Modelling Group
WATER NEW ZEALAND

Modelling Symposium

The Importance of Sensitivity Tests

Presented by
Andrew Sherson

water NEW ZEALAND
The New Zealand Water & Wastes Association Waiora Aotearoa

Safety Moment

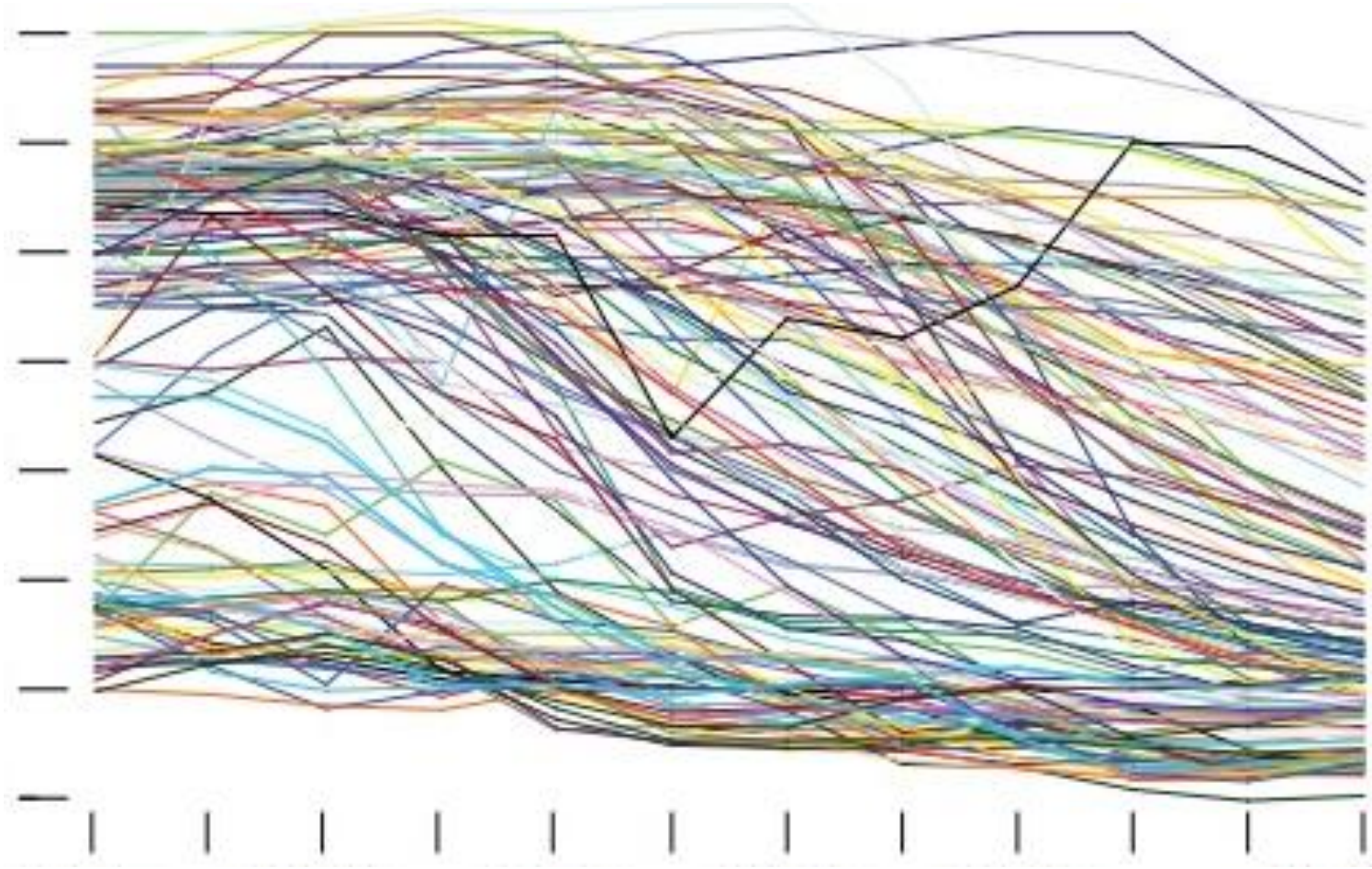
Take a stretch.

