



**Use of GIS in
communicating
information during
Cyclone Gabrielle
Response**





Sarah Jones

Engineering Geologist involved in the CHB Cyclone response and recovery effort. Involved in previous natural disaster recovery programmes including NCTIR and SCIRT.



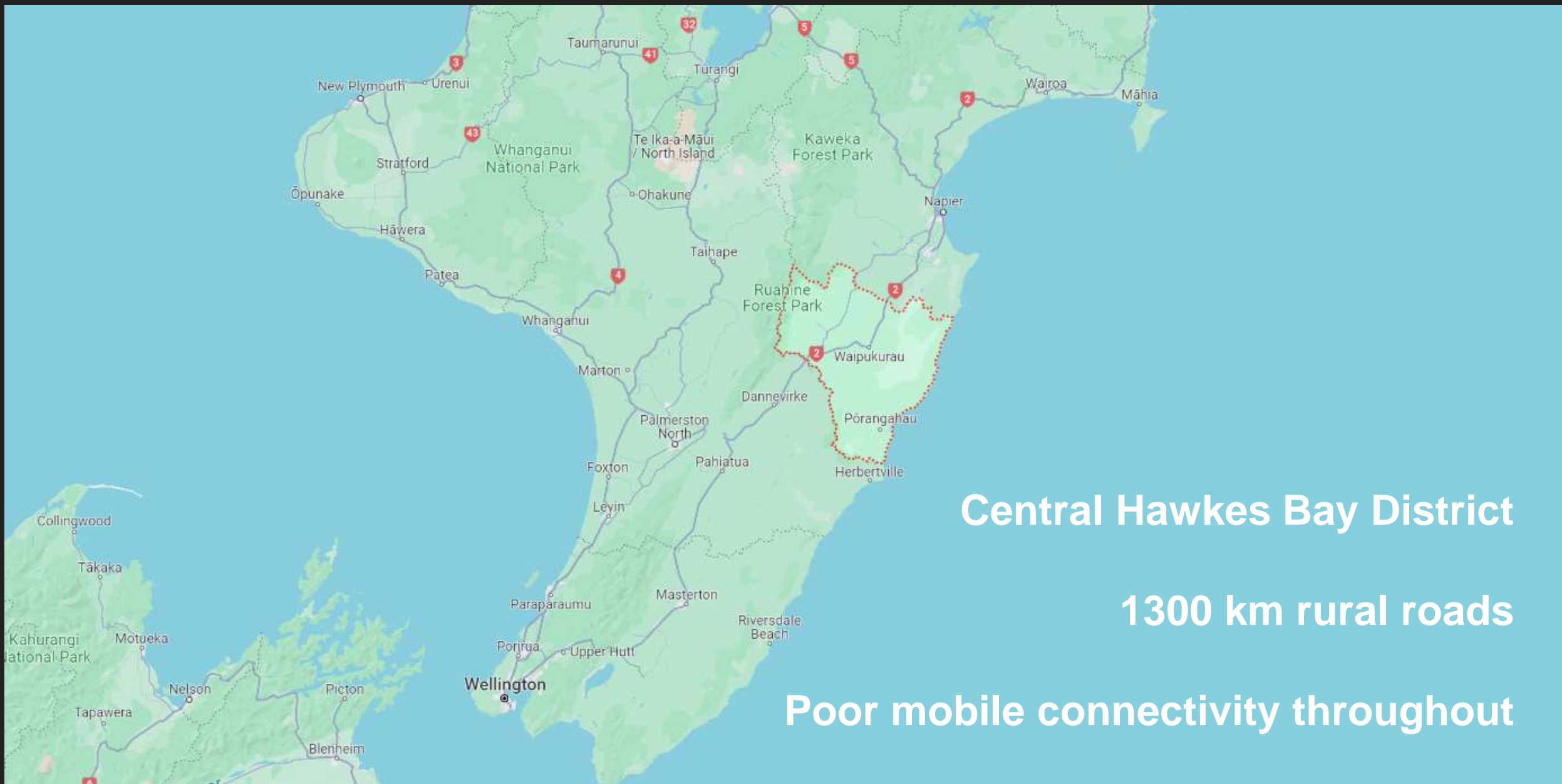
Grant Maxwell

One of Australasia's most experienced storm event response and recovery leaders. Geotechnical Engineer with extensive experience in resilience related project delivery specifically through disaster recovery programmes.



