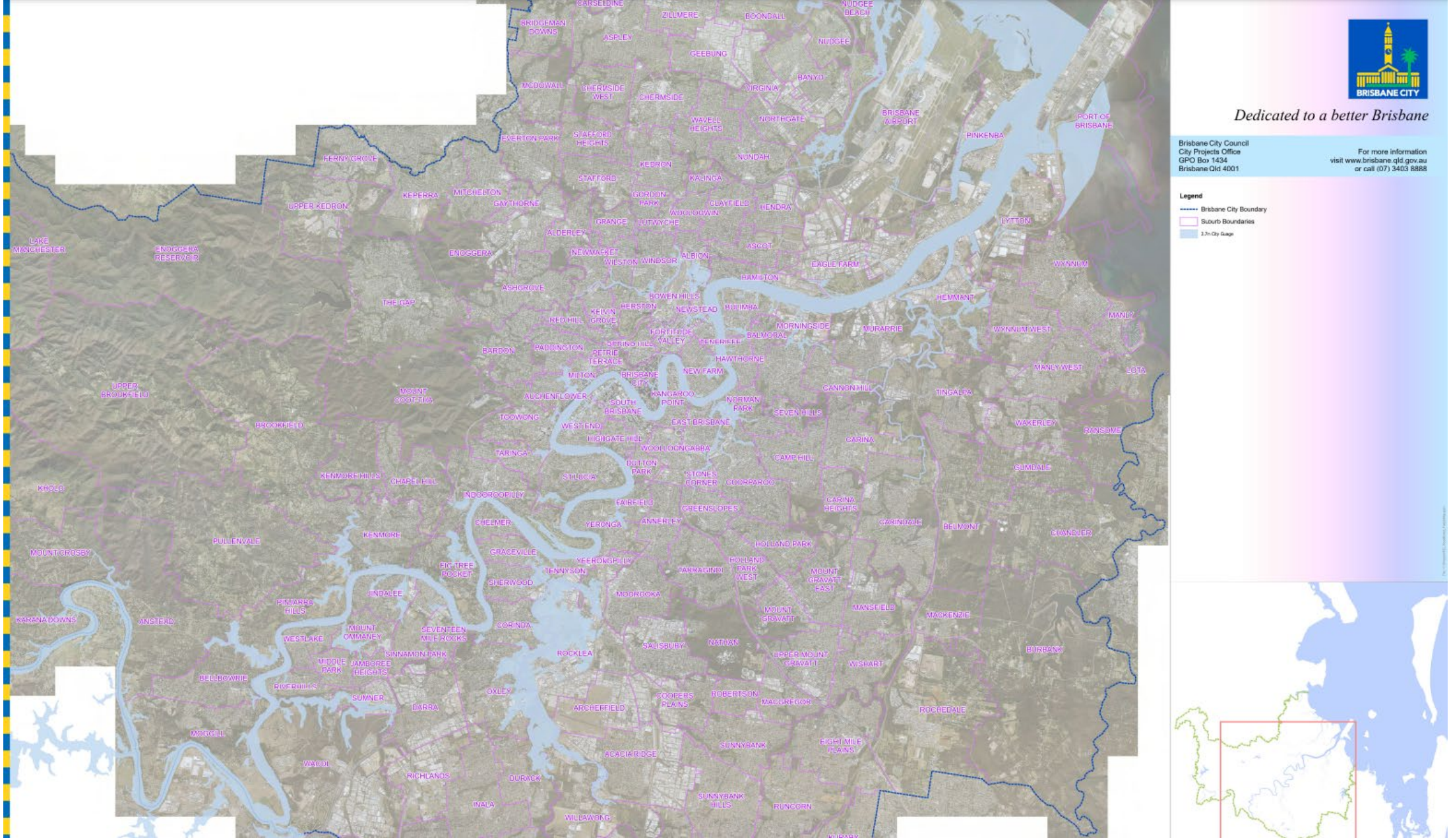
Real-time visualisation of flood extent

Charlotte Patterson, Owen Forbes, Larissa Patricio-Valerio, Matthew Tiller, Raiha Browning, Miguel Canizares, Leah South