What is a Sensitivity Test?

Models are complex

- Nodes: ~70 fields
- Pipes ~60 fields
- River Reaches
- Subcatchments ~100 fields
- Hydrology
- 2D Surface
- Run setup
- Simulation parameters
- etc…..

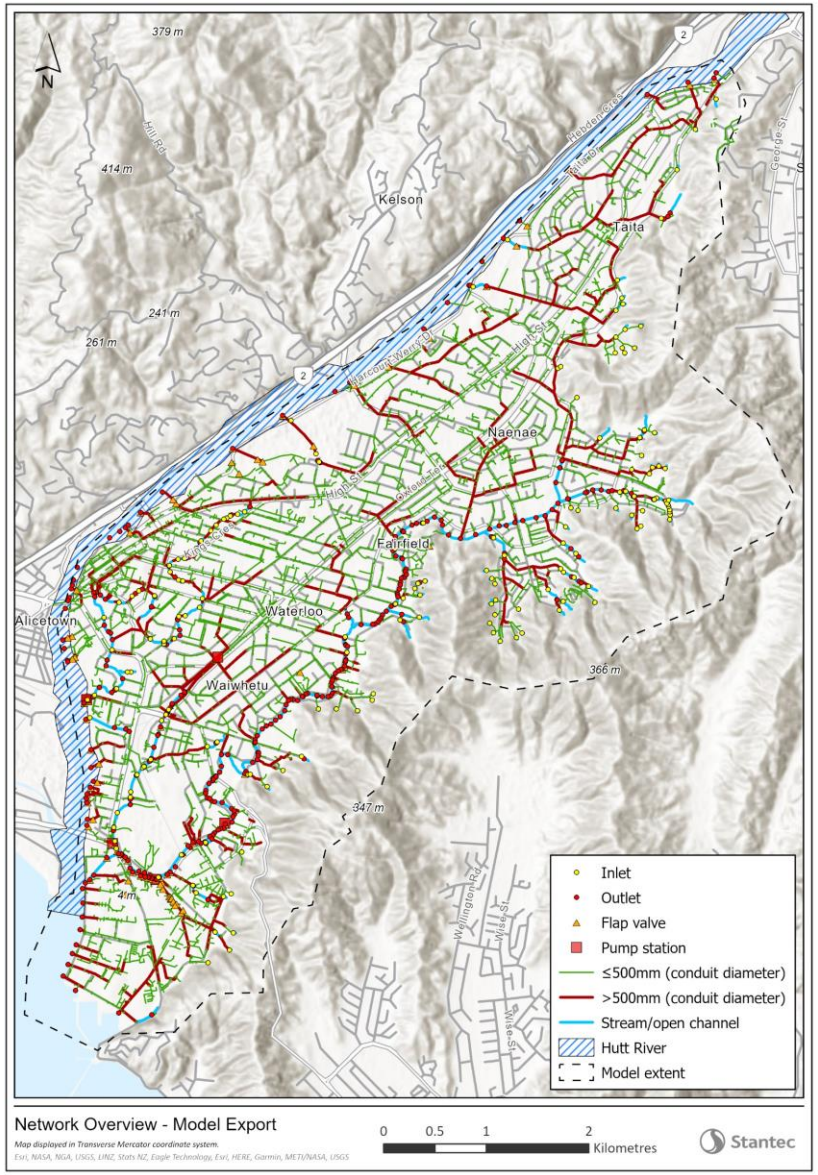
Models are complex



Why do a Sensitivity Test

To determine what factors to focus on.