Roy Ching

Engineering Geologist involved in the CHB Cyclone response and recovery effort. Involved in the development of a new refined GIS tool for future events.







Severe impact on road network from Cyclone Gabrielle

- Landslides
- Erosion
- Flooding
- Bridge damage

Reinstating community access - priority



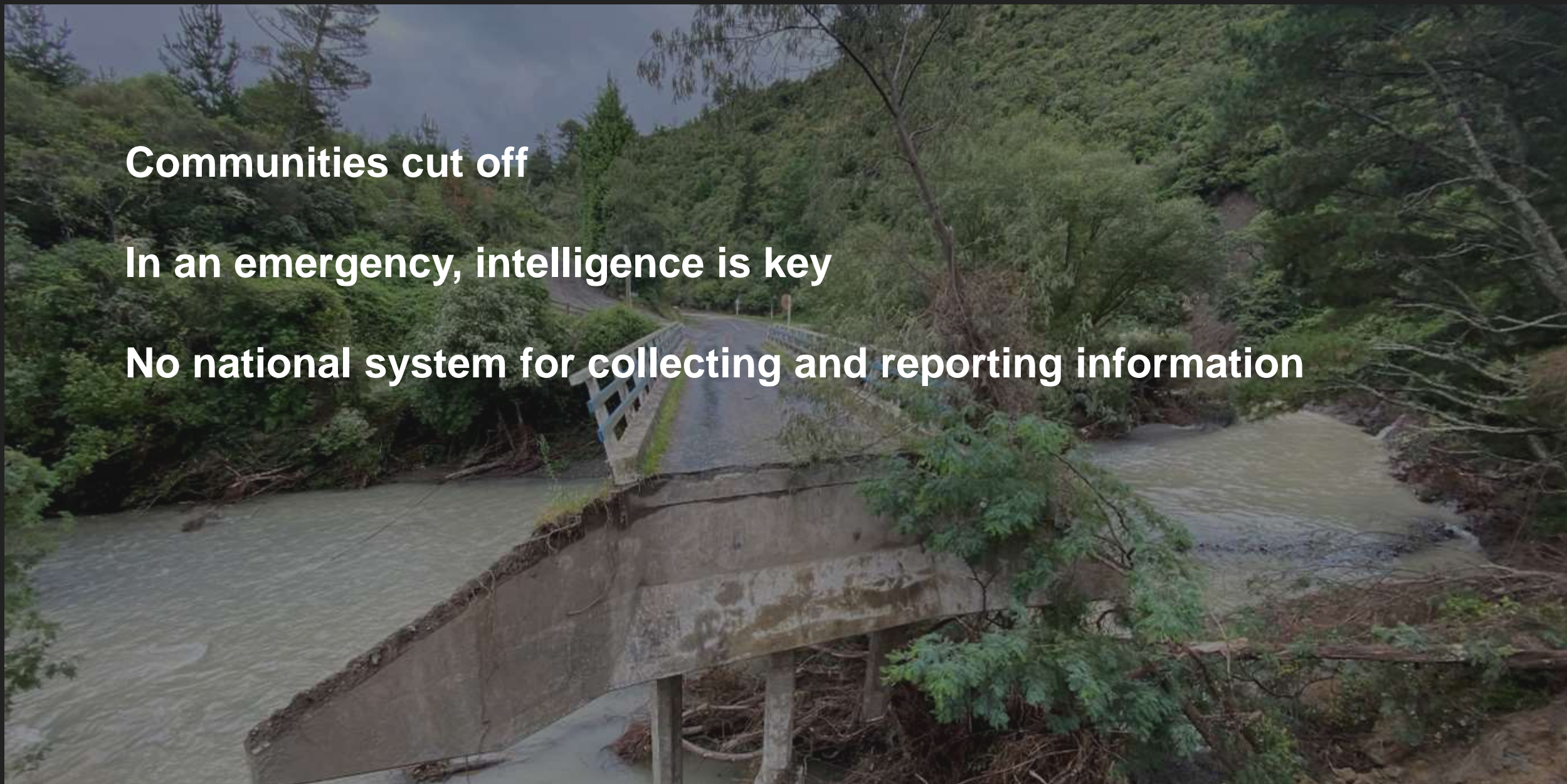




Communities cut off

