THEME 1 - EVALUATION REPORT

How telecommunications data can be used to improve disaster responses?

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QUEENSLAND FIRE AND EMERGENCY SERVICES

Queensland Government

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PROJECT THEME 1 - EVALUATION REPORT TIMELINE

How telecommunications data can be used to improve disaster responses?

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1 introducing the partnership organisations

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10 recommendations & implications

11 looking forward

12 questions

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OUR THEME 1 PARTNERS

AUDAX AT FIDELIS

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GRIFFITH UNIVERSITY - VALUES & IMPACT DRIVEN

Global:

- ranked 33rd in the 2022 Times Higher Education Young University Rankings
- ranked 33rd in the 2021 QS World University Rankings Top 50 Under 50
- ranked in the top 100 universities worldwide in the Times Higher Education Impact Rankings for 2022
- Griffith Business School's sustainable MBA program ranked number one in Corporate Knights 2021 Better World MBA Ranking for second year running

National:

- ranked first for performance against United Nations' Sustainable Development Goal (SDG) 16 – peace, justice and strong institutions – in Times Higher Education (THE) Impact Rankings 2022.

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RELATIONAL INSIGHTS DATA LAB

we make data matter

- create data capability within communities
- equip place-based community organisations with data
- advance transdisciplinary research
- establish and support data collaboratives
- evaluate evidence-based policies and programs to ensure sustainable value and impact

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GUIDING VALUES

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trust,
respect,
collaboration

Griffith

people,
learning,
leadership,
innovation

QFES & QGov

customers first,
ideas into action,
unleash potential,
be courageous,
empower people

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we refined the research question when things were somewhere between these two images

we originally formulated the research question when things we like this

SETTING THE SCENE

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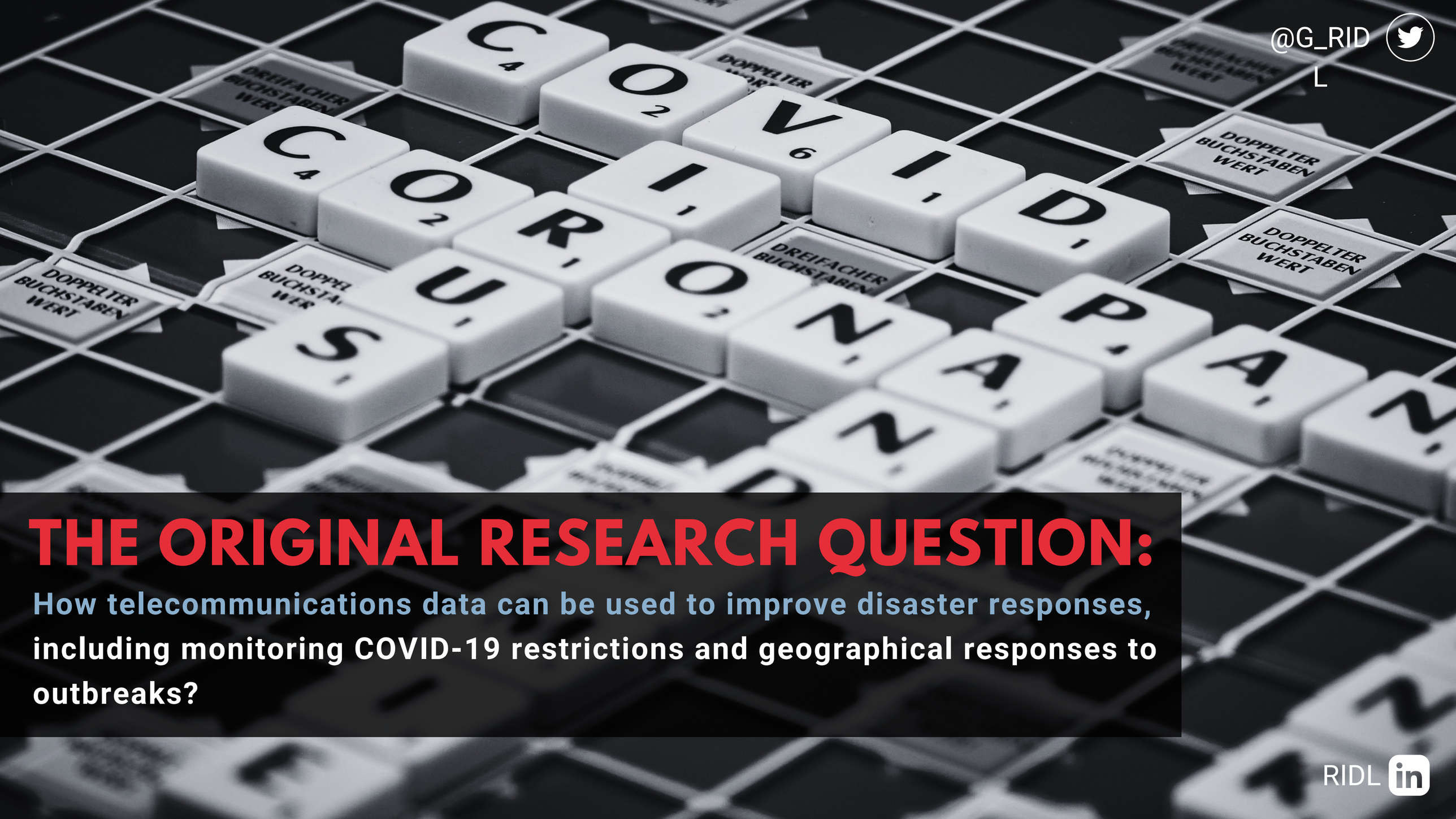
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THE ORIGINAL RESEARCH QUESTION:
How telecommunications data can be used to improve disaster responses, including monitoring COVID-19 restrictions and geographical responses to outbreaks?
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PILOT AIMS & OBJECTIVES