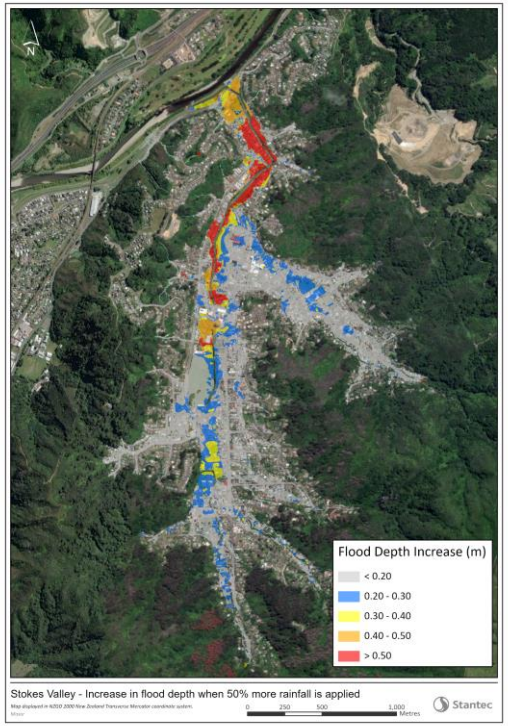
Eastern Lower Hutt Model

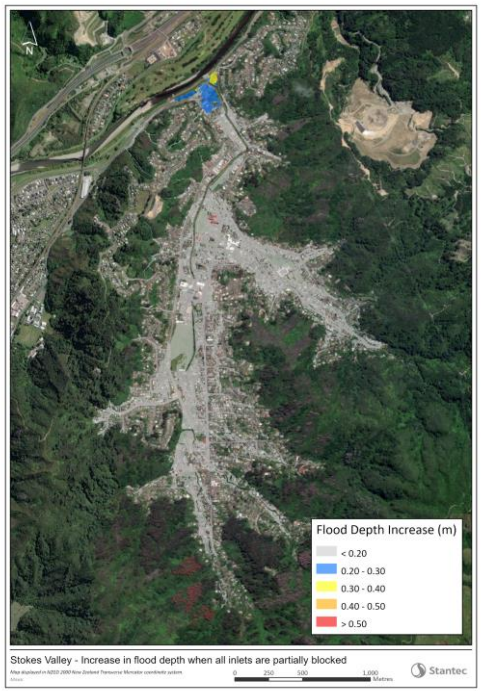


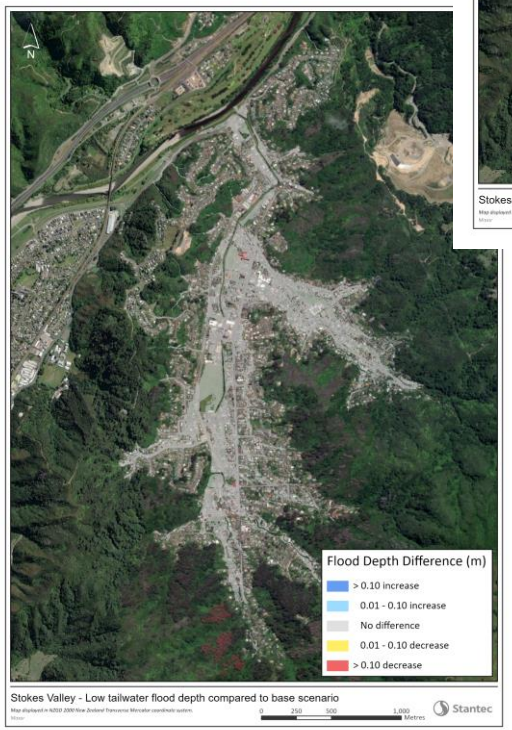
Wellington Water Sensitivity Tests

- **Increasing rainfall intensity by 50%**
- **Blocking culverts**
- **Blocking bridges**
- **Removing boundary conditions,**
- **Removing stormwater pumps**
- **Testing CN values**
- **Stream roughness**

