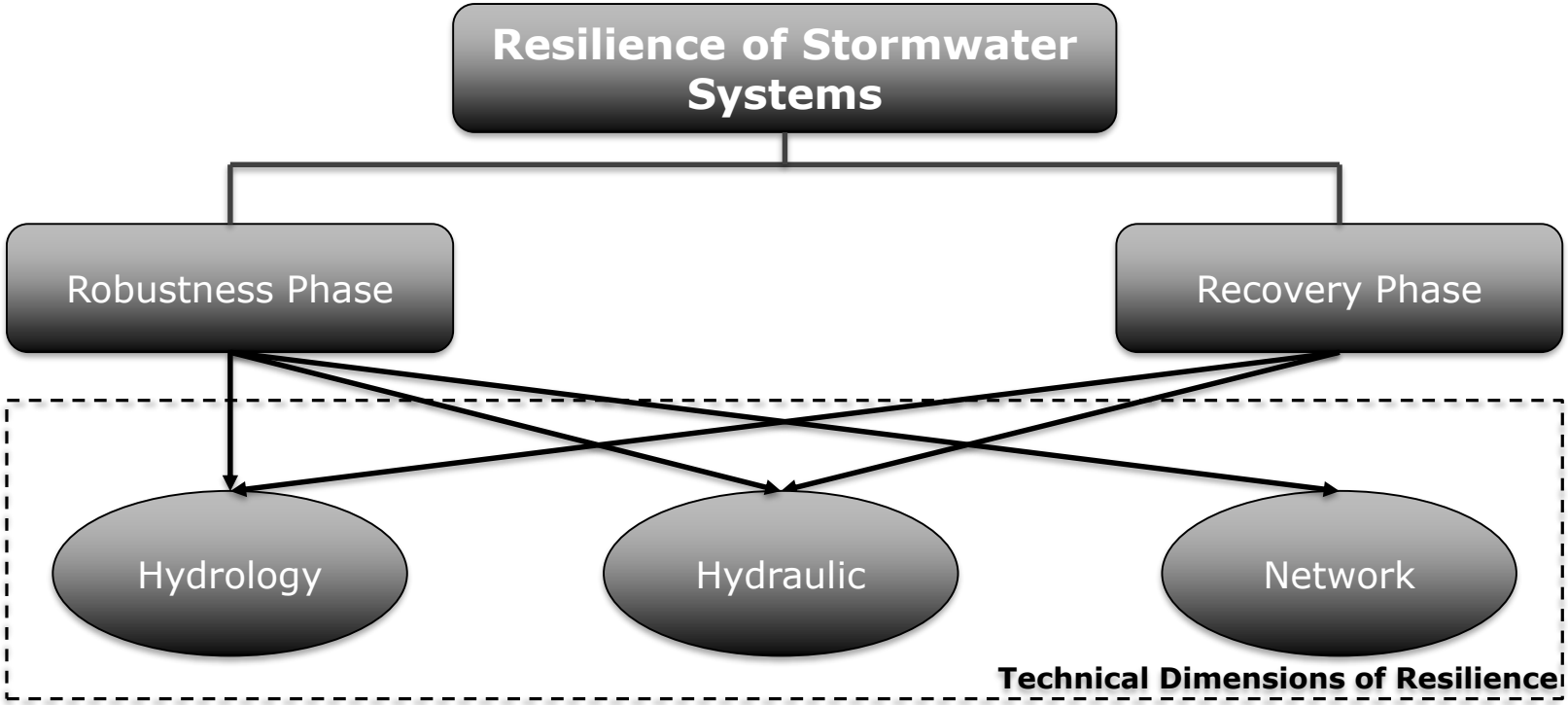
Stormwater System Resilience

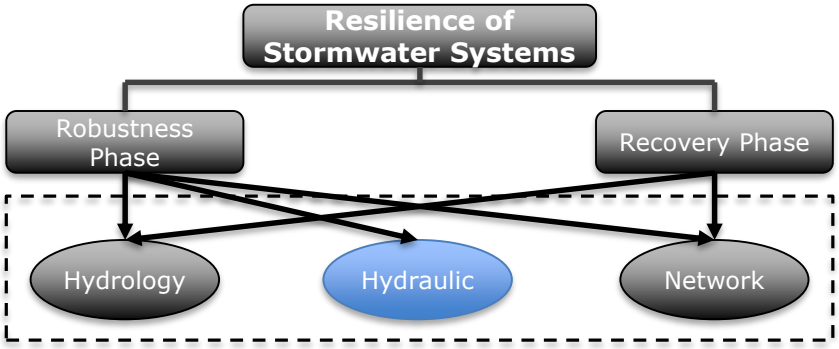