- determine QFES data gaps and how DSpark mobility intelligence could fill them
- provide quantifiable way to assess people movement during disasters or emergencies - previously none
- build dashboard to geospatially quantify and visualise population movements for the Peregian Bushfire disaster in September 2019, and for the March - May 2020 and 2021 COVID-19 lockdowns.

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THE REFINED RESEARCH QUESTION:

How telecommunications data can be used to improve disaster responses?

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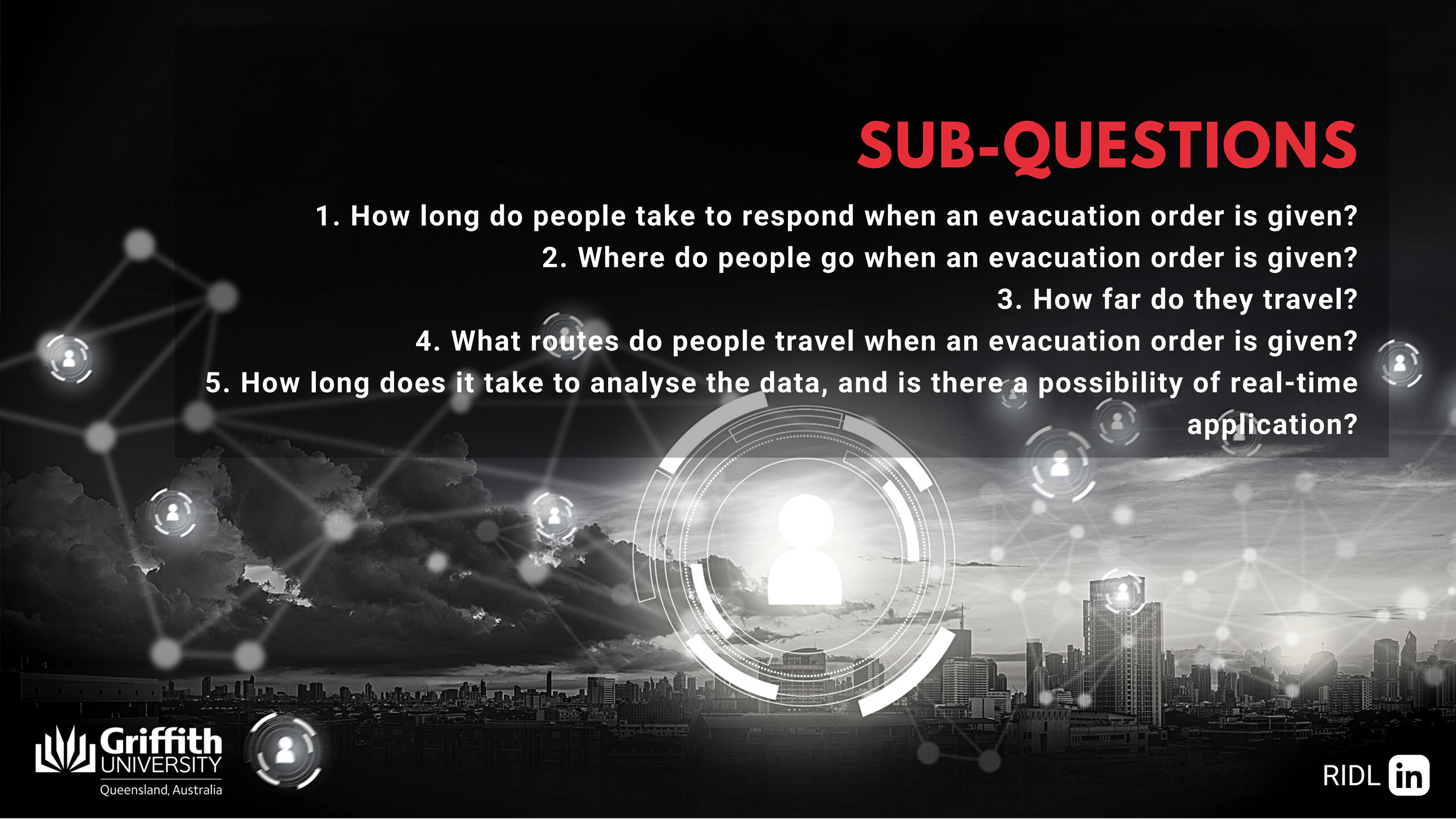
SUB-QUESTIONS