CRICOS No.00213J

Real-time flood visualisation team
QUT Flood Hackathon

Mehdi Bagherian @MehdiB64 · Feb 27
Replying to @bne_lordmayor
You need a new cartographer/visualisation expert!
1

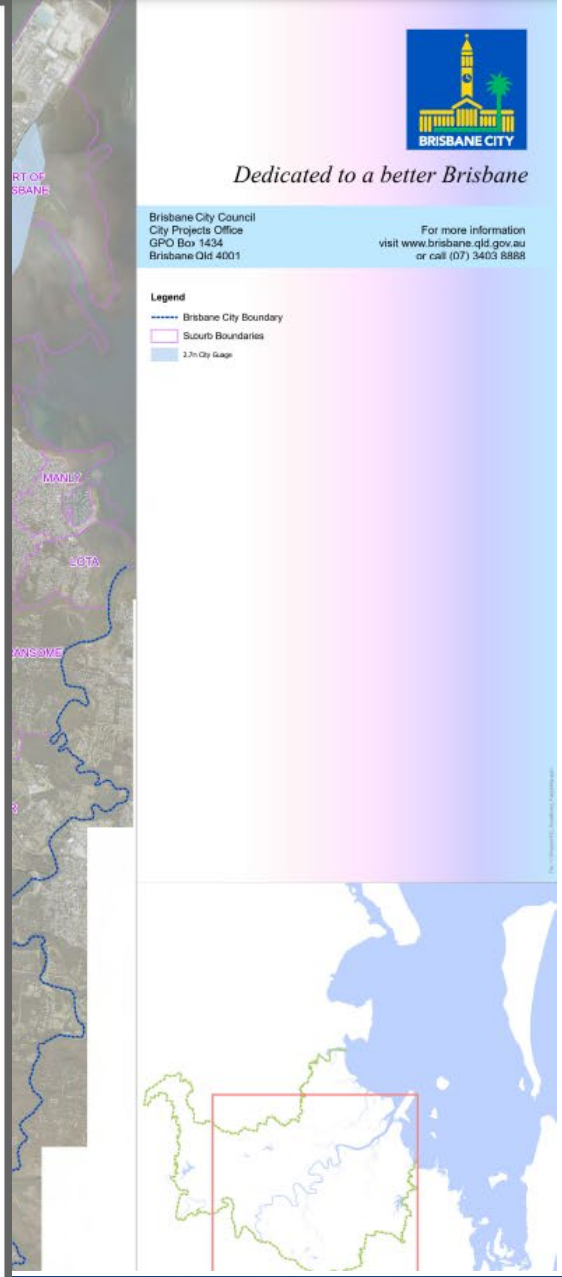
GEGeekTechToolkit @gegeektoolkit · Feb 27
Replying to @bne_lordmayor
17mb and the quality of this is absolutely crap.
2

The One @Gamalon · Feb 27
Replying to @bne_lordmayor
That map is shocking. Surely you have some IT people there that can create a nice user friendly and clear looking map!
4

Aether Jones @TessaSickKent · Feb 27
Replying to @bne_lordmayor
My 4 year olds minecraft makes more sense
4

Glenise Clelland @ArtyGlen · Feb 27
Replying to @bne_lordmayor
FLOOD MITIGATION PLEASE - What are Gov doing to help those that get flooded business/people/homes - still waiting for compensation from 2011 - not their fault.
1

PLAYTHINGAMAJIG @Playthingamajig · Feb 27
Replying to @bne_lordmayor
High quality 4k map !



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Adrian Schrinner
@bne_lordmayor

Queensland Disaster Management Committee now meeting about impacts in Brisbane and across the State. Will bring you updates as I hear more.

