Assessing disaster impacts to critical infrastructure services to increase resilience for rural isolated communities

Alistair Davies, Thomas Wilson, Tim Davies, Liam Wotherspoon, JC Gaillard, Matthew Hughes

Communities rely on infrastructure

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Distributed infrastructure networks are threatened by **regional** hazards

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Isolated communities have **low (or no)** infrastructure **redundancy**

Improve infrastructure management

▼

Increase isolated communities' resilience

National Science Challenges
rural
hazard
infrastructure
QuakeCoRE
NZ Centre for Earthquake Resilience
EQC
EARTHQUAKE COMMISSION
Kōmihana Rūwhenua
AF8
ALPINE FAULT MAGNITUDE 8

Improve infrastructure management

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Increase isolated communities' resilience

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1. Lessons learned from the "Kaikōura" earthquake sequence impacts.

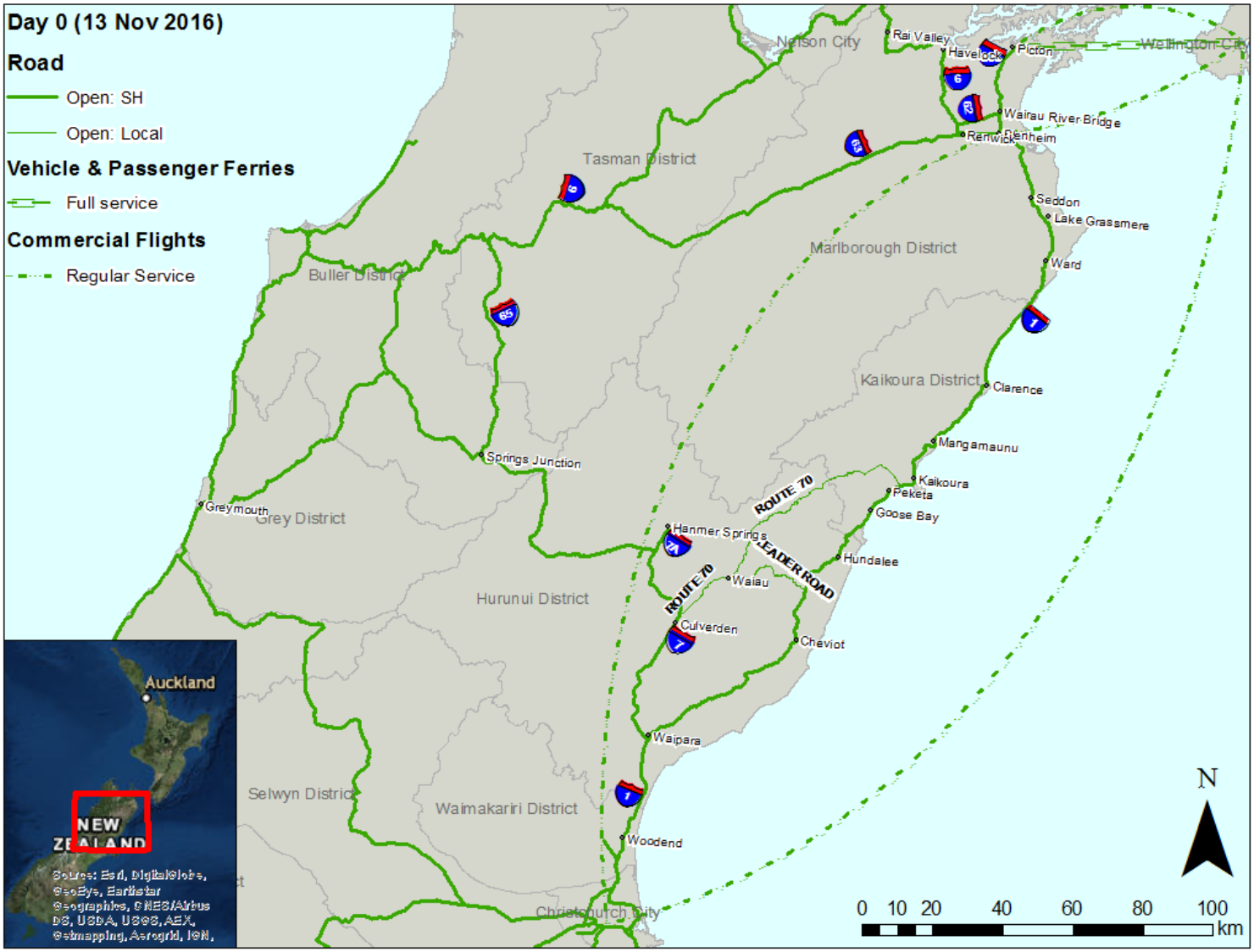
   - Co-authors: NZ TRANSPORT AGENCY WAKA KOTAHI; CANTERBURY Civil Defence Emergency Management Group; KiwiRail