1. How long do people take to respond when an evacuation order is given?
2. Where do people go when an evacuation order is given?
3. How far do they travel?
4. What routes do people travel when an evacuation order is given?
5. How long does it take to analyse the data, and is there a possibility of real-time application?



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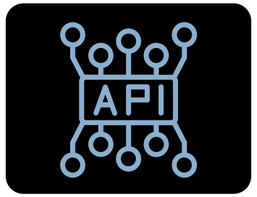
DESIGN & ENGAGEMNT MODEL PHASES

1. CO - DESIGN

Meet regularly to ensure the API queries were structured effectively and efficiently to provide actionable and meaningful insights into the key and sub research questions for theme 1

2. GATHER DATA

RIDL and DSpark work closely to gather data from DSpark API and analyse it in-line with the research questions



3. ANALYSE & BUILD

RIDL builds dashboard to enable QFES decision-makers to better understand how people behave during disasters and how they can target their response and prepare strategically

4. REFINE & DELIVER

RIDL, DSpark and QFES meet regularly again to refine dashboard to suit research aims and objectives, and suit business purposes

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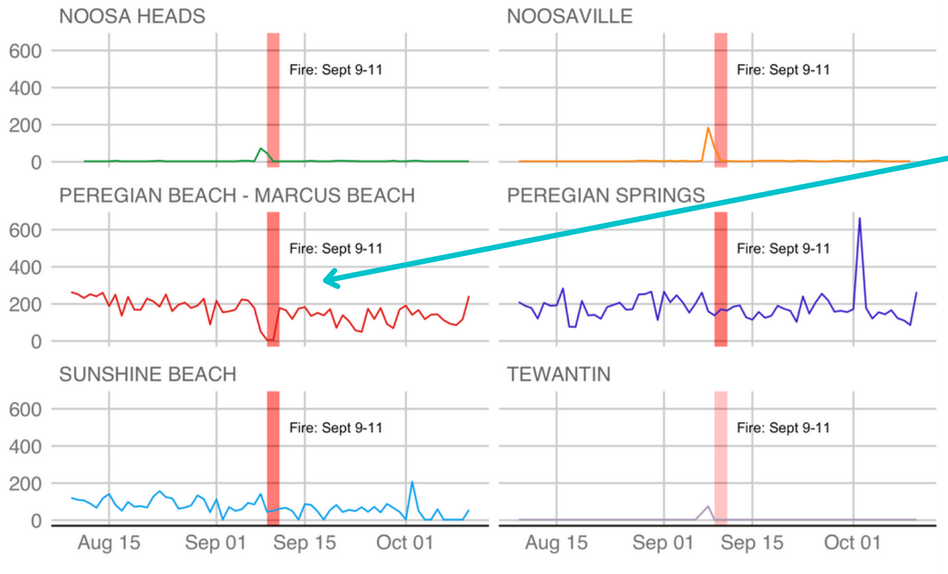
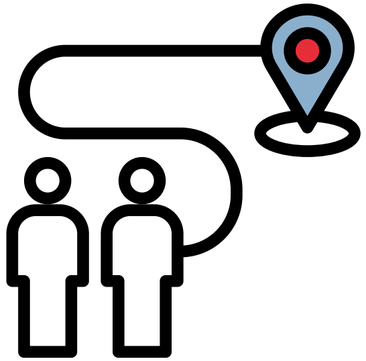
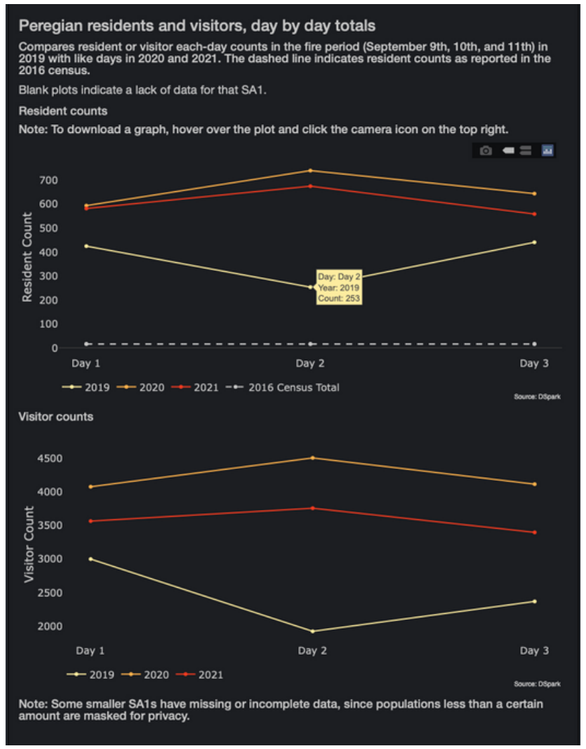