Stay safe!

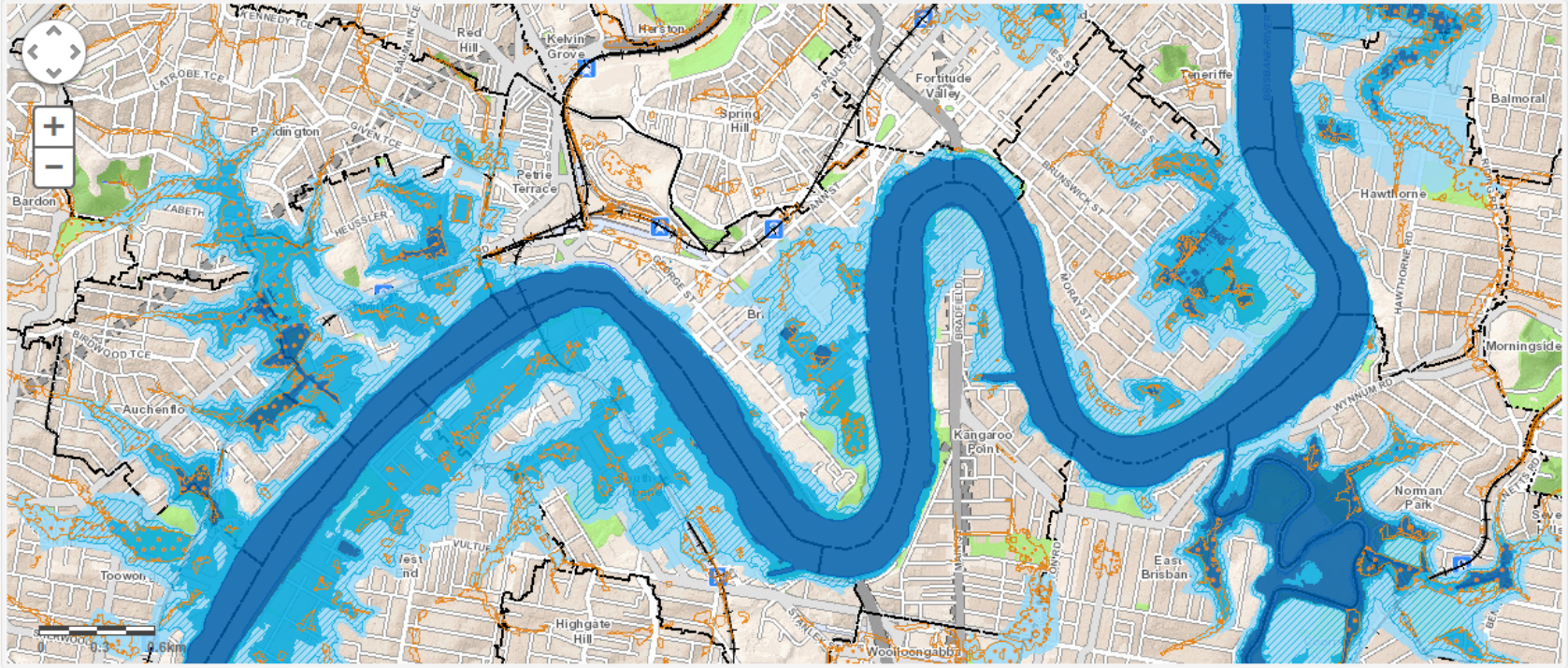
Using the Flood Awareness Map

The Flood Awareness Map has been updated with data from the 2017 Citywide Creek and Overland Flow Path Flood Study.

Brisbane City Council is committed to ensuring it has the latest flood data to help understand flooding in Brisbane and will continue to update the map as new information becomes available.

Click on the buttons below to explore the likelihood of flooding, as well as sources and historic flood events. The map does not show depth or speed of floodwater.