2. Co-creating scenarios to improve infrastructure and communities' resilience on the West Coast.

   - Infrastructure providers: ElectroNet DESIGN.BUILD.DELIVER; NZ TRANSPORT AGENCY WAKA KOTAHI; WEST COAST CIVIL DEFENCE EMERGENCY MANAGEMENT GROUP

   - Community stakeholders: *Franz Josef community*; Department of Conservation Te Papa Atawhai; WESTLAND DISTRICT COUNCIL; THE WEST COAST REGIONAL COUNCIL; WEST COAST CIVIL DEFENCE EMERGENCY MANAGEMENT GROUP

Transport infrastructure performance and management during the first 100 days following the “Kaikōura” earthquake



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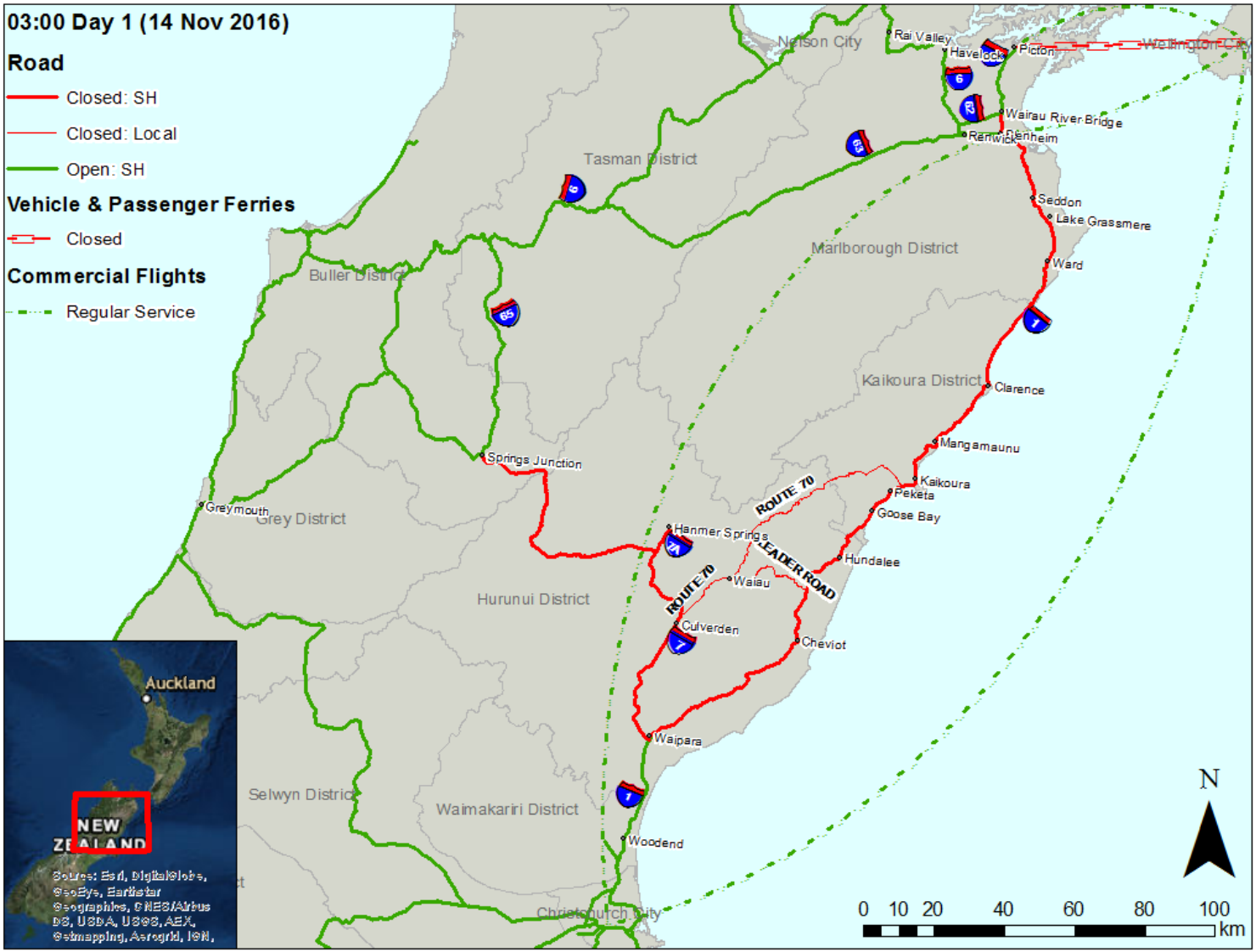