Look at the dip of people sleeping the night at home from the evacuated SA2s during and just prior to evacuation orders.



ANALYSIS: PEREGIAN SPRINGS FIRES



Where do people go when an evacuation order is given?

- over two thirds of evacuees are **“data invisible”** and unaccounted for
  - mobility data can help address this crucial missing link
- 9 September 2019 (first day of fire emergency), **more people stayed longer lengths of time** in the Noosa evacuation centre area
  - E.g., data shows **96 more people than average** (compared to previous or subsequent years) **stayed 3.5 hours longer than average**

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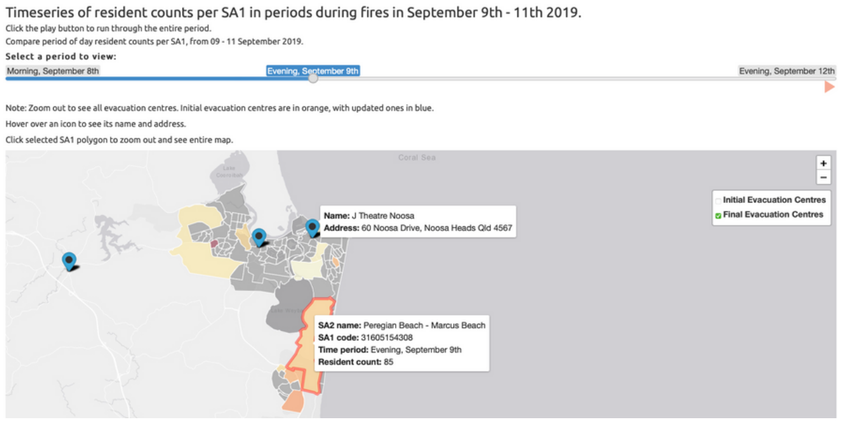