Flood Awareness | Flood Sources | Historic Floods



Understanding Flood

Click the buttons below to explore how flooding affects your property and local area.

The information is based on the latest flood modelling and does not reflect actual recorded flood levels.

Click here for a fact sheet to understand flood likelihood and impacts.

Map legend

Overland flow

River, creek, stormtide

- High likelihood (5.0% Annual Chance)
- Medium likelihood (1.0% Annual Chance)
- Low likelihood (0.2% Annual Chance)
- Very low likelihood (0.05% Annual Chance)

Flood resilient Brisbane

Brisbane is a sub-tropical city built on a floodplain, which means flooding can never be completely prevented. Council and the community share the responsibility to ensure our city is resilient and prepared for flooding. Click here for more information on what you can do to be prepared and to find out what Council is doing to ensure Brisbane is safe, confident and ready for flooding.

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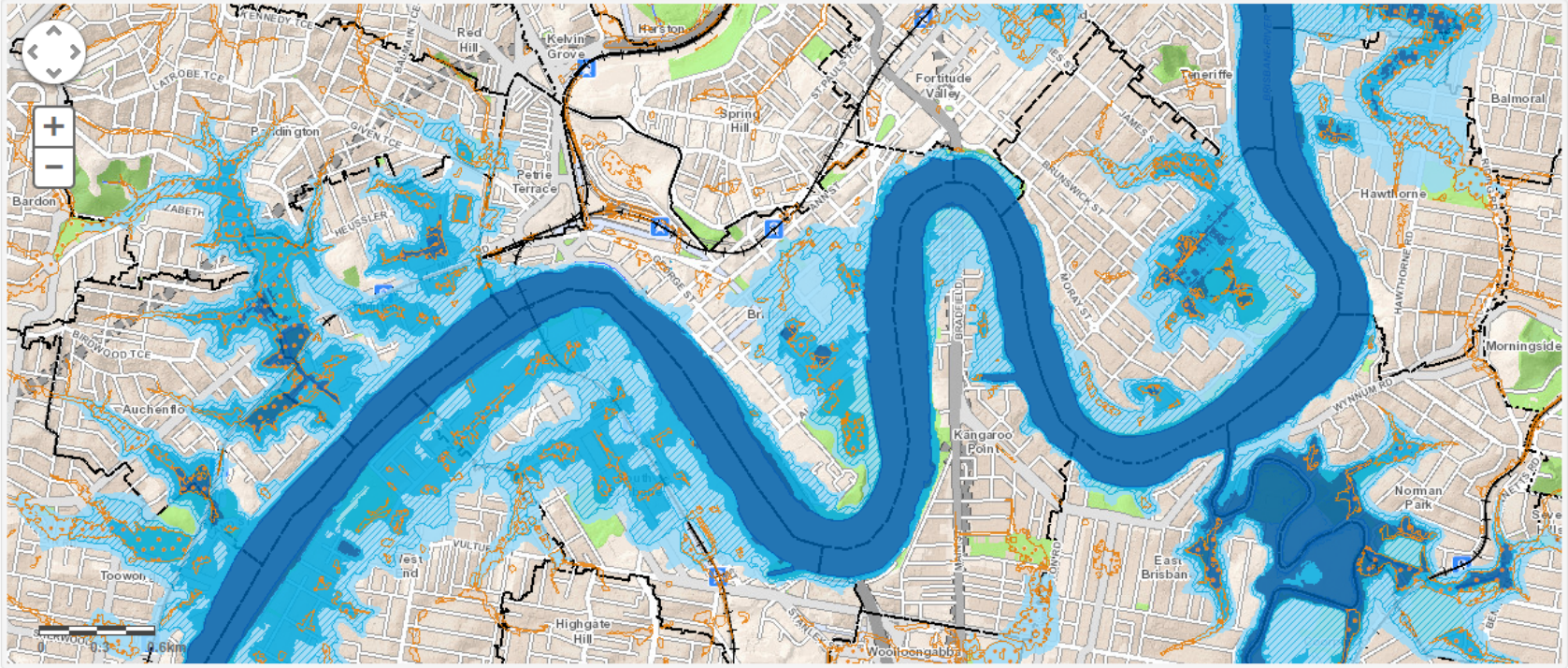