Large offset of rail track due to landslide.
Photo credit: William Ries, GNS Science.

Oaro bridge approach failure and pavement cracking.
Photo credit: Dizhur & Giaretton.

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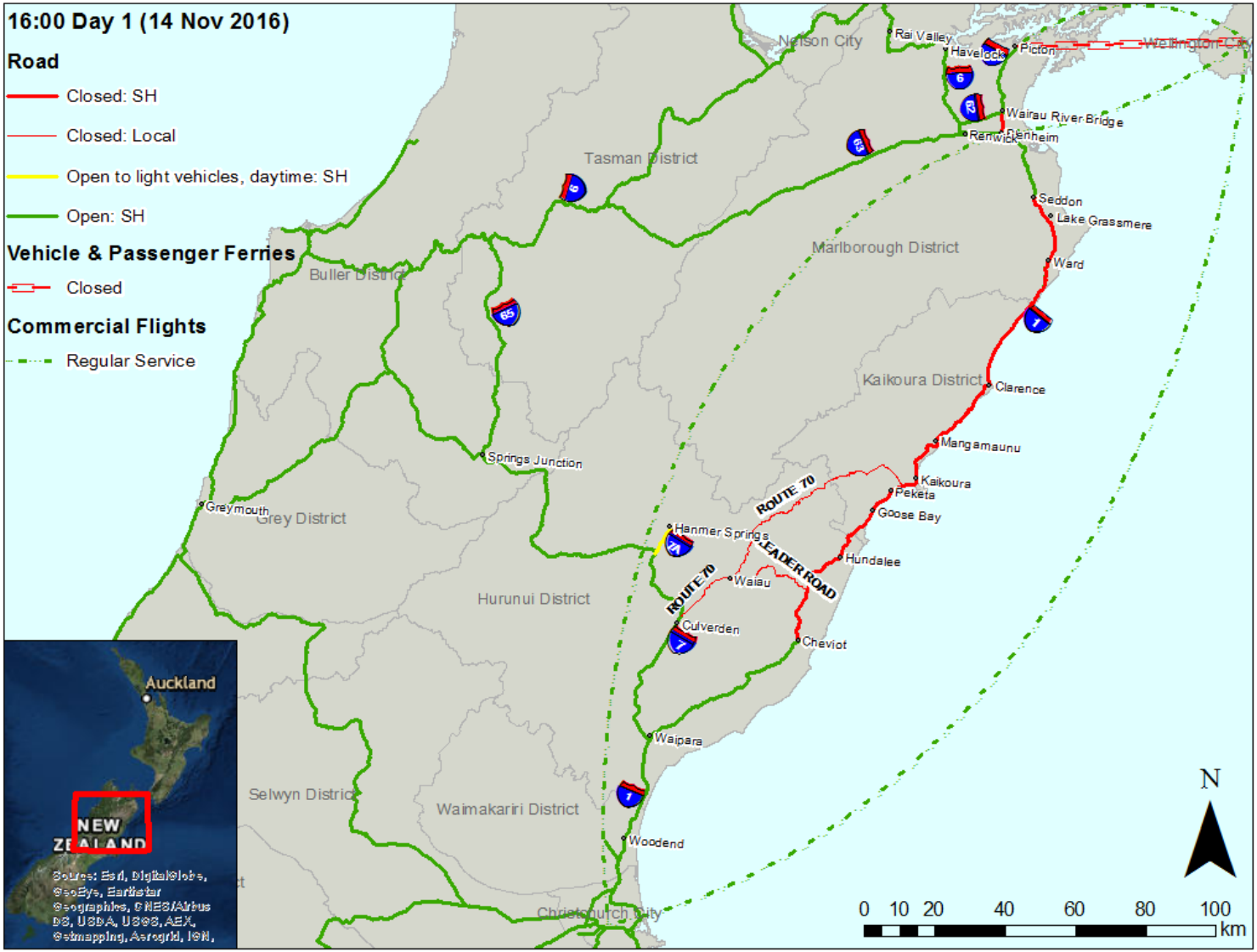