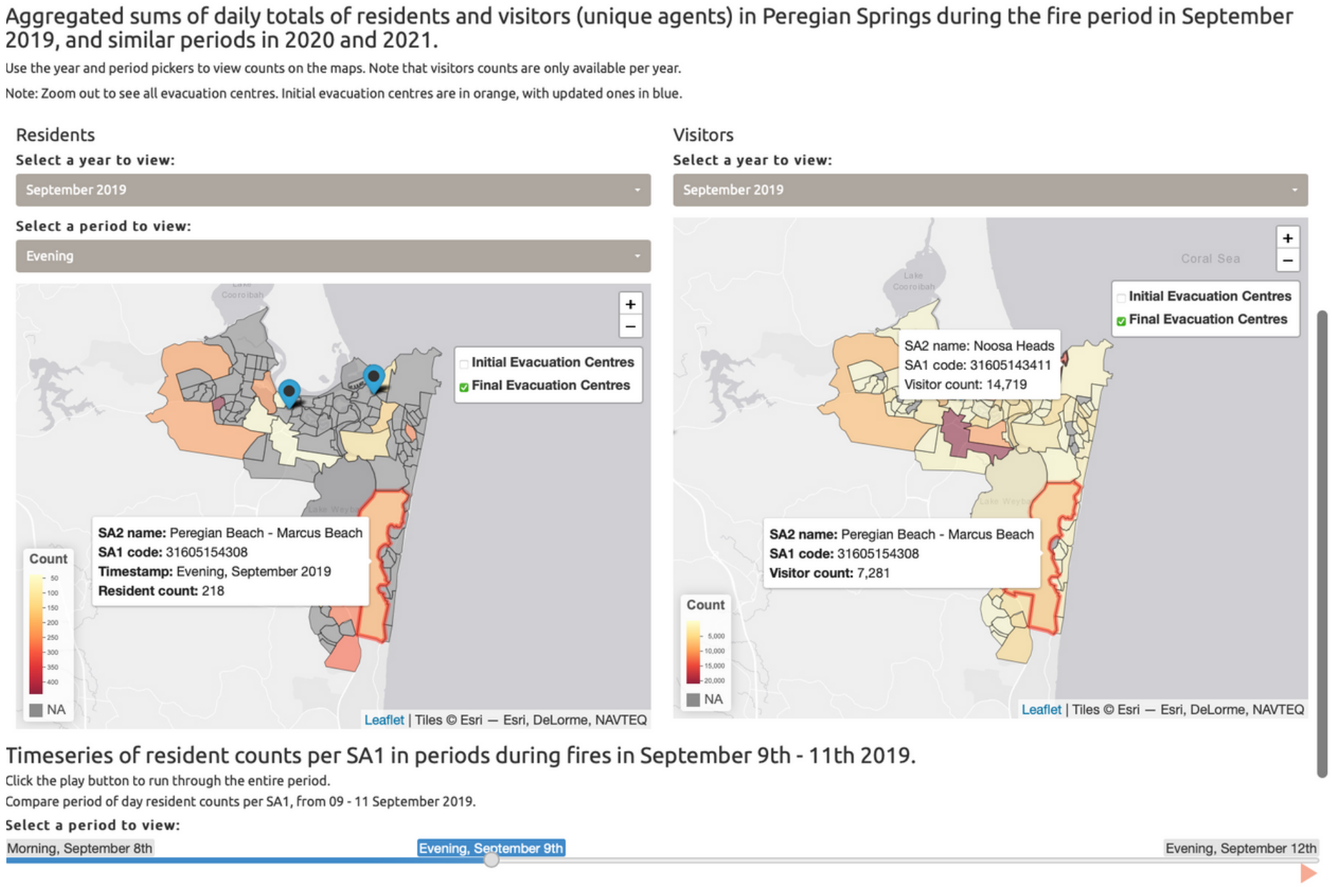
ANALYSIS: PEREGIAN FIRES

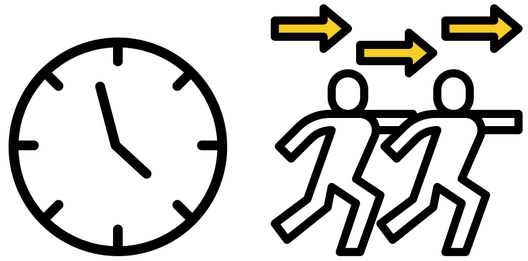




How long do people take to respond when an evacuation order is given?

- three main categories of people evacuating:
  - self-initiated evacuation based on forecasts
  - voluntary evacuation in response to information provided
  - directed evacuation issued by authorised officers

- using the filter function comparing periods of the day, it is possible to quantify that there was a 49.5% decline in residents at home compared to the previous morning, indicating that evacuation orders were promptly heeded