Magnitude of Flood Generated(**Robustness**)

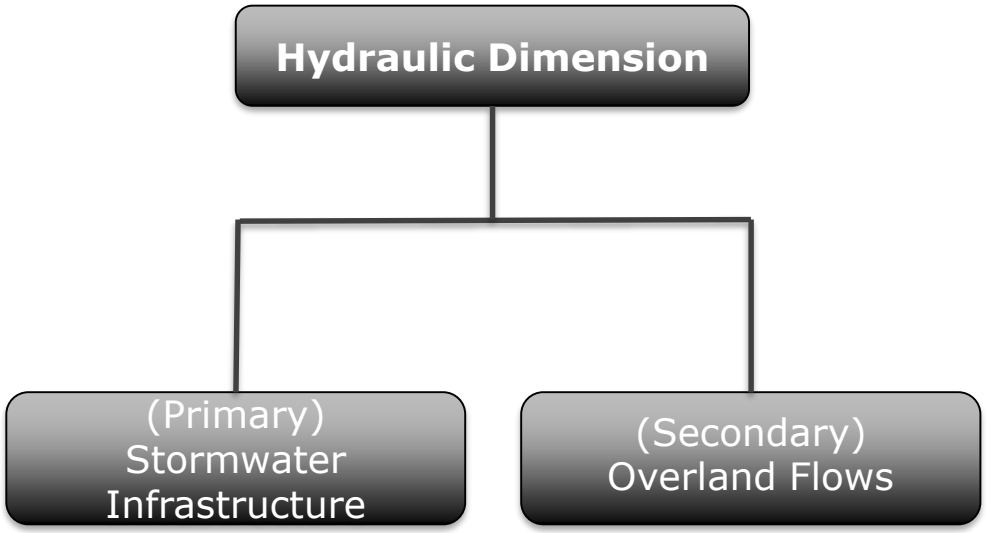
How Fast Recovers (**Rapidity**)