Preventative mitigation lessons

- **PINCHPOINTS:** SH6 section of SH1 diversion has zero redundancy (in the past 5 months, state highways have been closed by earthquakes, landslides, rural fires and flooding).
- **NETWORK LIMITATIONS:** Pre-disaster resilience works could have decreased SH1 diversion disruption and improved air travel into Kaikōura.

Response and recovery lessons

- **RECOVERY PLANNING:** Pre-established stakeholder relationships could have improved response and public messaging.
- **COMMUNITY PREPAIREDNESS:** Towns without road access for 15 days.

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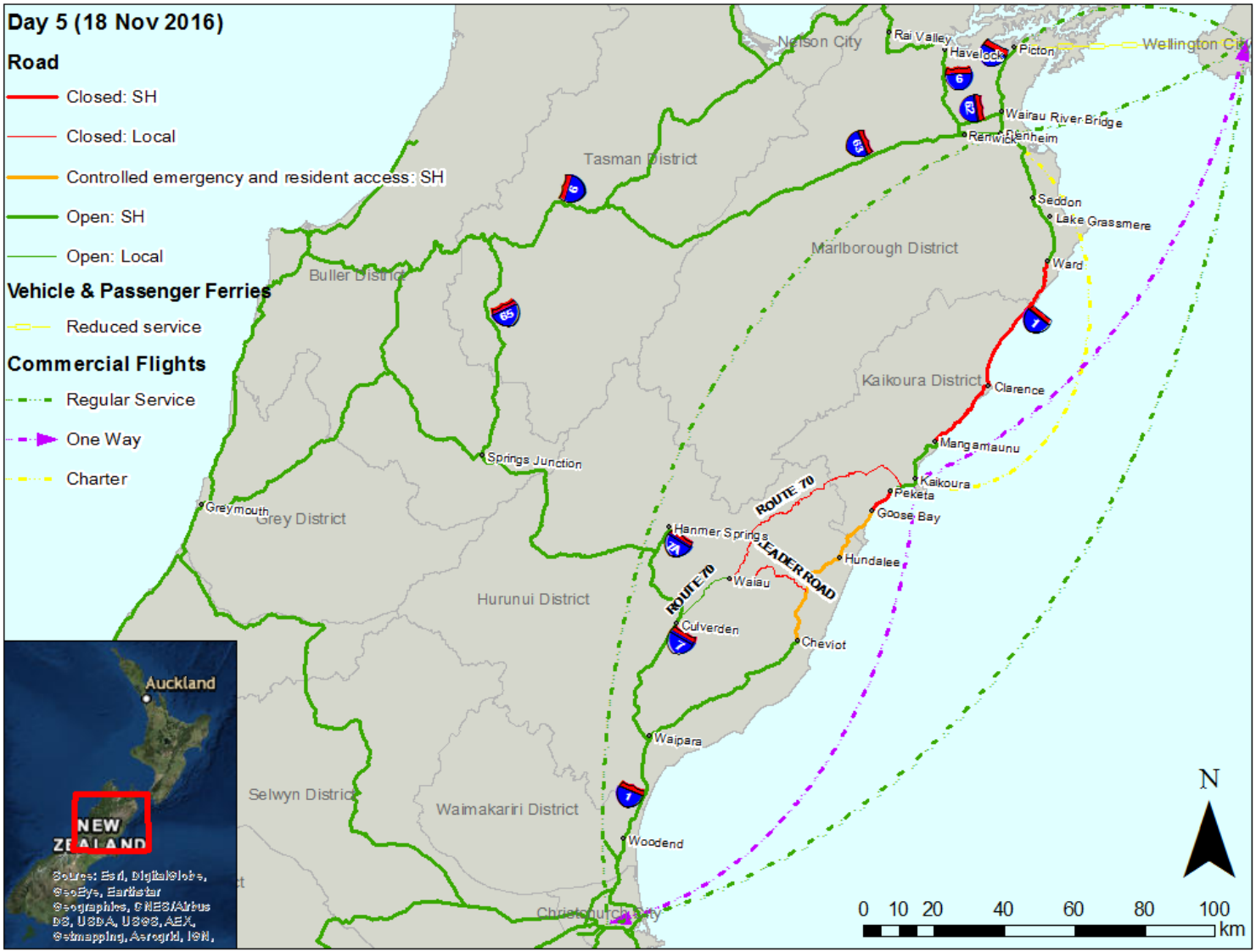