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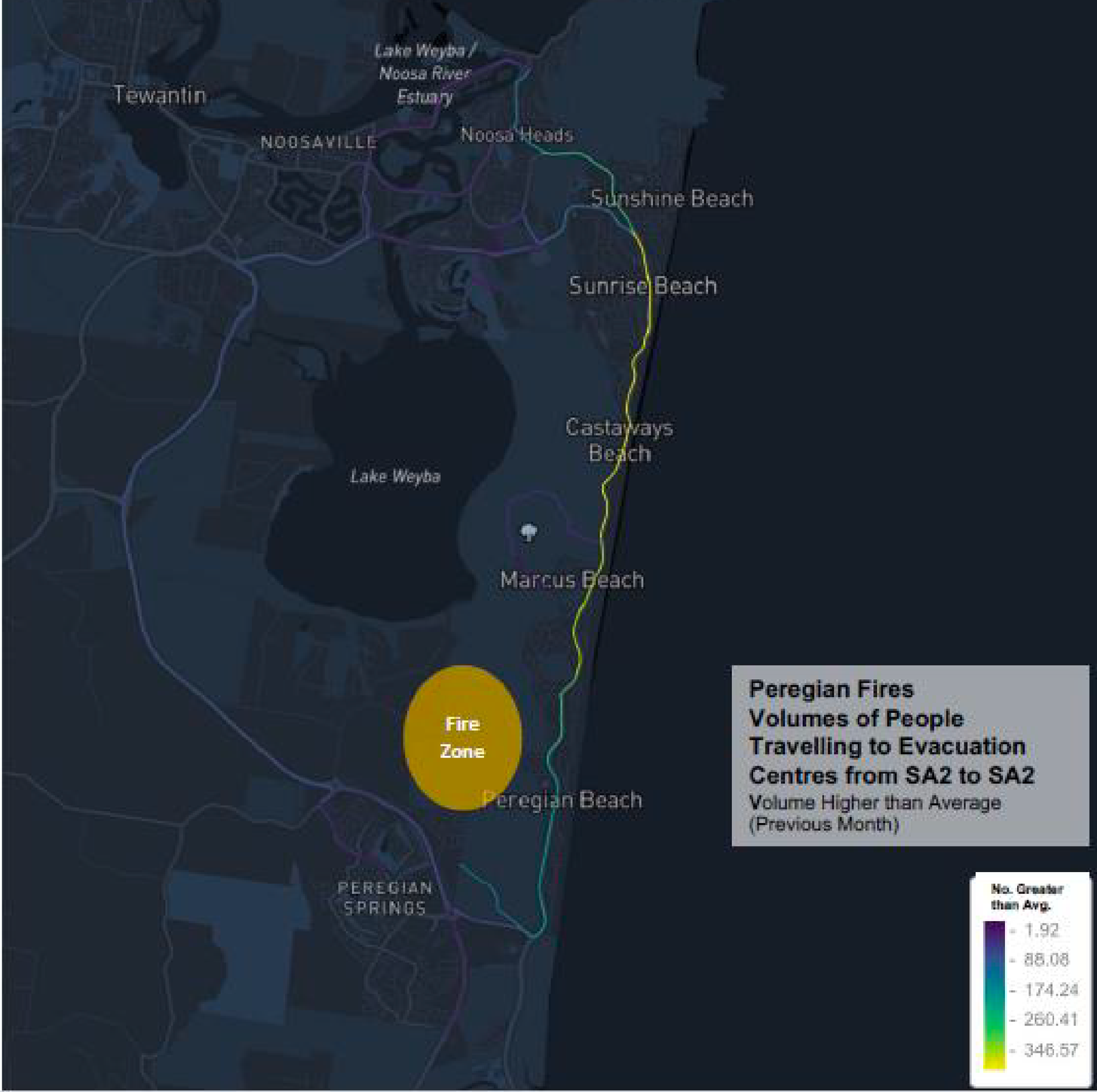

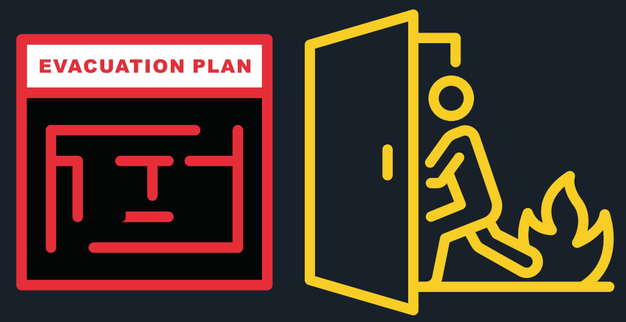

What routes do people travel when an evacuation order is given?