In an emergency, intelligence is key

No national system for collecting and reporting information





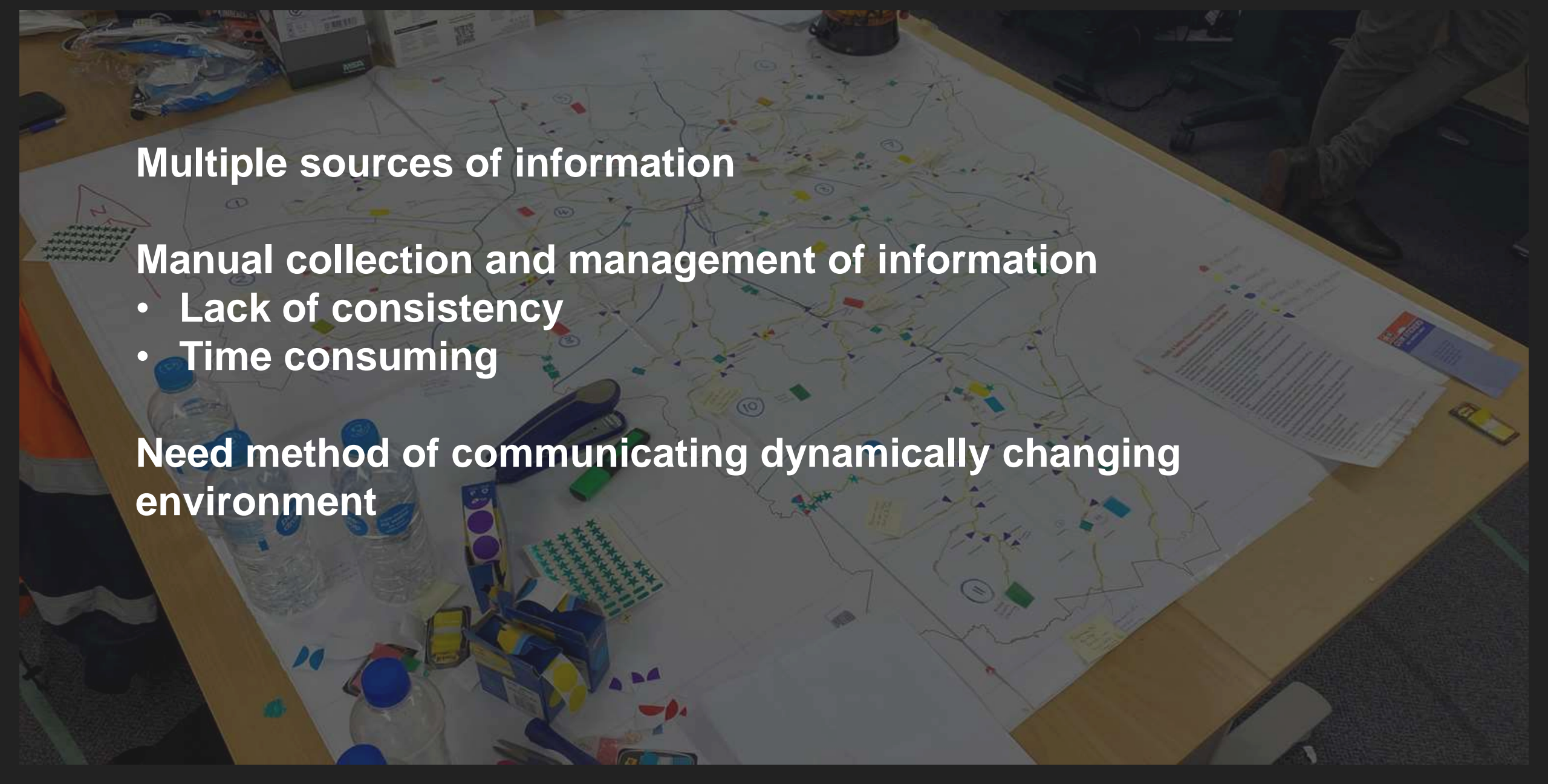


Multiple sources of information

Manual collection and management of information

- Lack of consistency
- Time consuming

Need method of communicating dynamically changing environment





My Survey123

Search

Bridge Damage Assessment For...