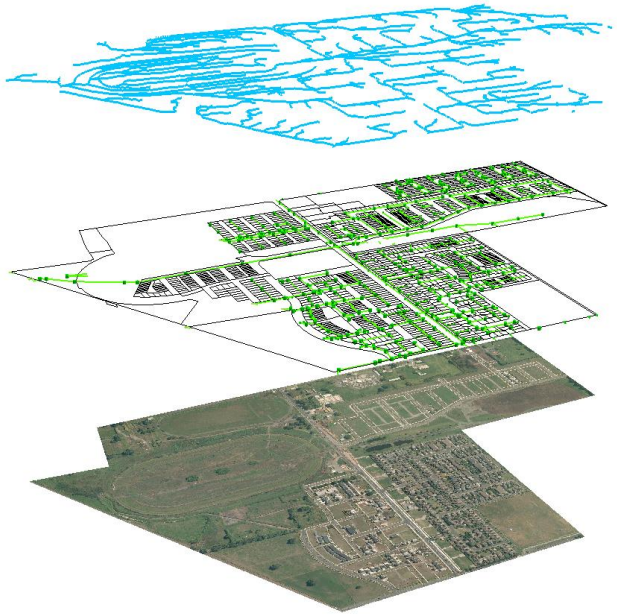
Method

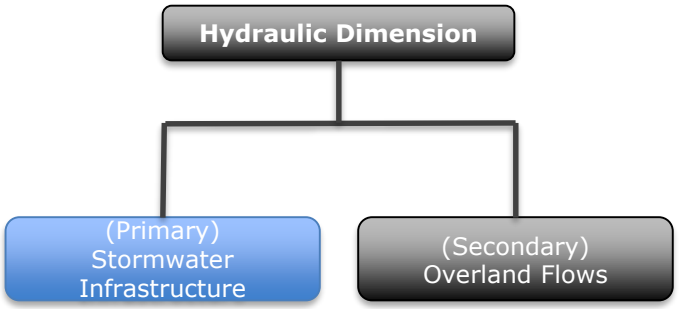

Resilience of Stormwater Systems
Robustness Phase
Recovery Phase
Hydrology
Hydraulic
Network
Technical Dimensions of Resilience



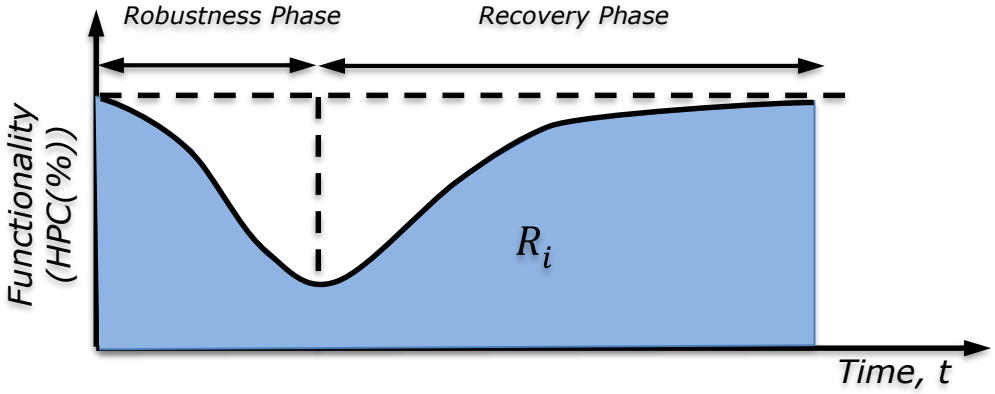
Hydraulic Dimension

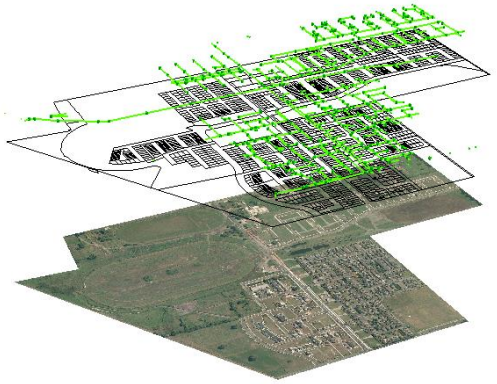






Hydraulic Dimension (Primary)