- crucial missing link
  - over two thirds of evacuees are “data invisible” and unaccounted for
- 96 more people than average stayed in the Noosa Evacuation Centre area, and stayed 3.5 hours longer than average
- on the day of the fires over 300 more unique agents were seen travelling north towards Noosa from Peregian - above average route usage
- many people from evacuated suburbs spent the night in neighbouring suburbs, likely with family, friends or neighbours

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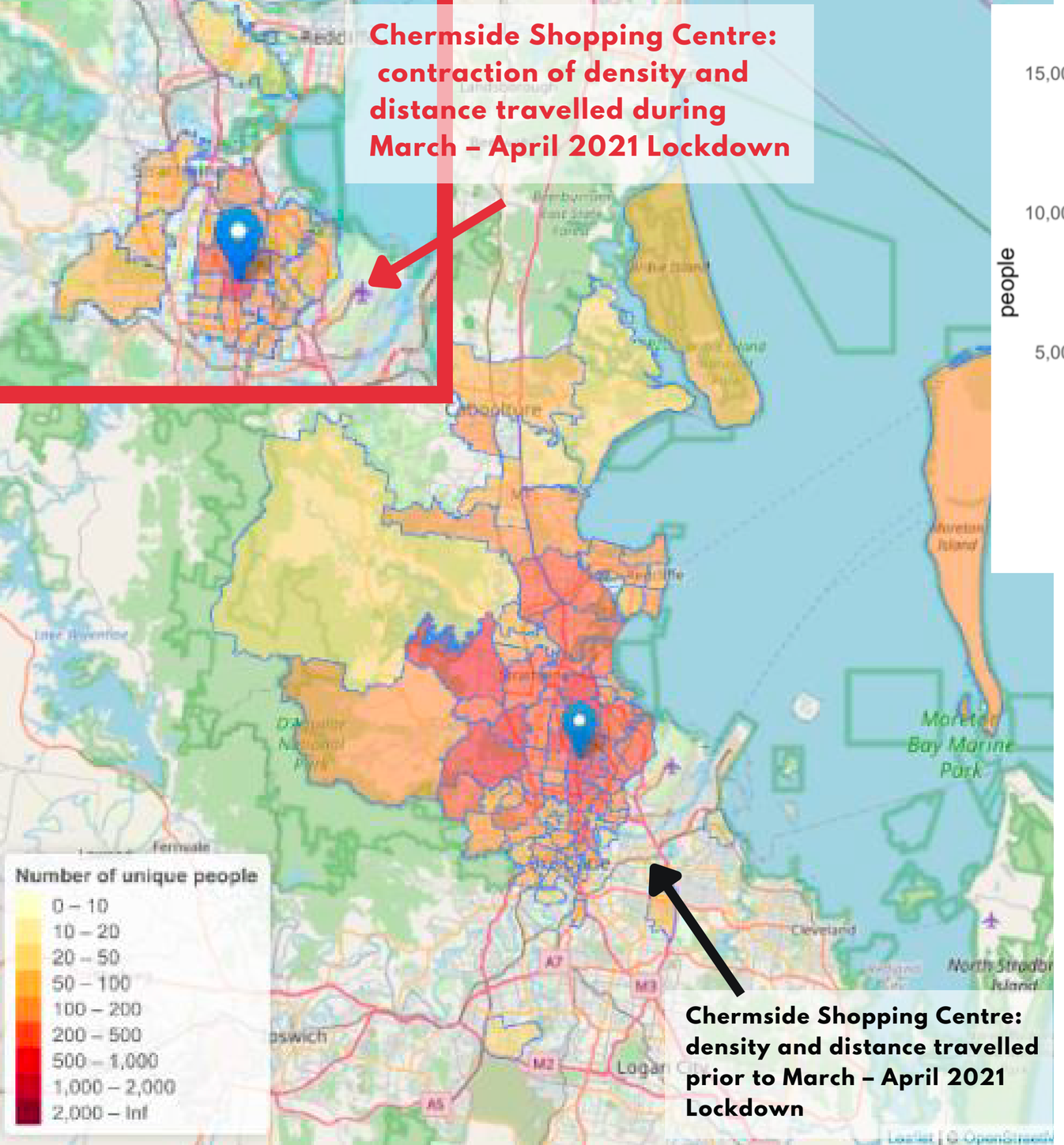