Drainage and Scour Assessme...

Landslide Assessment For...

River Assessment Form Cyclone G...

Site Inspection and Monitoring Form...

Landslide Damage Assessment Form
Cyclone Gabrielle

Inspection Team
Your name(s). Update as necessary.
Sarah Jones

Inspection Date/Time
Thursday, 30 May 2024
12:43 PM

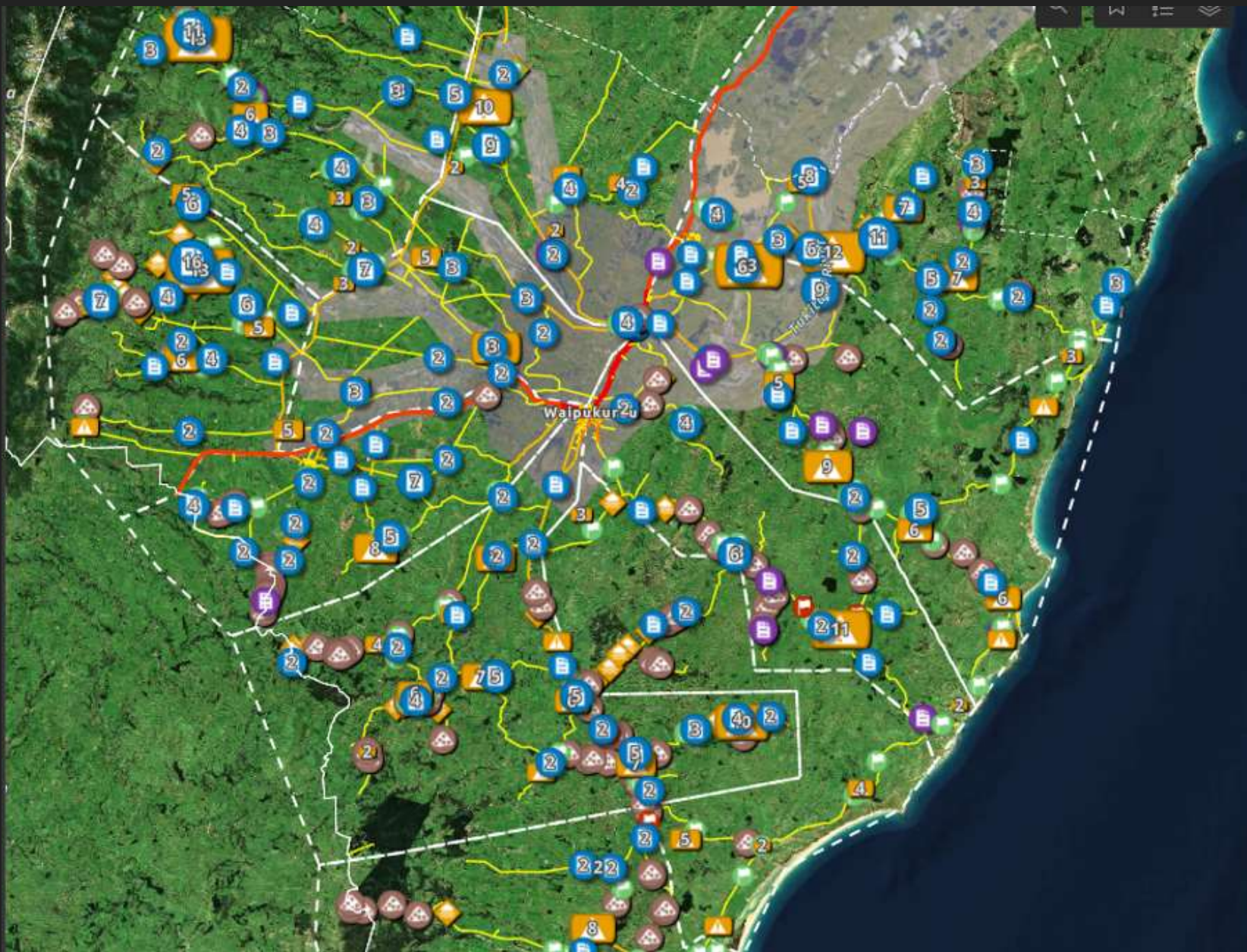
Map Location:
Use the map to update the GPS location if not correctly positioned.
43.542°S 172.615°E ± 35.0 m

