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Brisbane Floods and Fires Project

1. Project Description

Areas most affected by floods and fires aren't just those most susceptible to it—vulnerability and preparedness of areas is also vital to consider when locating and assisting high-risk areas. Finding the preparedness of different communities, however, is currently difficult for many areas throughout Greater Brisbane. Our proposed application provides a system for finding the most susceptible communities, and indicating the preparedness of these communities.

Primarily targeted towards council members to provide the most effective assistance to communities which require it, the application allows the most vulnerable and susceptible communities to be identified, also displaying the type of help they require to better prepare for natural hazards. Members of the community can also make use of the application, to find the preparedness of their community, finding ways to personally improve their community's hazard preparations and connections, providing positive social developments within their community.

In the application, users can search for suburbs and areas within Brisbane, to find the flood and fire risk of the area, as well as the level of preparedness for the community, provided as a percentage. To find specific focus areas, the preparedness is displayed as both an overall percentage, and as different subcategories, including the percentage of people with adequate insurance, personal confidence, trust in emergency services and more. This would allow users to know which focus area requires the most development and assistance within a community.

Users can also sort by risk level, as well as level of preparedness, to determine which communities are most at risk or least prepared (including ability to sort by each focus area), to find areas which require support. This would be ideal for Brisbane City Council members, to know where to target for council assistance (financial, educational, emergency service development), as well as insurance advertising and preparedness campaigns.

2. Data Story

According to the Queensland Government, Queensland Reconstruction Authority Deloitte Report, its estimated more than 500,000 people were affected by the most recent floods in Brisbane in some way or another (2021-2022 Floods), and the estimated cost of damages was $4.5 billion. The Brisbane City Council estimates the floods impacted 91% of Brisbane suburbs, and has subsequently enacted a Flood Resilience Action Plan, working to identify and support those who need it most after the floods. Providing predicted preparedness of communities in the Brisbane area could aid in this identification for future hazards, before they take place, with many existing surveys and publicly available data considering the preparedness of communities.

Research from the Australian Institute for Disaster Resilience suggests perception of threat, levels of self-efficacy, high levels of social connectedness and trust in communities may facilitate engagement in preparatory behaviours for severe weather events. The results from their study show that perceived susceptibility to a future severe weather event, social connectedness, and self-efficacy significantly predict part of the variance in preparatory behaviour.

This suggests similar factors could be used to approximate the preparedness of communities at risk to upcoming natural hazards. Many existing surveys from various groups, like the Queensland Fire and Emergency Services (QFES) Community Insights Survey, and the Queensland Resilience Index from the Get Ready Queensland campaign, assess similar factors to determine the preparedness of

various local communities, publishing the results to the public. Assuming the consistent upkeep of the survey data, this could be implemented in the application as an annual assessment of community preparedness, based on the individuals in the community who have answered the questions and supplemented with further related data, e.g. Census data. Hence, by compiling and analysing this data, we can summarise the preparedness of different suburbs around Brisbane -- informing the Council of suburbs' risks for an upcoming hazard.

Additionally, although primarily developed based on council needs, by visualising this data in an accessible format it also allows residents of the suburbs to better understand their overall community's risk, and how they can aid in the preparation and planning, ahead of unexpected hazards.

Percent statistics which determine a community's overall preparedness were calculated using the two survey results datasets, by firstly determining which questions would be relevant to our application. These questions were then grouped into the 'statistics', such as the community's trust in emergency services, or financial recovery ability. As most questions were yes/no questions, the percentages for each statistic would be calculated by firstly considering, for each individual question, the percentage of people in the suburb who answered the favourable answer (indicating they are 'prepared'). These percentages for each question under a certain statistic would then be averaged to calculate the overall statistic percent. For the questions with a range of answers (on a scale with 5 options), the most desirable end of the scale would be assigned '5', and these values averaged for within the suburb, and converted to a percentage (out of 100, rather than out of 5). Again, the average suburb percentages for each question under a certain statistic would be averaged, to find the overall statistic percent.

The flood (Brisbane City Council) and fire (Queensland Government) risk level datasets were also used, to allow council members (and possibly also community members) to consider the disaster risk levels of suburbs, when determining which areas require assistance. Additionally, Census data was used to present suburbs' populations, to provide council members with further information about the requirements of different areas. It can be noted that additional Census data could also be utilised, if even more information would benefit council decision-making.

Appendices

Appendix 1: Content which will be found on the "QLD Survey Questions Used" page. This information shows which questions from the survey data we used, in order to calculate each percent statistic.