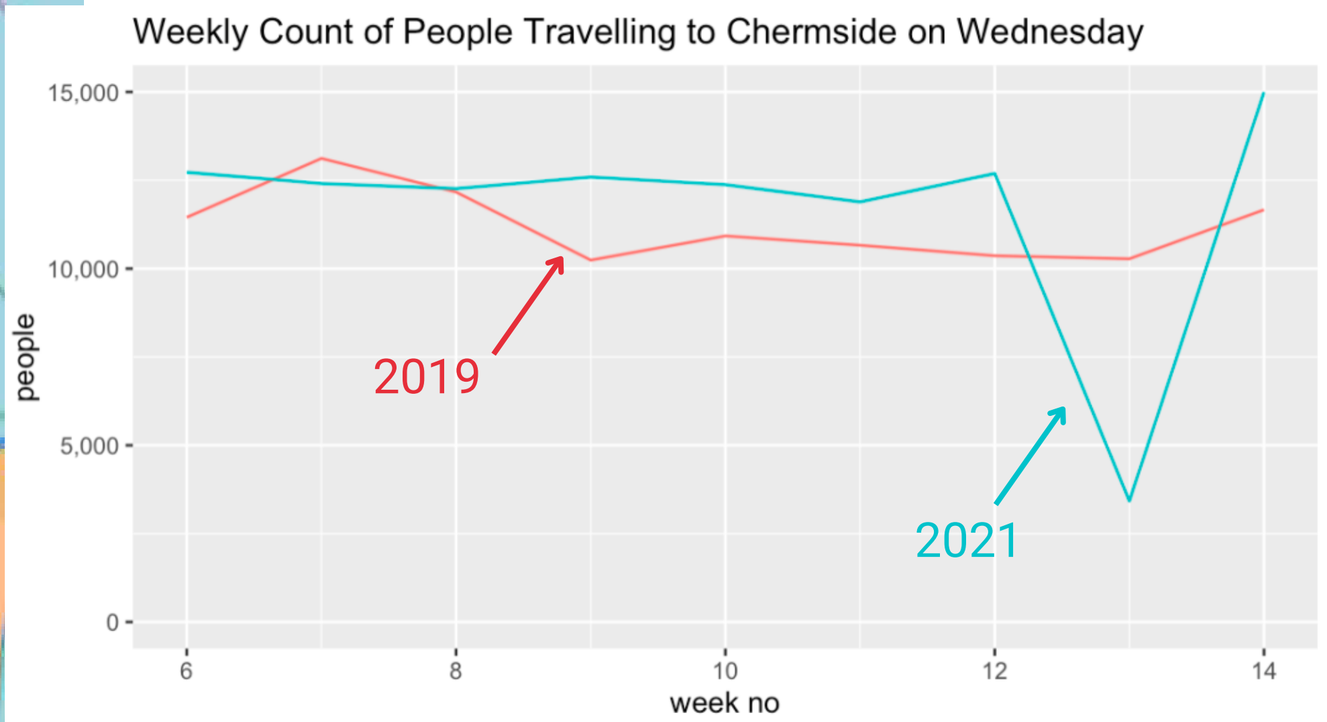

How far do people travel when a lockdown order is given?

- dramatic contraction in volume of people and distance travelled
  - estimate - caution
- median distance travelled also dropped from a median distance of 3km at the longest median distance to 2km on lockdown day.

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SUMMARY OF KEY FINDINGS

Short term emergency response	Current QFES methodology	DSpark mobility data pilot
Where do people go when an evacuation order or lockdown order is given?	• COVID Lockdowns – no visibility • evacuation centre or family/friends • evacuation centre registration • some who go to family/friends may register with Red Cross register/find/reunite but this is not always the case	✓ Data available via: • Origin Destination Matrix • Link API • Discrete Visit API • Staypoint API
How long do they take to respond?	• monitored on the ground by the QPS undertaking the evacuation ◦ unsure if this is currently captured	✓ Data available via: • Origin Destination Matrix • Link API • Staypoint API

SUMMARY OF KEY FINDINGS

Short Term Emergency Response	Current QFES Methodology	DSpark Mobility Data Pilot
How far do they travel and what routes do they take?	• this can be manually found out at evacuation centre or the Red Cross database	✓ Data available • Origin Destination Matrix and Through • Links API • Links Meta API
How long does it take to analyse the data? i.e. Is there a possibility of real-time use of the data?	• depends on the event and data available	• there are current legislative constraints on live data and recency is limited to 60-72hrs • the current API data is best placed to assist in disaster response reviews and predictive modelling

RECOMMENDATIONS & IMPLICATIONS

- disaster management entities consider acquiring ongoing access to DSpark mobility data
- QFES develop an ongoing relationship with DSpark data scientists
- build upon the dashboard pilot and explore the creation of predictive modelling tools for disaster management and planning
- implement audit of current data, staff access, tools and applications being developed to avoid duplication across functional areas and departments
- develop a standardised methodology and documentation process to allow for accurate interpretation and analysis of outputs
- establish a rigorous security clearance protocol and register of DSpark and Government department staff with access to sensitive mobility intelligence and government datasets

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FUTURE RESEARCH

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