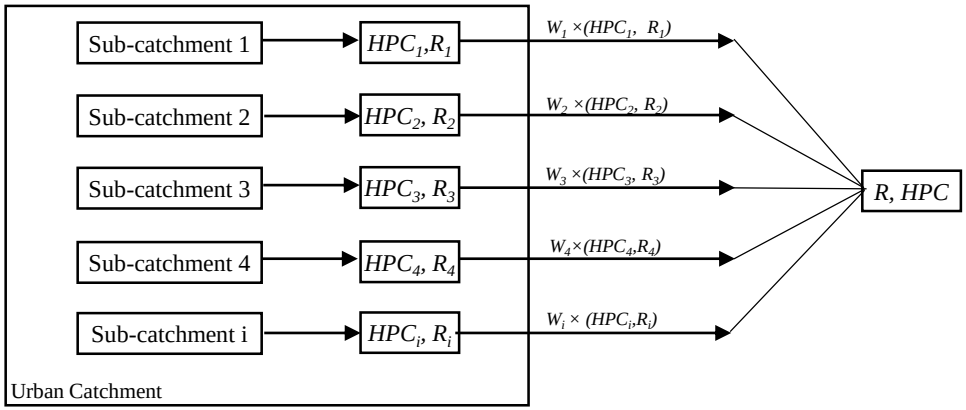


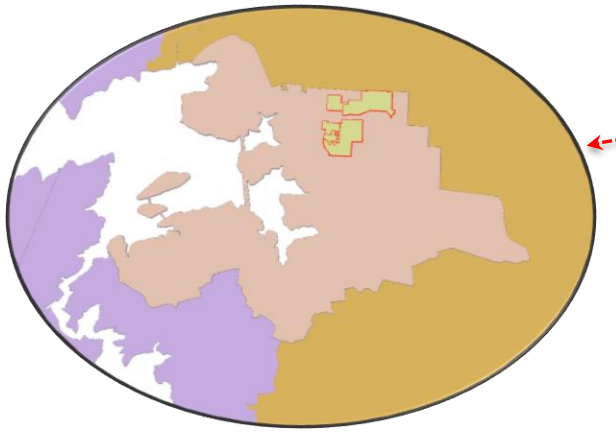


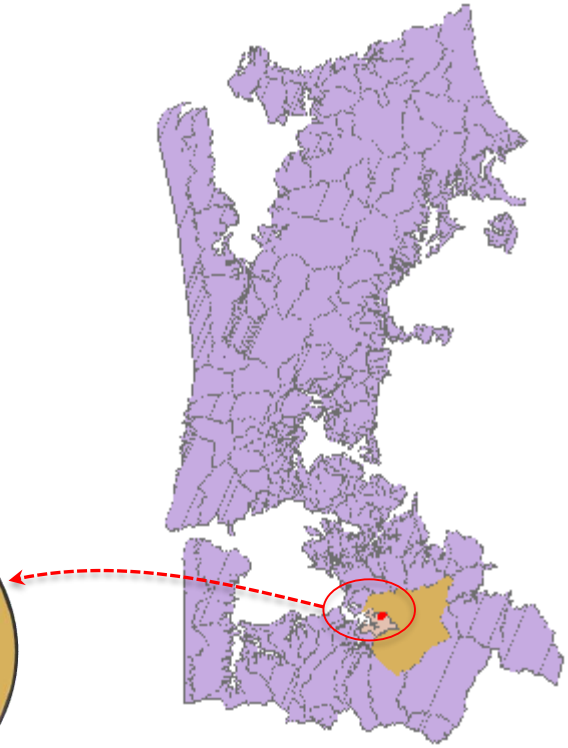
$$Unit\ performance\ (n_i(t)) = f(flow\ rate, flow\ depth)$$

$$HPC_i = ((\sum n_i)/(\sum \frac{L_i}{L_t})) \times 100$$

Hydraulic Dimension (Primary)