Personal confidence
I feel able to cope with the physical impacts of future severe weather events
I feel able to cope with the emotional impacts of future severe weather events
I feel able to prepare my home or property well for future severe weather events
I know where to go for information on how to prepare for future severe weather events
I have a good awareness of the potential risks that me, my family and or my property could face as a result of future severe weather event
Facing severe weather events is just a part of living where I live
If I needed to evacuate from my home I would know where to go to

Overall, I feel confident and optimistic that I could prepare for, cope with and recover from a severe weather event in the future
Trust in emergency services
My community can rely on the local council to be properly prepared, organised and well resourced in the face of a severe weather event
My community can rely on local council to learn from past severe weather events and pass planning and development laws so that the community can withstand the impact of future events
My community can rely on the state government to help after a severe weather event- in terms of providing on the ground support
My community can rely on the state government to help after a severe weather event- in terms of providing financial support
My community can rely on the federal government to help after a severe weather event- in terms of providing financial support
Local volunteer emergency services (State Emergency Service/Rural Fire Service/Volunteer Marine Rescue) are supported by people volunteering in our community
Local volunteer emergency services (State Emergency Service/Rural Fire Service/Volunteer Marine Rescue) are properly prepared and resourced
I feel confident we would receive enough accurate information in a timely fashion from authorities, before, during and after a severe weather event
My region is often isolated after a severe weather event - in terms of phone and internet services, electricity supplies and or food supplies or transport getting in and out of town
Things would get back to normal pretty quickly in my area after a severe weather event
Community connectedness
I could rely on friends and family to help if I was affected by a severe weather event
I could rely on my neighbours to help me if I was affected by a severe weather event
I would help out my neighbours if they were affected by a severe weather event
There is good community spirit in my town or suburb - people get involved in things
I know the names of my close neighbours
Vulnerable people in my community would be looked after if there was a severe weather event
I feel closely connected to and committed to my local community
Adequate insurance

My property and/or possessions are adequately insured for future severe weather events
Financial recovery status
My region is highly dependent on just one or two industries for jobs and our economy
I feel confident I have the financial resources to recover from a future severe weather event
People in my region, town or suburb are worried about keeping their jobs
Preparation measures taken
I keep my gutters clean in the storm and cyclone season
I would never drive through flood waters
I am a member of a local social, faith-based or community oriented group
One of the people I live with has a first aid certificate
I store bottled water during the summer in case of a water supply failure

(Queensland Government, 2013)

Received services or warnings in the last year
Have you received a service delivered by QFES in the last year? Services include: - education material/programs/visits - warnings and/or alerts - response to an incident - help to prepare my property to reduce the impact of an emergency or disaster
FLOODS - Would be safe from impacts (home, family or business)
How do you rate the likelihood that the following emergency or disaster event could impact your home, your family or your business in the next year? Floods;
Overall, how prepared do you feel to reduce or prevent the impact from the following emergency or disaster events? Floods;
FLOODS - Members of community made sufficient preparations
What has been done/planned to be done to your property by you or your landlord to reduce or prevent the impact of an emergency or disaster event? Floods; (Appendix 2: considerations 4, 6, 7-9, 15, 16, 19, 24, 25, 27)
In the last year, have you undertaken any of the following activities? Floods; (Appendix 3: considerations 5-12)
FIRES - Would be safe from impacts (home, family or business)
How do you rate the likelihood that the following emergency or disaster event could impact your home, your family or your business in the next year? Bushfires;
Overall, how prepared do you feel to reduce or prevent the impact from the following emergency or disaster events? Bushfires;
FIRES - Members of community made sufficient preparations

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What has been done/planned to be done to your property by you or your landlord to reduce or prevent the impact of an emergency or disaster event? Bushfires; (Appendix 2: considerations 1-3, 5, 7, 11, 12, 15, 17, 18, 22-27)
In the last year, have you undertaken any of the following activities? Bushfires; (Appendix 3: considerations 1-12)

(Queensland Government, 2021)

Flood Risk data from Brisbane City Council, licensed under Creative Commons Attribute 4.0

Fire Risk, Queensland Resilience Index and Community Insights data from Queensland Government Open data portal, licenced under Creative Commons Attribute 4.0

Appendix 2: Considerations taken into account in the questions about what users have done to prepare their property.

1. Install hard-wired smoke alarms;
2. Change the battery in smoke alarms;
3. Test the smoke alarm;
4. Raise the ground level of a building;
5. Install a sprinkler system to protect a building;
6. Install gutter guards;
7. Relocate a building from a flood or fire prone area;
8. Seal a building below expected flood level;
9. Replace building materials with more water-resistant options;
10. Reinforce any part of a building to increase that building's cyclone rating;
11. Add a fire alarm that is not monitored;
12. Add a remotely monitored fire alarm;
13. Reinforce any part of a building to withstand earthquake;
14. Install protective covers for windows;
15. Install back up energy to power essential services to your home;
16. Add a flood levee;
17. Install a fire break;
18. Maintain a fire break;
19. Add or improved property drainage;
20. Add wind breaks;
21. Add a storm surge barrier;
22. Clean combustible material and items from around buildings;
23. Clear or maintain access for emergency services to the property/hydrant;
24. Cleaned,
25. vacuumed,
26. maintained smoke alarms;
27. Other (please specify)

Appendix 3: Considerations taken into account in the questions about activities undertaken.