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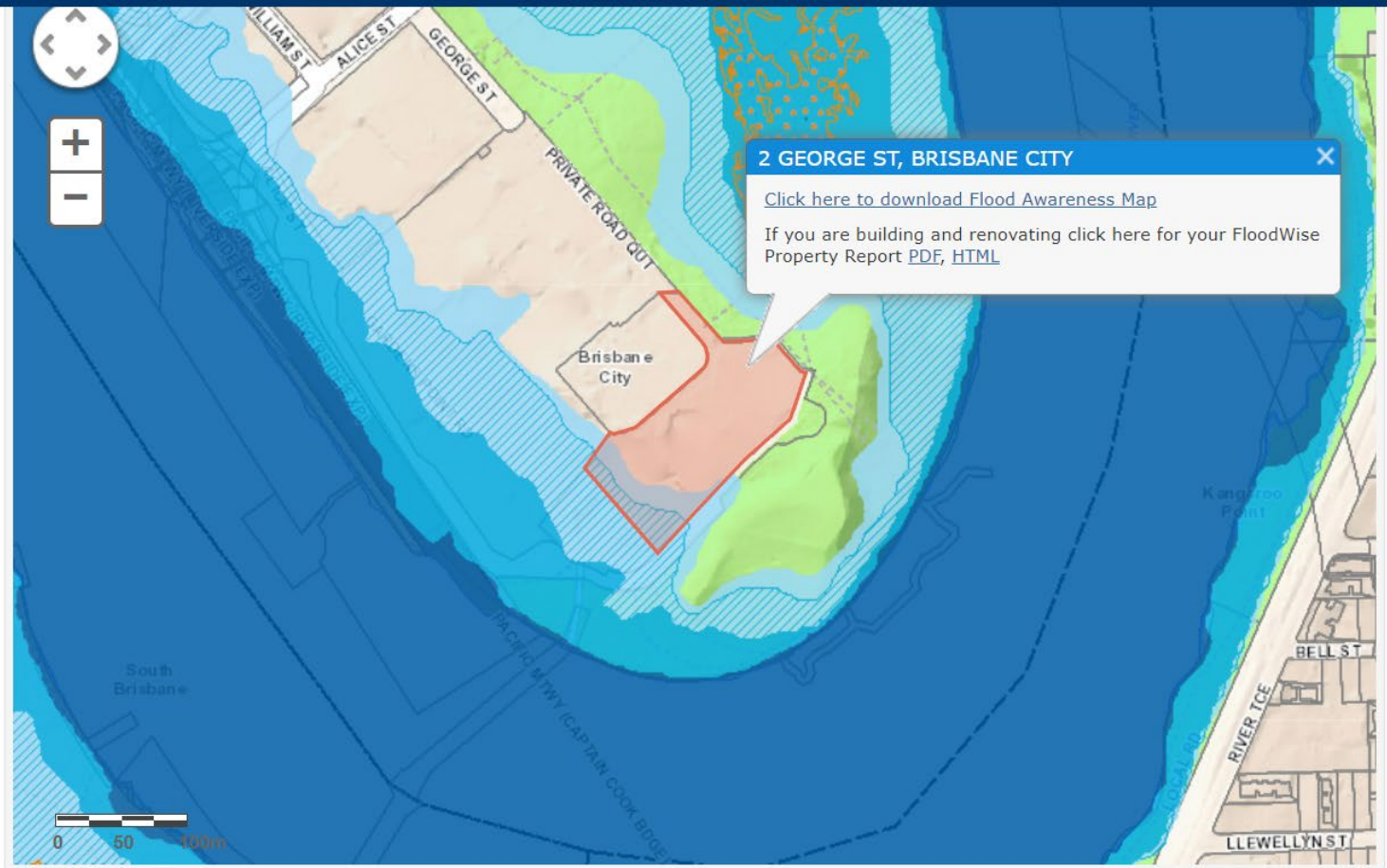
Brisbane City Council
Dedicated to a better Brisbane