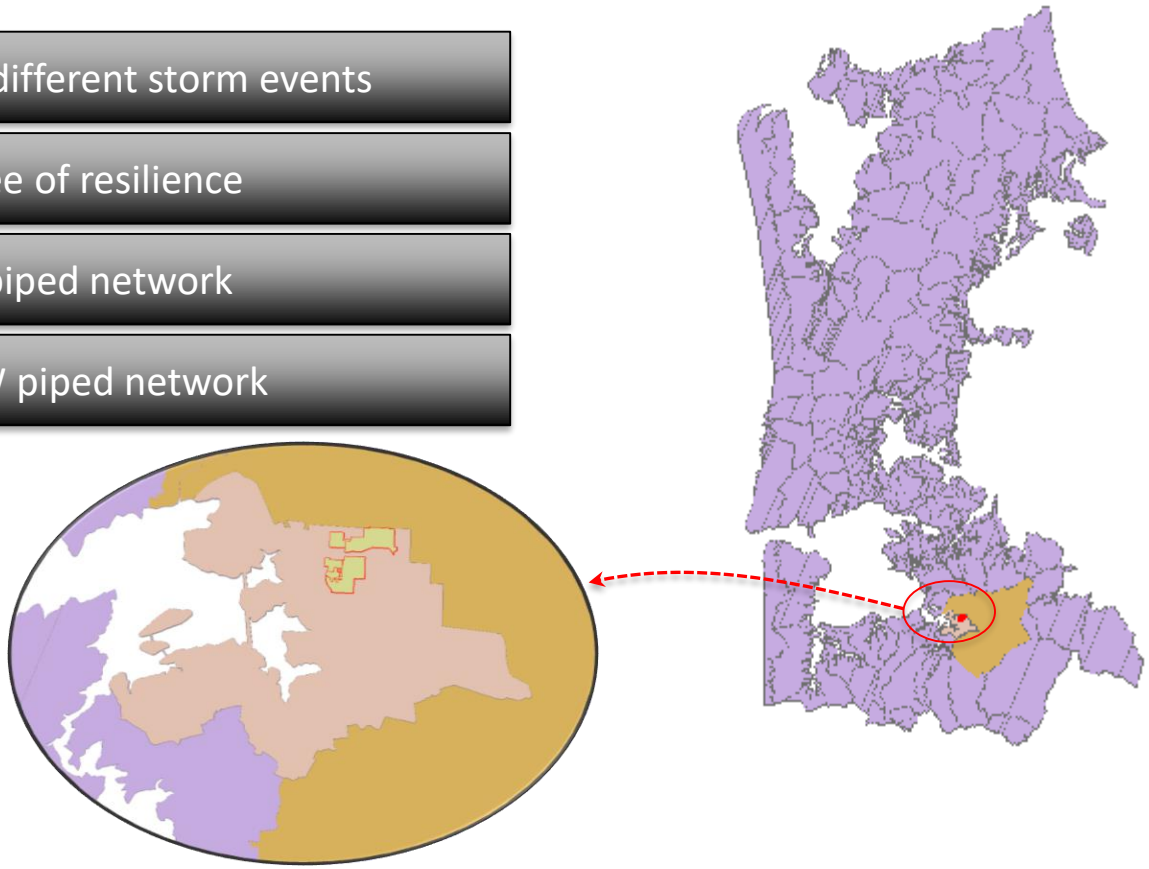




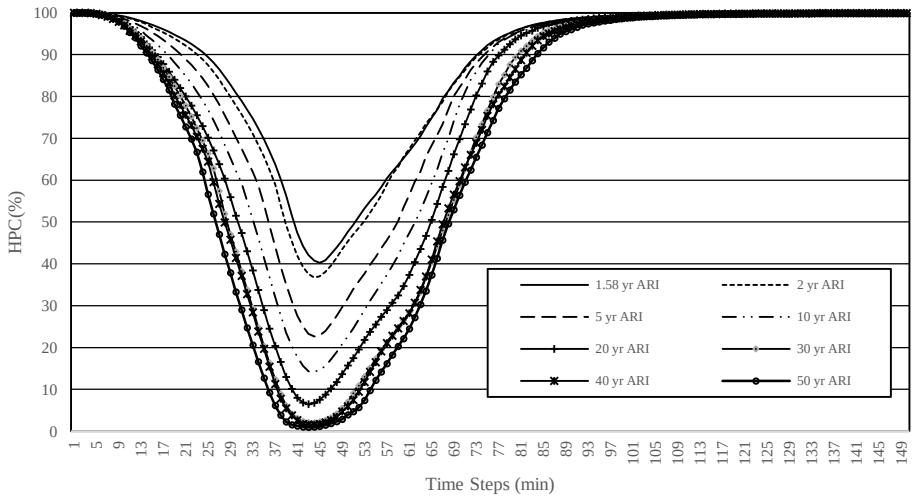


Application Scenarios

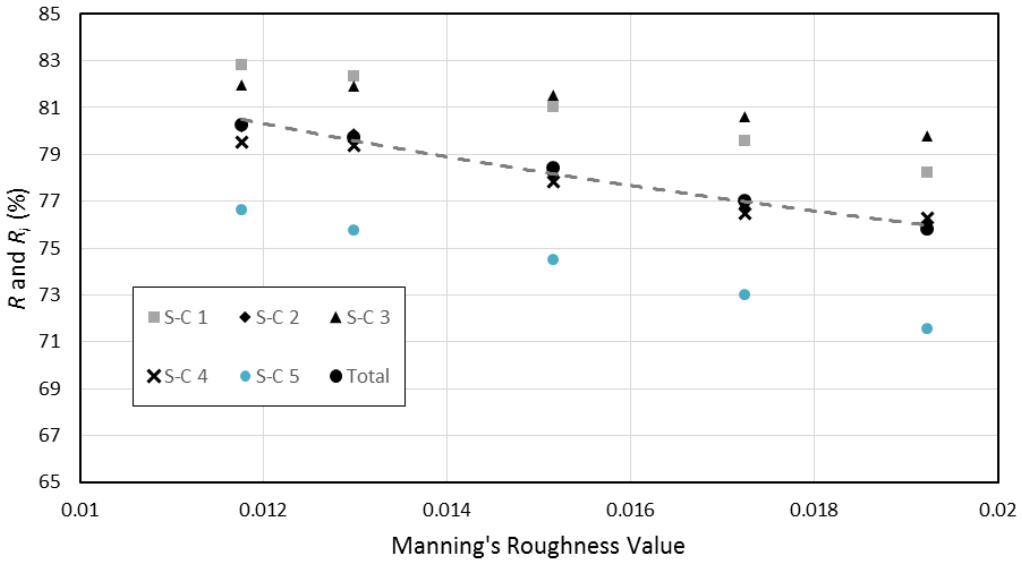
- Performance of SW system in different storm events
- Pipeline aging impact on degree of resilience
- Volume Control effect on SW piped network
- Peak flow Control effect on SW piped network