Address Location:
Update as necessary.
2 Hazeldean Road, Christchurch, 8024

Road Position

Capture Site Photo(s) or Markup on Map

- **Survey123 based, feeding directly into ArcGIS**
- **Unique forms for data collection in the field**
- **Live updating and offline entry**
- **Standardised information**
- **Georeferenced photos**
- **Site history tracking**




Bridge General Inspection Form

Number of features

-  > 16
-  12
-  9
-  5
-  < 2


Bridge Damage Assessments

Number of features


-  > 13
-  10
-  7
-  5
-  < 2

CHBDC Bridges Inspection Status


Landslide Assessments

-  Landslide Assessment Form Cyclone Gabrielle

River Assessments



-  River Assessment Form Cyclone Gabrielle

Drainage and Scour Assessments

-  Drainage and Scour Assessment Form Cyclone Gabrielle

NZTA Highway Information - Active Events

Road Events

-  Road Closed
-  Road Restrictions

Road Area Events

-  Road Closed
-  Road Restrictions



Real-time data visualisation

Collation of information

Accessible by client


Reporting to CHBDC and Civil Defence


Secure and preserved digital record





Bridge General Inspection Form


Number of features

 > 16

 12

 9

 5


 < 2


Bridge Damage Assessments

Number of features

 > 13

 10

 7

 5

 < 2

CHBDC Bridges Inspection Status

Landslide Assessments

 Landslide Assessment Form Cyclone Gabrielle

River Assessments

 River Assessment Form Cyclone Gabrielle


Drainage and Scour Assessments

 Drainage and Scour Assessment Form Cyclone Gabrielle


NZTA Highway Information - Active Events


Road Events

 Road Closed

 Road Restrictions

Road Area Events

 Road Closed

 Road Restrictions



Cyclone Gabrielle Recovery - Reporting Tool

Programme Projects Maps Summary

Total Repairs to Complete

3836

Complex Repairs
251

Simple Repairs
159

Minor Repairs
3426

Expenditure to Date

Repairs Completed

Repairs Completed
4535

Road Closures

BURNSIDE ROAD - 753m to 852	Bridge badly damaged by Cyclone Gabrielle Weather event	Closed
GWAVAS ROAD - 6200m to 6300	Large Multi-plate Culvert Washed – completely impassable at 6.2 km from SH50. New damage 23/6/23	Closed
HARKER STREET - 540m to 600	Closed at the Rail Underpass as the rail line and structure have been damaged. NO THROUGH ACCESS	Closed
TE URI ROAD - 17000m to 17100	Closed due to a dropout	Closed
TOD ROAD - 5560m to 5810	between Elsthorpe and Even Road Closed due to road washout at Old Waipawa Riverbed Bridge	Closed
WAKARARA ROAD - 19170m to 19224	Road washed out at FLETCHERS CROSSING BRIDGE due to Cyclone Gabrielle Weather Event	Closed
WAKARARA ROAD - 25445m to 25470	Road washed out at DOUGLAS BRIDGE	Closed
WALKER ROAD - 0m to 893	from Pourerere Road washed out due to Cyclone Gabrielle Weather Event	Closed
WILSON CUTTING ROAD - 2280m to 3086	has been closed due to damage to WILSON CUTTING BRIDGE from Cyclone Gabrielle weather event. Access available up to the top of the hill either side of the bridge.	Closed
ASHCOTT ROAD - 0m to 160	At SH 2 closed at bridge. Road passable from 15/2/2023 however bridge closed	Reopened
BLACK ROAD - 5500m to 5600	slip_ at approx 5.5km from Ashley Clinton	Reopened
BRIDGE STREET - 1356m to 1356	ONGAONGA – surface flooding closed at SH50	Reopened