Flood Awareness Map



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CRICOS No.00213J

The problem

How can we leverage real-time information to provide **useful** flood extent information as the situation unfolds while appropriately communicating **uncertainty**?

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How can we leverage real-time information to provide **useful** flood extent information as the situation unfolds while appropriately communicating **uncertainty**?

Our idea

Create a hub of real-time and predicted flood extent information.

What data were available?

Real-time visualisation:

- River height data
- 25m DEM

Predictions and previous events:

- Flood prediction PDF
- Previous flood extent satellite imagery
- Flood awareness map shapefiles

IDQ60286

Latest River Heights for the Brisbane, Pine, Caboolture Rivers and tributaries

Issued at 2.40pm on Monday, 27 June 2022

About river heights | About this table | Flood Warning Centre | Rain and River Data

Stanley/Upper Brisbane | Lower Brisbane | Ipswich/Brisbane Creeks | Lower Brisbane | Ipswich/Brisbane Creeks | Pine/Caboolture

Station Name	Time/Day	Height	Tendency	Crossing	Flood Class	Recent Data
Stanley/Upper Brisbane						
Stanley R at Peachester *	1.00pm Mon	0.57	steady		below minor	Plot | Table
Stanley R at Woodford-1 #	2.29pm Mon	1.90	steady	4.20 below Bridge	below minor	Plot | Table
Stanley R at Woodford-2 #	1.36pm Mon	1.97	steady	4.13 below Bridge	below minor	Plot | Table
Stanley R at Woodford *	1.00pm Mon	1.91	steady	4.19 below Bridge	below minor	Plot | Table
Kilcoy Ck d/s Mt Kilcoy Weir *	1.00pm Mon	0.87	steady			Plot | Table
Stanley R at Somerset Dam HW #	2.19pm Mon	97.24	steady	0.24 above Full Supply	below minor	Plot | Table
Stanley R at Somerset Dam HW *	12.00pm Mon	97.25^	steady		below minor	Plot | Table
Cooyar Ck at Cooyar-Kooralgin Rd *	1.25pm Mon	0.24	steady			Plot | Table
Cooyar Ck at Cooyar Ck *	1.00pm Mon	1.02	steady			Plot | Table
Cooyar Ck at Cooyar Ck #	2.27pm Mon	1.04	steady		below minor	Plot | Table
Brisbane R at Linville #	1.09pm Mon	0.55	falling		below minor	Plot | Table
Brisbane R at Linville *	2.00pm Mon	0.54	steady		below minor	Plot | Table
Brisbane R at Devon Hills #	12.46pm Mon	1.42	steady		below minor	Plot | Table
Emu Ck at Boat Mountain #	1.33pm Mon	1.08			below minor	Plot | Table
Emu Ck at Boat Mountain *	2.00pm Mon	0.99	steady		below minor	Plot | Table
Maronghi Ck at Glendale *	2.00pm Mon	1.20	steady			Plot | Table
Brisbane R at Gregor Ck-1 #	3.31am Mon	1.56	steady		below minor	Plot | Table
Brisbane R at Gregor Ck-2 #	2.13pm Mon	1.54	steady		below minor	Plot | Table
Brisbane R at Gregor Ck *	2.00pm Mon	1.54	steady		below minor	Plot | Table
Cressbrook Ck at Cressbrook Dam #	2.29pm Mon	281.22	steady	1.22 above Spillway		Plot | Table
Cressbrook Ck at Rosentreters Br #	11.44am Mon	1.42	steady		below minor	Plot | Table
Cressbrook Ck at Rosentreters Br *	2.00pm Mon	1.41	steady		below minor	Plot | Table
Reedy Ck at Mt Byron *	2.00pm Mon	0.38	falling			Plot | Table
Esk Ck at Falls Rd *	2.00pm Mon	1.84	steady			Plot | Table
Brisbane R at Wivenhoe Dam	9.00am Mon	65.81	steady			Plot | Table
Brisbane R at Wivenhoe Dam HW #	1.34pm Mon	65.80	steady			Plot | Table
Brisbane R at Wivenhoe Dam HW *	12.15pm Mon	65.81^	falling			Plot | Table
Brisbane R at Wivenhoe Dam TW #	11.46am Mon	27.46	steady			Plot | Table
Brisbane R at Wivenhoe Dam TW *	12.05pm Mon	27.47^	steady			Plot | Table