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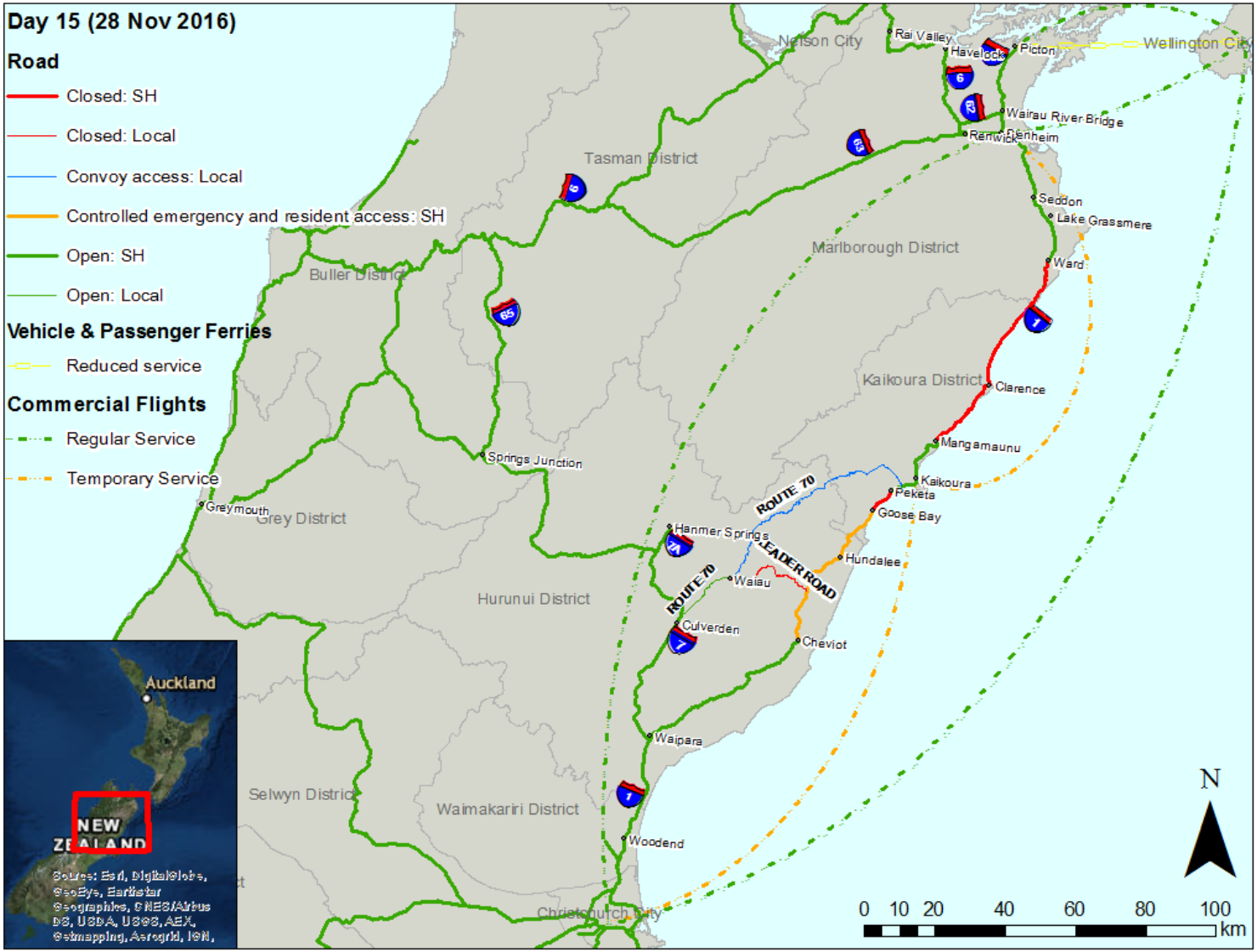