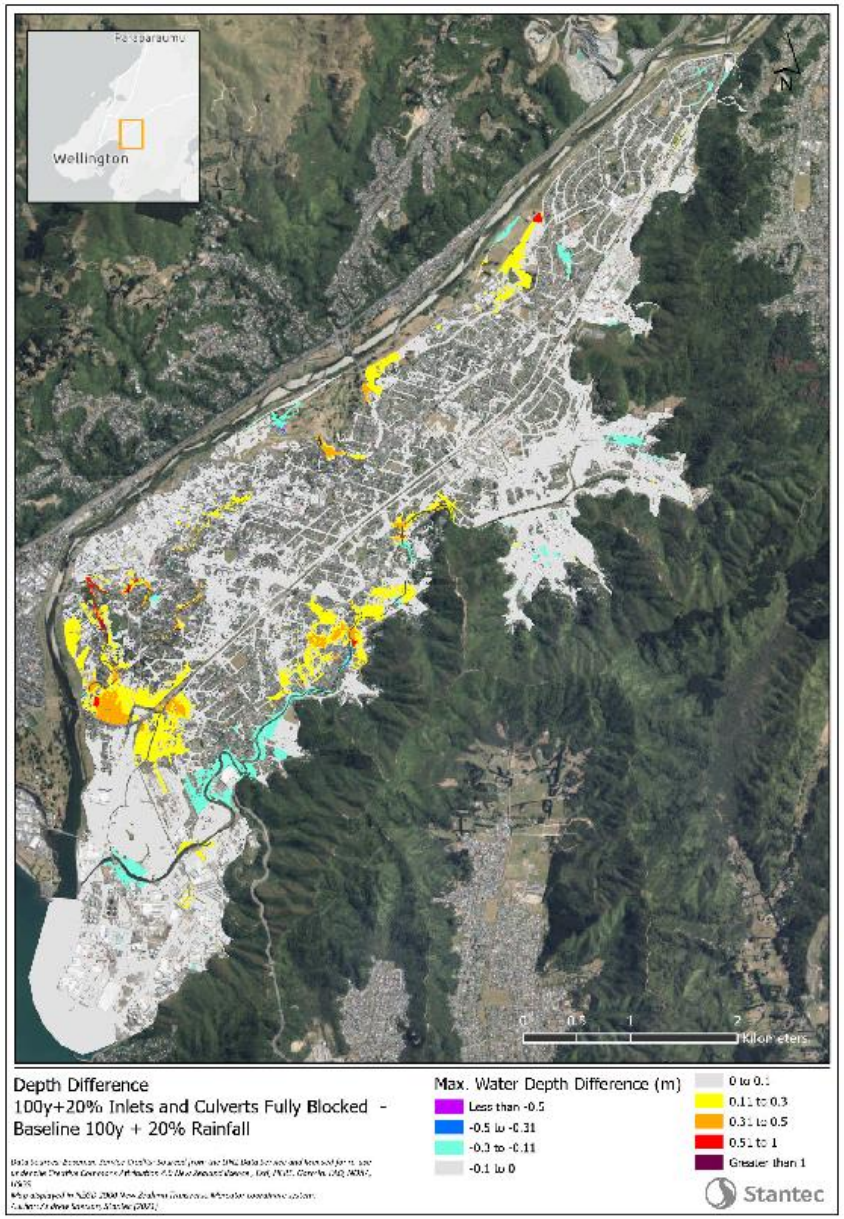
Previous Model Sensitivity Checks



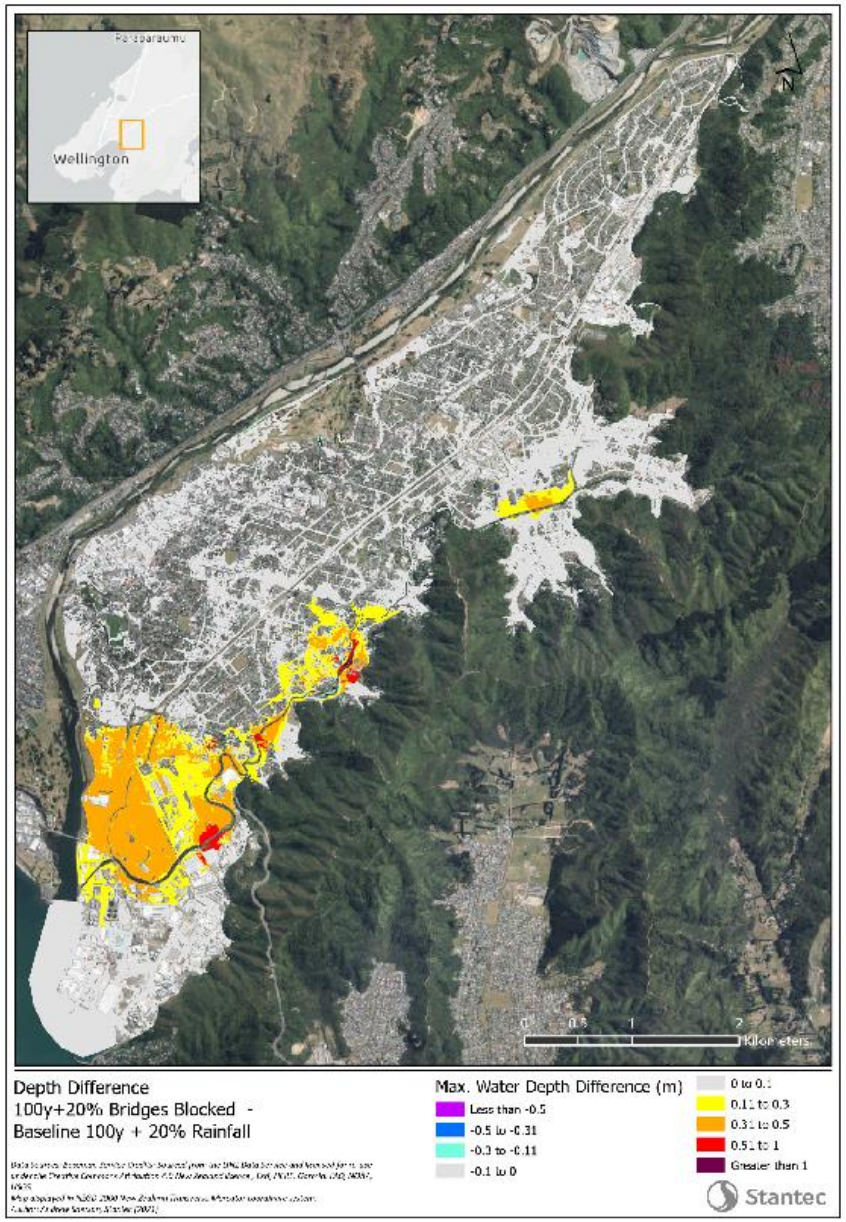