IDQ65389

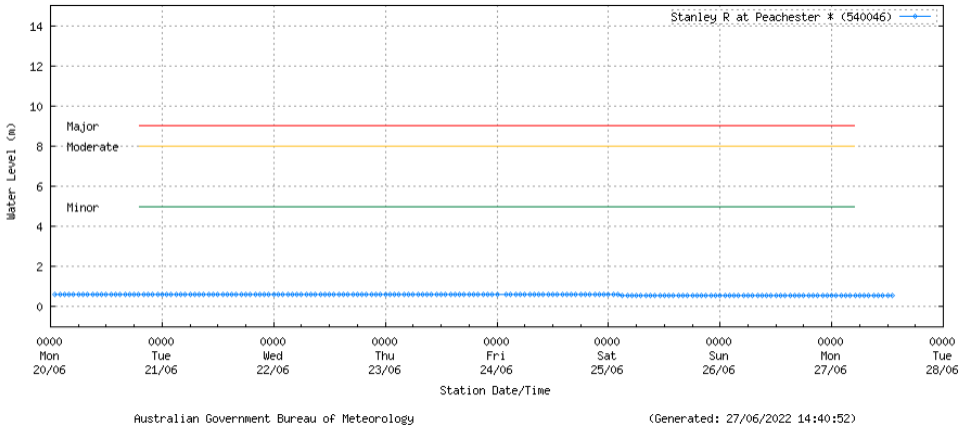
Latest River Heights for Stanley R at Peachester *

Issued at 2:40 pm EST Monday 27 June 2022

About river height plots | About this Plot

Station details: Station Number: 540046 Name: Stanley R at Peachester * Owner: DRDMW:143303
Flood levels: Minor: 5.00 Moderate: 8.00 Major: 9.00

Data from the previous 7 days.



Data as Table | Previous Station | Next Station | Back to Bulletin

About this plot

1. The river height data is the latest available operational data provided for flood warning purposes and has not been quality controlled.

Latest River Heights for Stanley R at Peachester *

Issued at 9:41 am EST Tuesday 28 June 2022

About river heights | About this table

Station details: Station Number: 540046 Name: Stanley R at Peachester * Owne
Flood levels: Minor: 5.00 Moderate: 8.00 Major: 9.00

Data from the previous 7 days.

Station Date/Time	Water Level (m)
21/06/2022 01:00	0.63
21/06/2022 02:00	0.63
21/06/2022 03:00	0.63
21/06/2022 04:00	0.63
21/06/2022 05:00	0.63
21/06/2022 06:00	0.63
21/06/2022 07:00	0.62
21/06/2022 08:00	0.62
21/06/2022 09:00	0.62
21/06/2022 10:00	0.62
21/06/2022 11:00	0.62
21/06/2022 12:00	0.62
21/06/2022 13:00	0.62
21/06/2022 14:00	0.62
21/06/2022 15:00	0.62
21/06/2022 16:00	0.62
21/06/2022 17:00	0.62
21/06/2022 18:00	0.62
21/06/2022 19:00	0.62
21/06/2022 20:00	0.62
21/06/2022 21:00	0.62
21/06/2022 22:00	0.62
21/06/2022 23:00	0.62
22/06/2022 00:00	0.62
22/06/2022 01:00	0.62
22/06/2022 02:00	0.62
22/06/2022 03:00	0.62
22/06/2022 04:00	0.62