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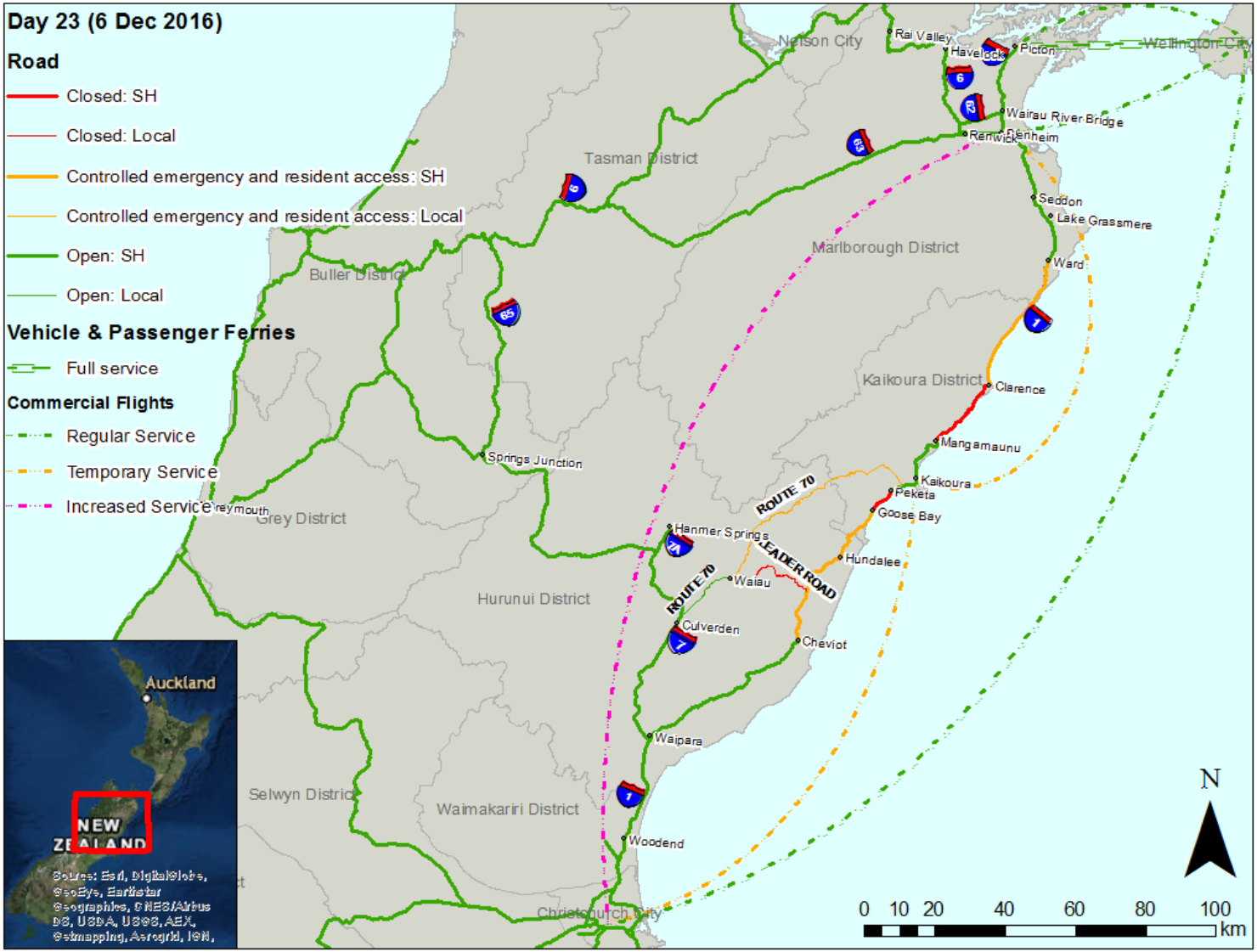