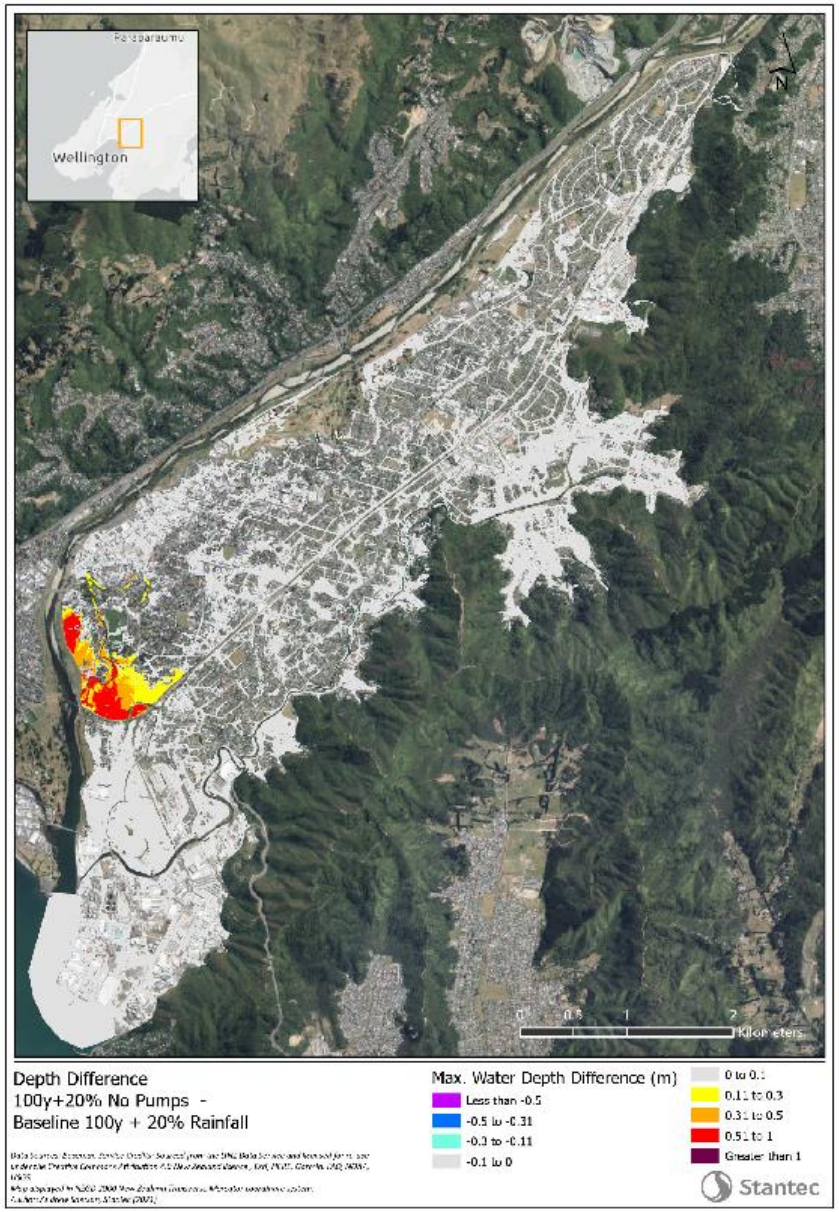
Blocked Inlets



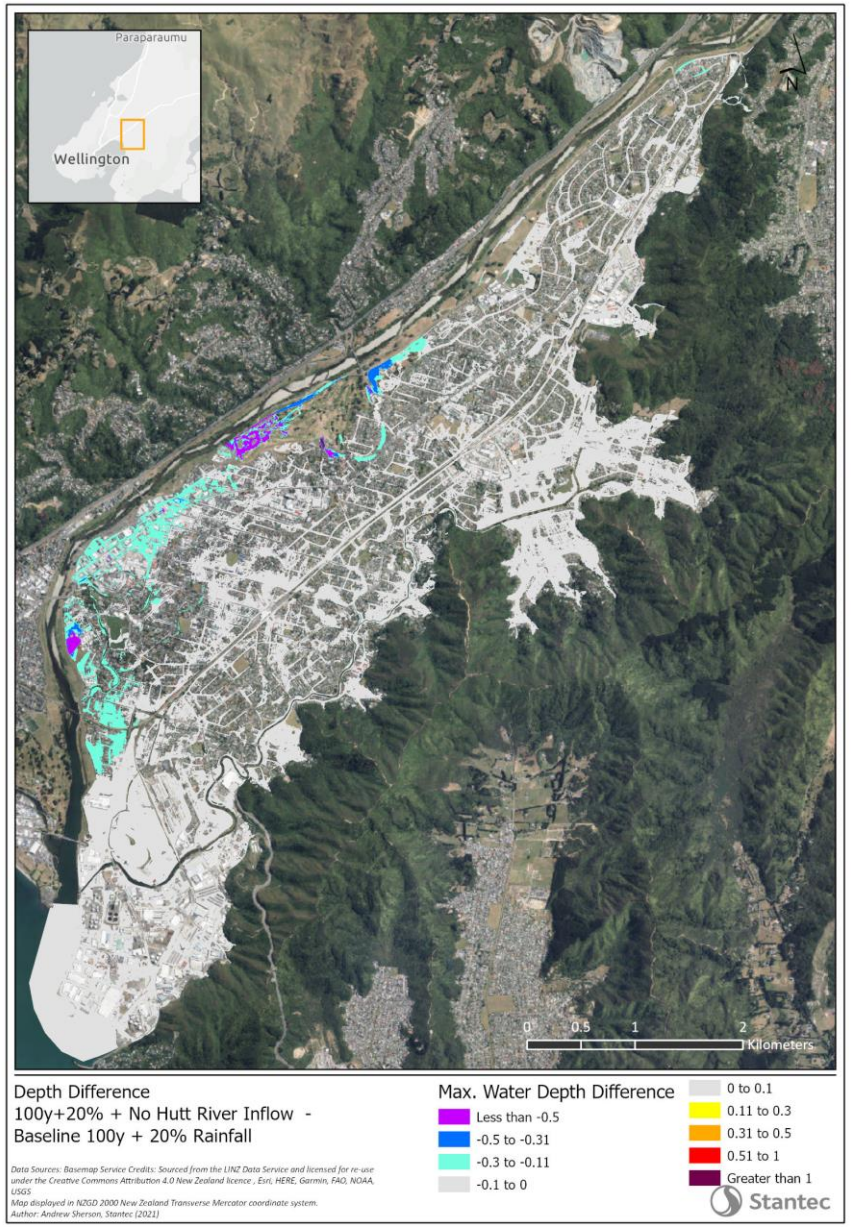
Blocked Bridges



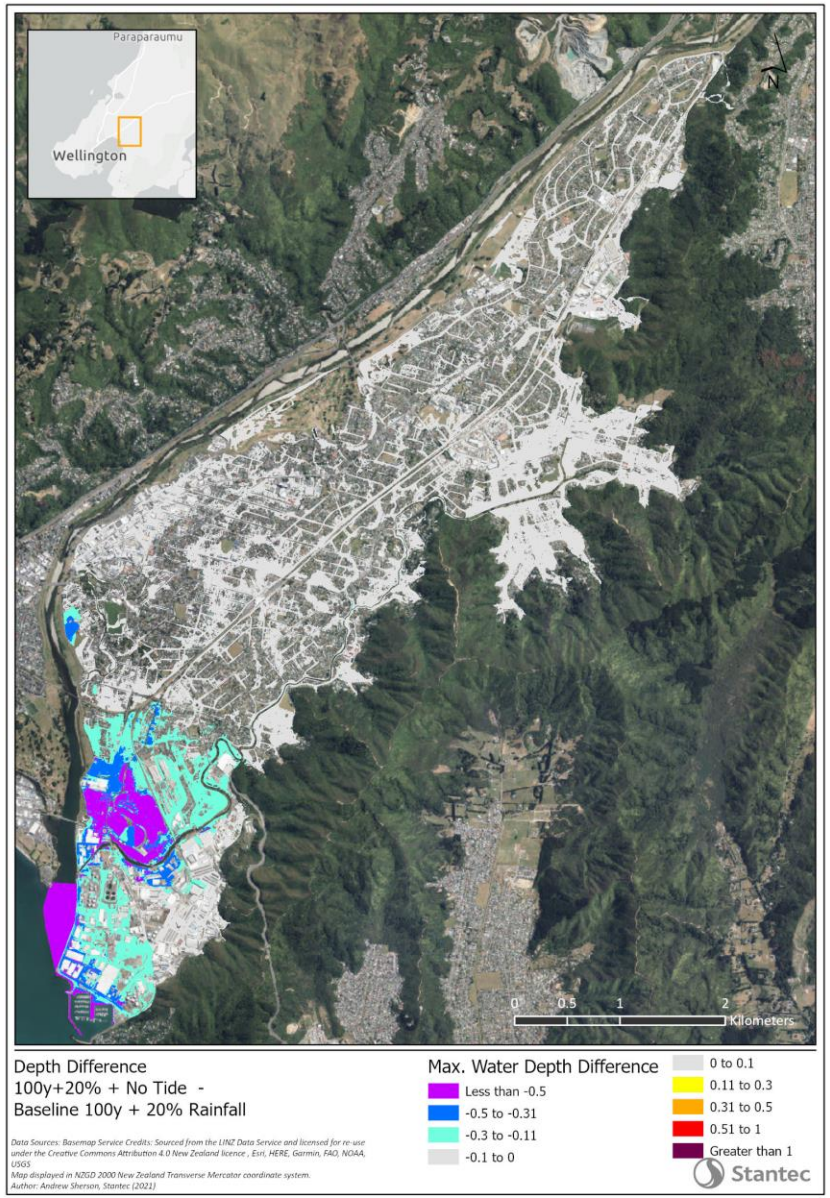
No Pumps


Wellington
N
0
0.5
1
2
Kilometers
Depth Difference
100y+20% No Pumps -
Baseline 100y + 20% Rainfall
Max. Water Depth Difference (m)
Less than -0.5
-0.5 to -0.31
-0.3 to -0.11
-0.1 to 0
0 to 0.1
0.1 to 0.3
0.3 to 0.5
0.5 to 1
Greater than 1
Stantec