Impact of Storm Event



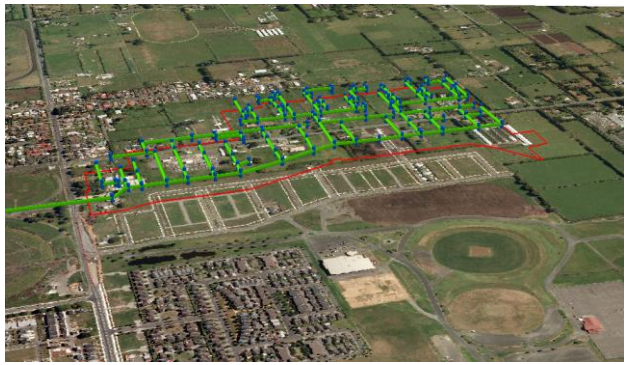
Impact of Pipe Condition

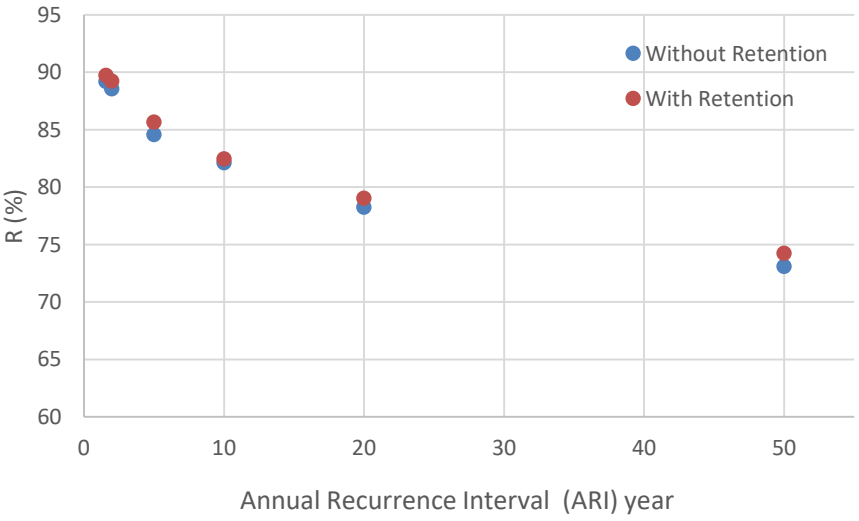


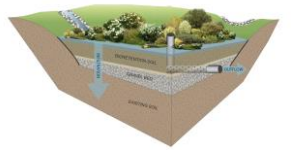
Impact of Volume Control

Objectives for Volume Control in SWM

Volume control effect on *HPC* and *R in Primary SWM*



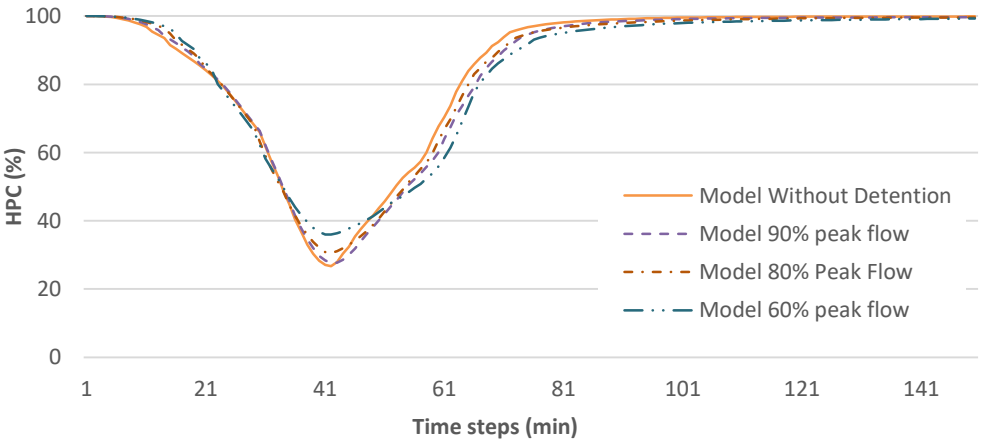


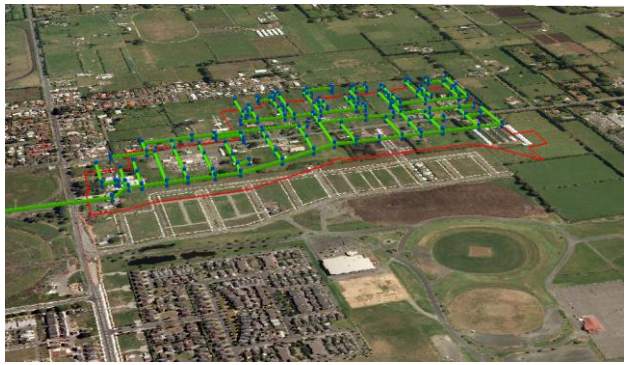


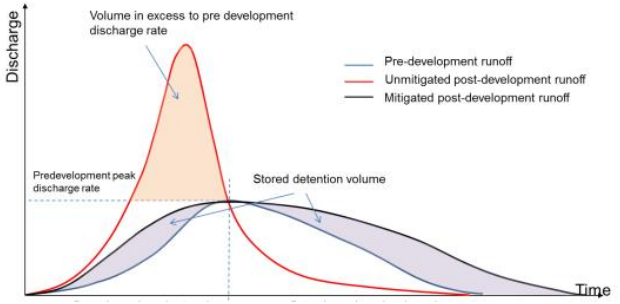
Impact of Peak Flow Control

Objectives for Peak flow Control in SWM

Peak flow control effect on *HPC* and *R in Primary SWM*







***Source**: SWM Device in Auckland Region (GD217/001)*

Conclusion

- Approach is able quantify functionality and resilience degree
- Index for quantifying network conveyance
- Able to assess the primary SW functionality under different scenarios
- A comparative approach to quantify improvement of resiliency

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Thank you

Questions?

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