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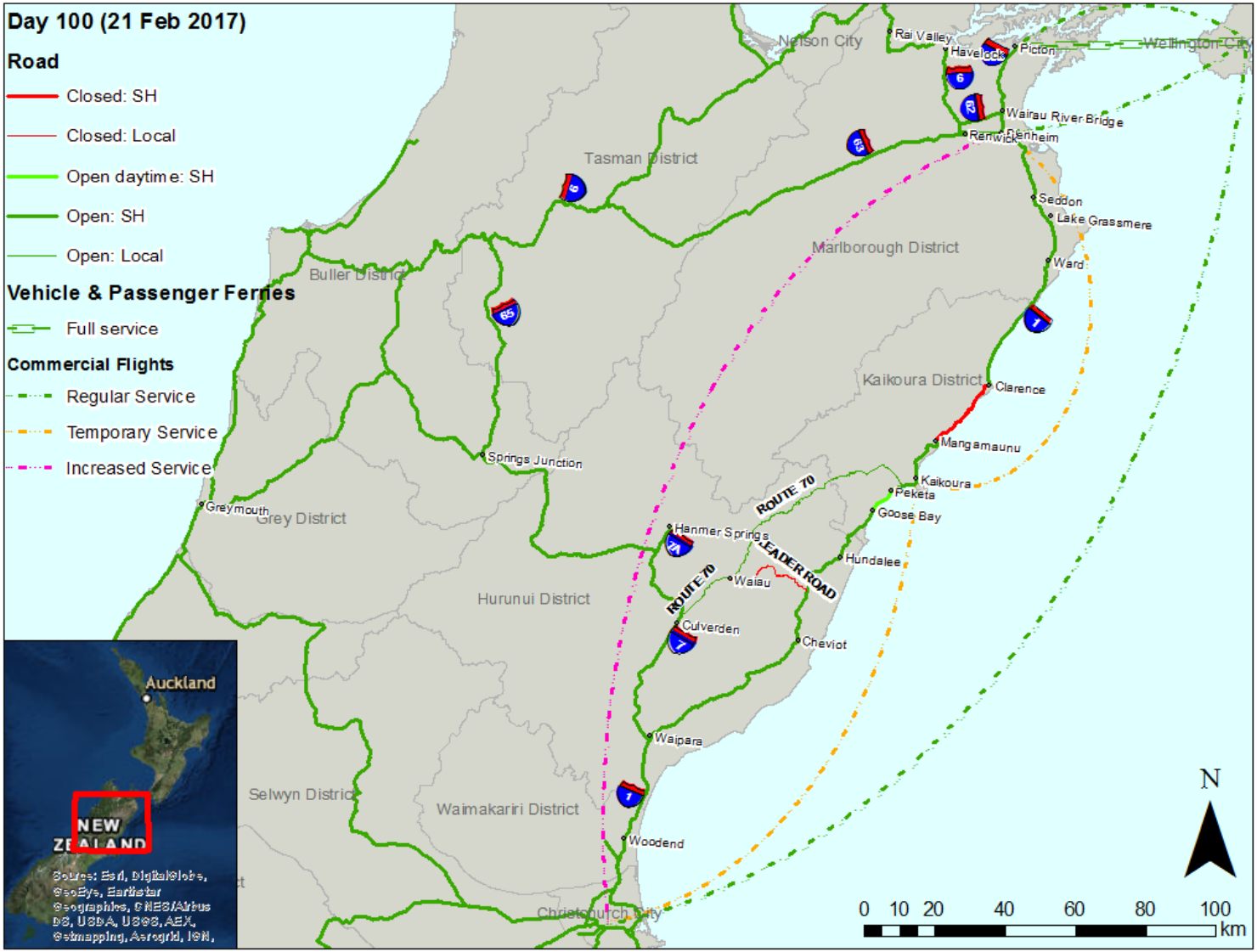