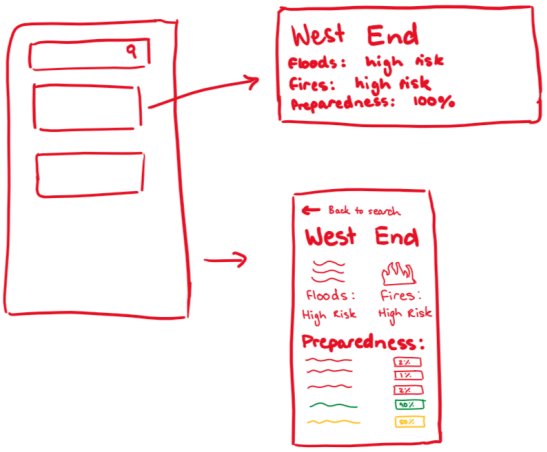
1. Developed a fire plan for your household;
2. Made or reviewed a mental or written plan for evacuating your home;
3. Talked about, and agreed on, an evacuation plan with your household;
4. Planned a safe evacuation route;

5. Prepared an emergency kit with water, food, medical supplies, battery operated radio and valuables;
6. Prepared an evacuation kit (emergency kit plus clothing, bedding, medical equipment, battery power for devices);
7. Checked local council website for information and advice related to disasters and emergency events;
8. Checked the QFES website for information and advice related to disasters and emergency events;
9. Identified friends or family in safer places that you could evacuate to;
10. Completed a first aid course/refresher;
11. Considered any pets in your planning;
12. Other (please specify)

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3. Evidence of Work

Sketches:



Determining how to use the survey questions:

Queensland Resilience Index – 2013:

DD. Postcode	Use in programming to separate suburbs
Region 1.	
Region 2	
Q1. Preparedness Factors - I feel able to cope with the physical impacts of future severe weather events	personal confidence
Q1. Preparedness Factors - I feel able to cope with the emotional impacts of future severe weather events	
Q1. Preparedness Factors - I feel able to prepare my home or property well for future severe weather events	
Q1. Preparedness Factors - I know where to go for information on how to prepare for future severe weather events	
Q1. Preparedness Factors - I have a good awareness of the potential risks that me, my family and or my property could face as a result of future severe weather event	
Q1. Preparedness Factors - Facing severe weather events is just a part of living where I live	
Q1. Preparedness Factors - If I needed to evacuate from my home I would know where to go to	
Q1. Institutional Factors - My community can rely on the local council to be properly prepared, organised and well resourced in the face of a severe weather event	trust in emergency services
Q1. Institutional Factors - My community can rely on local council to learn from past severe weather events and pass planning and development laws so that the community can withstand the impact of future events	
Q1. Institutional Factors - My community can rely on the state government to help after a severe weather event- in terms of providing on the ground support	
Q1. Institutional Factors - My community can rely on the state government to help after a severe weather event- in terms of providing financial support	
Q1. Institutional Factors - My community can rely on the federal government to help after a severe weather event- in terms of providing financial support	
Q1. Institutional Factors - Local volunteer emergency services (State Emergency Service/Rural Fire Service/Volunteer Marine Rescue) are supported by people volunteering in our community	
Q1. Institutional Factors - Local volunteer emergency services (State Emergency Service/Rural Fire Service/Volunteer Marine Rescue) are properly prepared and resourced	
Q1. Institutional Factors - I feel confident we would receive enough accurate information in a timely fashion from authorities, before, during and after a severe weather event	
Q1. Institutional Factors - My region is often isolated after a severe weather event - in terms of phone and internet services, electricity supplies and or food supplies or transport getting in and out of town	
Q1. Institutional Factors - Things would get back to normal pretty quickly in my area after a	
Q1. Social Factors - I could rely on friends and family to help if I was affected by a severe weather event	Community connectedness
Q1. Social Factors - I could rely on my neighbours to help me if I was affected by a severe weather event	
Q1. Social Factors - I would help out my neighbours if they were affected by a severe weather event	
Q1. Social Factors - There is good community spirit in my town or suburb - people get involved in things	
Q1. Social Factors - I know the names of my close neighbours	
Q1. Social Factors - Vulnerable people in my community would be looked after if there was a severe weather event	
Q1. Social Factors - I feel closely connected to and committed to my local community	
Q1. Economic Factors - My region is highly dependent on just one or two industries for jobs and our economy	
Q1. Economic Factors - My property and/or possessions are adequately insured for future severe weather events	Insurance
Q1. Economic Factors - I feel confident I have the financial resources to recover from a future severe weather event	Financial recovery ability
Q1. Economic Factors - People in my region, town or suburb are worried about keeping their jobs	
Q1. Overall - Overall, I feel confident and optimistic that I could prepare for, cope with and recover from a severe weather event in the future	personal confidence
Q2. Behaviours - I keep my gutters clean in the storm and cyclone season	preparation measures taken
Q2. Behaviours - I would never drive through flood waters	
Q2. Behaviours - I am a member of a local social, faith-based or community oriented group	
Q2. Behaviours - One of the people I live with has a first aid certificate	
Q2. Behaviours - I store bottled water during the summer in case of a water supply failure	