All Closures from CG

89

Number of Cautions

4

Sites Still Closed
9

Restricted
3

Reopened
80

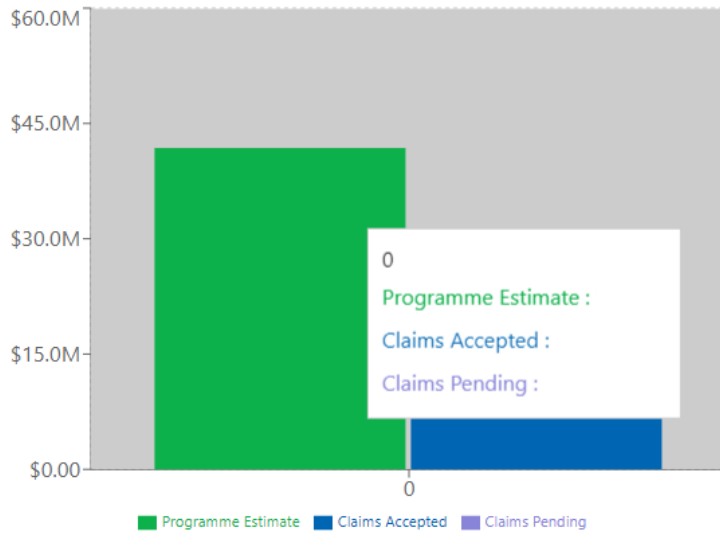


Cyclone Gabrielle Recovery - Reporting Tool

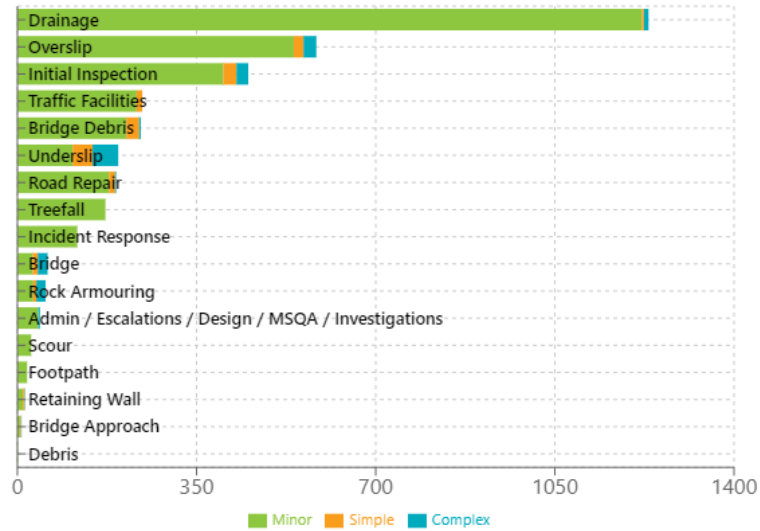
Programme Projects Maps Summary

Programme Progress

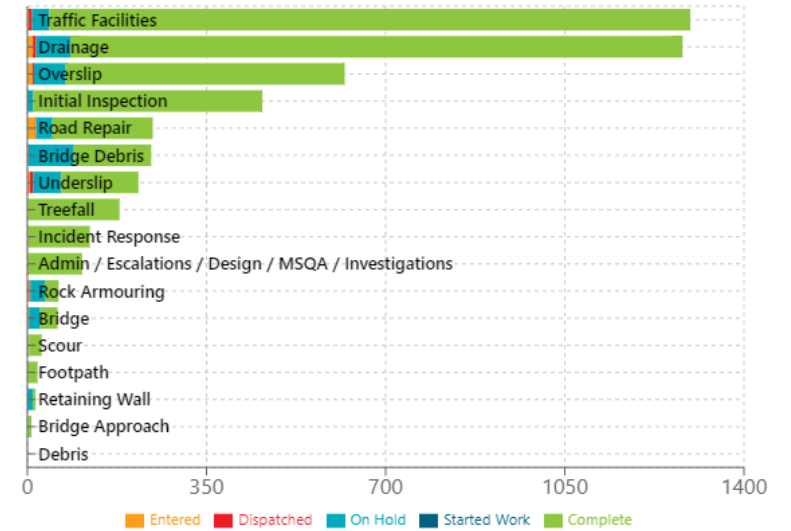
Costs Loaded to Date

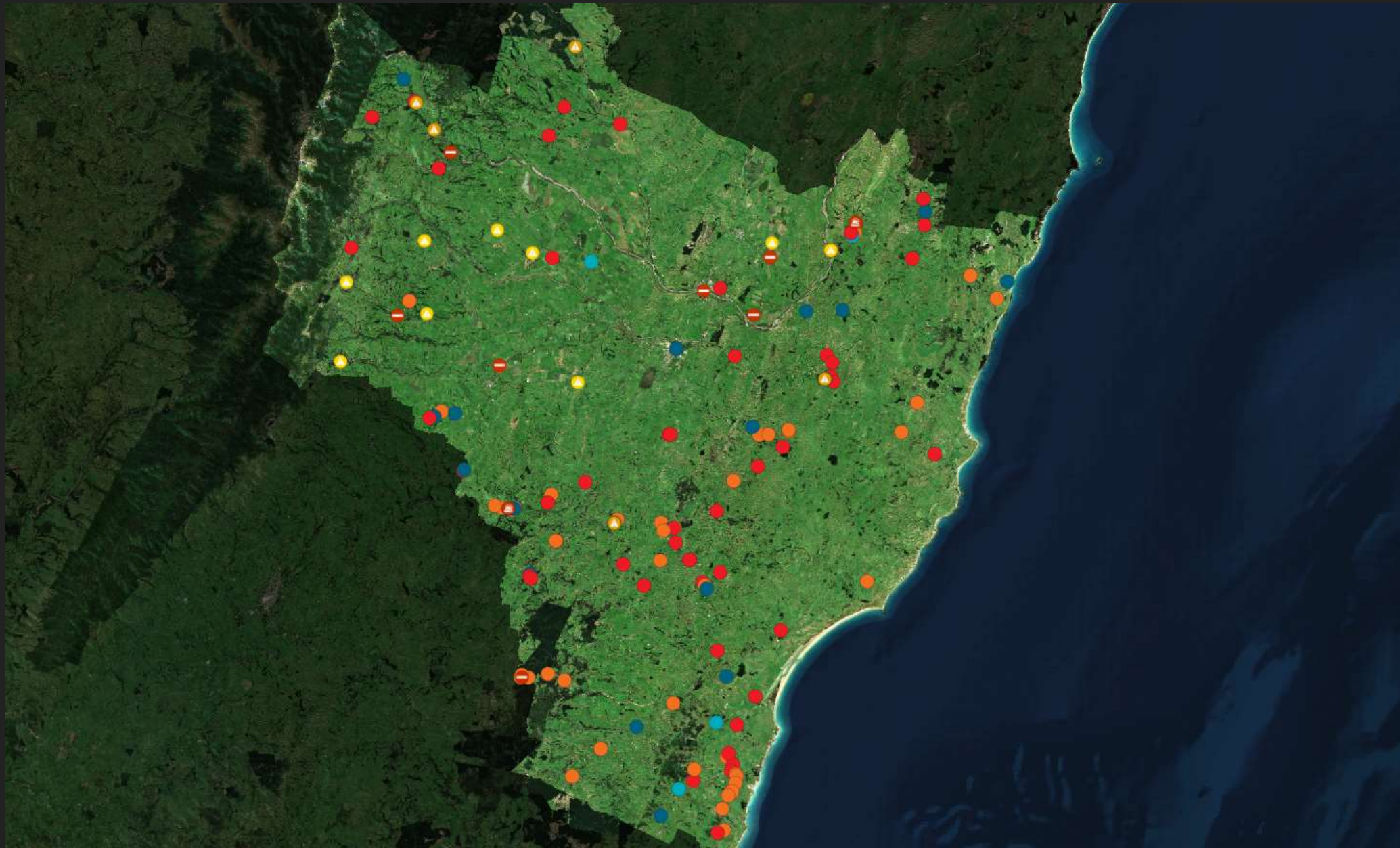





Count of Faults by Severity



Count of Faults by Status





-  CLOSED
-  RESTRICTED - WEIGHT RESTRICTIONS APPLY
-  RESIDENT ACCESS ONLY

Cyclone Recovery Road Works

- Phase
-  Approved Response
 -  Unapproved Response
 -  Approved Recovery
 -  Unapproved Recovery





Information in one location

- Accessible by various parties
- Standardised formats

Editor portal for Quality Assurance





GIS tool stood up rapidly during event

Future opportunities and functionality improvements

Stantec designing framework and system architecture

Share further development for benefit of other local government and asset owners





Imagine if...

...all critical asset owners had similar tools that allowed for interdependent data management and reporting during emergency events.

With the technology available to us today, this is what our communities and stakeholders should be expecting of us.

If you have been thinking about this too, we would be keen to hear your thoughts.



Working together

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

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