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Scenario co-creation methodology

Compile hazard scenarios

▼

Assess infrastructure impacts

▼

Adjust impacts: collaboration with
INFRASTRUCTURE STAKEHOLDERS

▼

Adjust impacts: collaboration with
COMMUNITY

Preventative mitigation measures

- PINCHPOINTS
- NETWORK LIMITATIONS

Response and recovery measures

- RECOVERY PLANNING
- COMMUNITY PREPAIREDNESS

Co-creating scenarios to improve infrastructure and communities' resilience on the West Coast.

- ✓ Involves and driven by communities, infrastructure providers, and CDEM.
- ✓ Stakeholder and community communication tool.
- ✓ Sustainable: considers ALL hazards.
- ✓ Immediate risk reduction & co-benefits (unknown risks stunt development).

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Otago AF8. 23rd January 2017.

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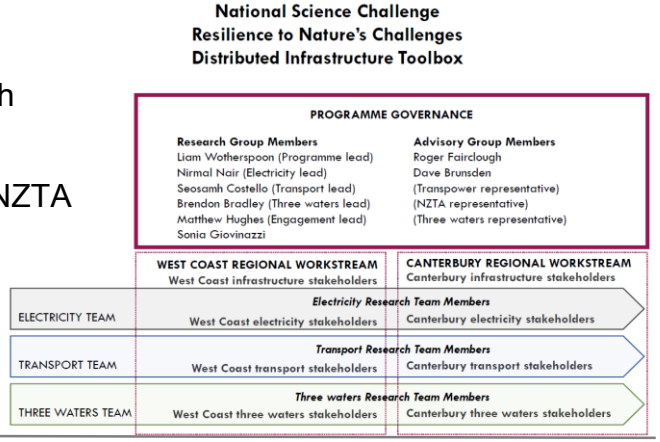
Leading engagement with West Coast CDEM and infrastructure:

- Sit on West Coast Lifelines Meetings
- Sit on Readiness Response Committee
- Data-sharing agreement with Electronet
- Engaging with West Coast NZTA



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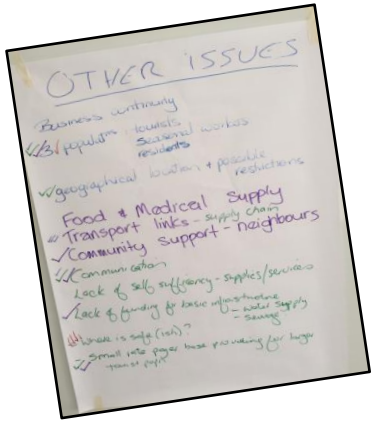

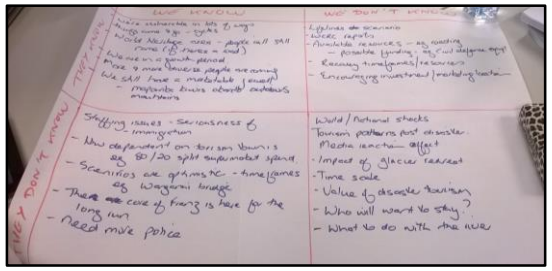

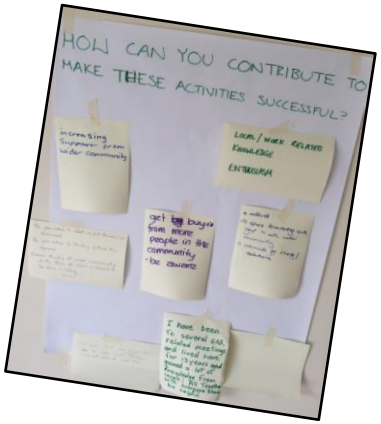

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