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Q0	What is your home postcode and suburb?	Verified value and suburb
Q1_1, Q1_2 {5, Very Unlikely}, {4, Slightly Unlikely}, {3, Neither Likely or Unlikely}, {2, Slightly Likely}, {1, Very Likely}	How do you rate the likelihood that the following emergency or disaster event could impact your home, your family or your business in the next year?	Bushfire; Flood; Storm; Cyclone; Earthquake; Storm surge; Heatwave; Hazardous mate incident; Structure fire; Pandemic/widespread disease; Vehicle fire; Transport acciden Terrorism; Other (please specify)
Q2_1, Q2_2 {5, Very Prepared}, {4, Prepared}, {3, Neither Prepared or Unprepared}, {4, At risk - unprepared}, {5, At risk - totally unprepared}	Overall, how prepared do you feel to reduce or prevent the impact from the following emergency or disaster events?	
(Calculate a percentage of those tasks completed for each person, and average for the suburb) (Also split tasks into flood/fire)	What has been done/planned to be done to your property by you or your landlord to reduce or prevent the impact of an emergency or disaster event?	Install hard-wired smoke alarms; Change the battery in smoke alarms; Test the smoke Raise the ground level of a building; Install a sprinkler system to protect a building; Ins gutter guards; Relocate a building from a flood or fire prone area; Seal a building belo expected flood level; Replace building materials with more water-resistant options; Reinforce any part of a building to increase that building's cyclone rating; Add a fire al that is not monitored; Add a remotely monitored fire alarm; Reinforce any part of a bu to withstand earthquake; Install protective covers for windows; Install back up energy power essential services to your home; Add a flood levee; Install a fire break; Maintai break; Add or improved property drainage; Add wind breaks; Add a storm surge barrie Clean combustible material and items from around buildings; Clear or maintain acces emergency services to the property/hydrant; Cleaned, vacuumed, maintained smoke Other (please specify)
(Also split into flood/fire, and average percentages completed for a suburb)	In the last year, have you undertaken any of the following activities?	Developed a fire plan for your household; Made or reviewed a mental or written plan evacuating your home; Talked about, and agreed on, an evacuation plan with your household; Planned a safe evacuation route; Prepared an emergency kit with water, fo medical supplies, battery operated radio and valuables; Prepared an evacuation kit (emergency kit plus clothing, bedding, medical equipment, battery power for devices) Checked local council website for information and advice related to disasters and eme events; Checked the QFES website for information and advice related to disasters and emergency events; Identified friends or family in safer places that you could evacuate Completed a first aid course/refresher; Considered any pets in your planning; Other (p specify)
Yes/No question, so just follow protocol from other dataset	Have you received a service delivered by QFES in the last year? Services include: - education material/programs/visits - warnings and/or alerts - response to an incident - help to prepare my property to reduce the impact of an emergency or disaster	Yes; No

Community Insights Data – 2021:

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4. Video

(Submitted separately)

5. Homepage or Demo

(Submitted separately, as a PowerPoint)

6. Datasets Used

Brisbane City Council, Flood — Awareness — Flood Risk Overall, https://www.data.brisbane.qld.gov.au/data/dataset/flood_awareness_flood_risk_overall

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Queensland Government, Bushfire prone area – South East Queensland, https://www.data.qld.gov.au/dataset/bushfire-prone-area-queensland-series/resource/96585744-f0fd-4afd-af44-653355397108

Queensland Government, Queensland Resilience Index, https://www.data.qld.gov.au/dataset/queensland-resilience-index

Queensland Government, 2021 Community Insights Data, https://www.data.qld.gov.au/dataset/qfes-community-insights-survey/resource/d27de119-6ad5-4869-abb8-b35a662b567d

Australian Bureau of Statistics, Census, https://www.abs.gov.au/census

7. Challenges Entered

- Brisbane City Community Preparedness
- Brisbane City Experience
- Best Creative Use of Data in Response to ESG