No Hutt River



No Tidal Influence



Each area is sensitive to a different parameter

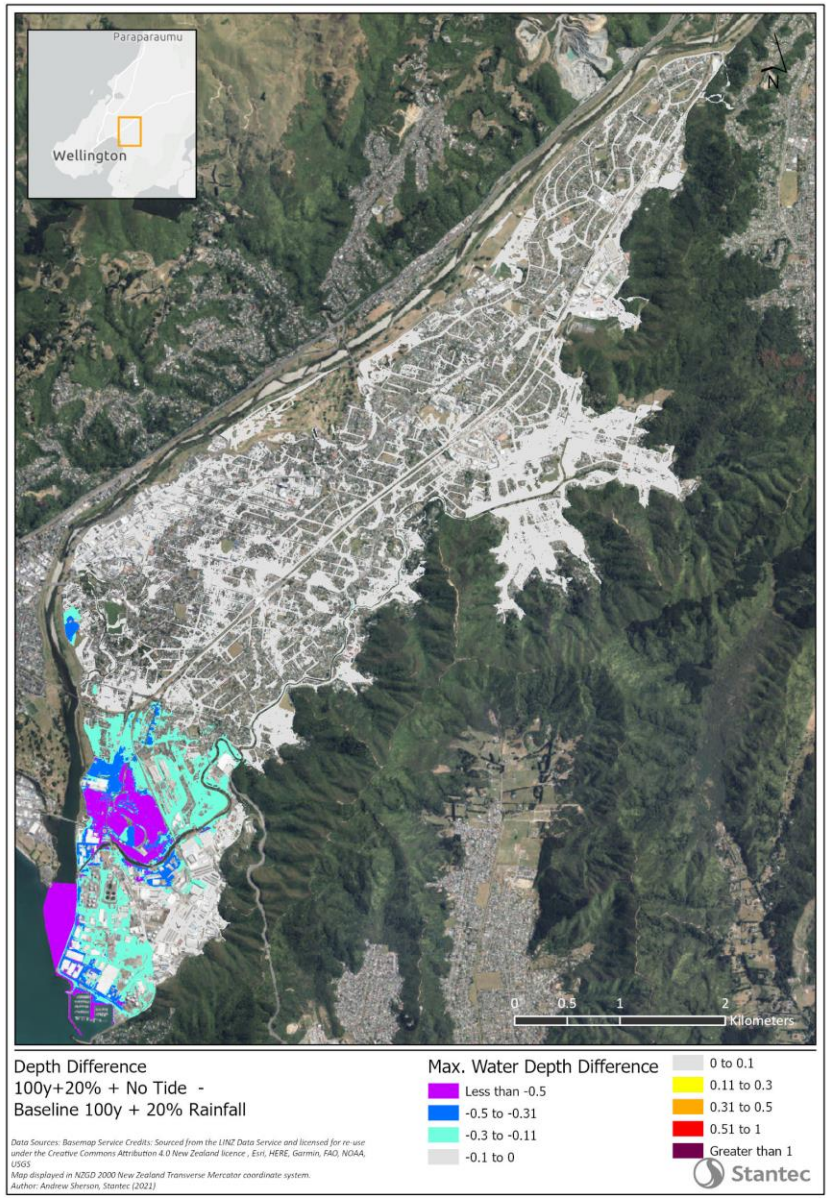
Context

- Sensitivity tests give context

- Context is important when considering:

  - Model limitations
  - Model accuracy
  - How to use the model results
  - Communication of results

No Tidal Influence



Conclusions

- Models are complex.
- Sensitivity is useful for highlighting factors to focus on.
- The Eastern Lower Hutt model showed significant and varied sensitivities.
- It is important to highlight these sensitivities to better understand the limitation of the model and context.
- Without sensitivity it is hard to know the context.

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Thank you!
Questions? Patai?

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