Date: 05/01/2022 SECTION 1 Page: 1

INDEX OF QUEENSLAND FLOODWARN RAINFALL STATIONS

Station No	Station Name	Basin Name	Latitude (ddmmss)	Longitude (dddmmss)
544070	ABBIEGLASSIE AL	CONDAMINE-BALONNE	271731S	1472902E
539218	ABERCORN ALERT	BURNETT	250745S	1510750E
039319	ABERCORN TM	BURNETT	250745S	1510750E
032174	ABERGOWRIE ALERT	HERBERT	182920S	1455611E
532028	ABERGOWRIE BRIDGE ALERT	HERBERT	183052S	1460002E
532006	ABERGOWRIE TM	HERBERT	182920S	1455611E
530033	ABINGDON DOWNS TM	GILBERT	175359S	1431518E
541090	ACCOMMODATION CREEK ALERT	BORDER RIVERS	284829S	1515011E
541076	ACCOMMODATION CREEK TM	BORDER RIVERS	284822S	1514946E
540157	ADAMS BRIDGE ALERT	BRISBANE	274946S	1523039E
540068	ADAMS BRIDGE TM	BRISBANE	274952S	1523035E
544056	ADAVALE ROAD ALERT	WARREGO	261935S	1460552E
040881	AIR SEA RESCUE ALERT	SOUTH COAST	275709S	1532527E
532111	AITKENVALE ALERT	ROSS	191741S	1464617E
530044	ALBA TM	FLINDERS	210353S	1440101E
540467	ALBANY CREEK AL	PINE	272103S	1525927E
540239	ALDERLEY ALERT	BRISBANE	272526S	1530011E
544069	ALICE DOWNS AL	WARREGO	262447S	1465313E
544068	ALLAMBIE AL	PAROO	265412S	1452109E
535118	ALLANDALE ALERT	COOPER CREEK	241810S	1460045E
532034	ALLIGATOR CREEK ALERT	ROSS	192313S	1465728E
539220	ALLIGATOR FLATS ALERT	BAFFLE	242043S	1513556E
041516	ALLORA TM	CONDAMINE-BALONNE	280160S	1520100E
539116	ALMA CK BORE TM	FITZROY	235708S	1501438E
029000	ALMORA STATION	NICHOLSON	181743S	1391658E
037000	ALNI	DIAMANTINA	220915S	1422924E
531093	ALOOMBA TM	MULGRAVE-RUSSELL	170657S	1455016E
544080	ALROY CROSSING TM	PAROO	274820S	1444228E
040816	AMBERLEY (DNRM) TM	BRISBANE	273957S	1524156E
540180	AMBERLEY ALERT-P	BRISBANE	274042S	1524156E
541079	AMIENS KNOB ALERT	BORDER RIVERS	283622S	1514903E
539133	AMPTHILL ALERT	BAFFLE	244206S	1515118E
533197	ANDERGROVE ALERT	PIONEER	210555S	1491040E
044001	ANGELLALA DOWNS HOMESTEAD	WARREGO	260104S	1470148E
532108	ANNANDALE ALERT	ROSS	191846S	1464711E
533198	ANTONEYS CROSSING ALERT	PLANE	211347S	1485658E
532029	APLIN WEIR ALERT	ROSS	191814S	1464649E
544031	ARABELLA ALERT	WARREGO	262601S	1462731E
535200	ARCADIA VALLEY SCHOOL ALERT	FITZROY	251519S	1484919E

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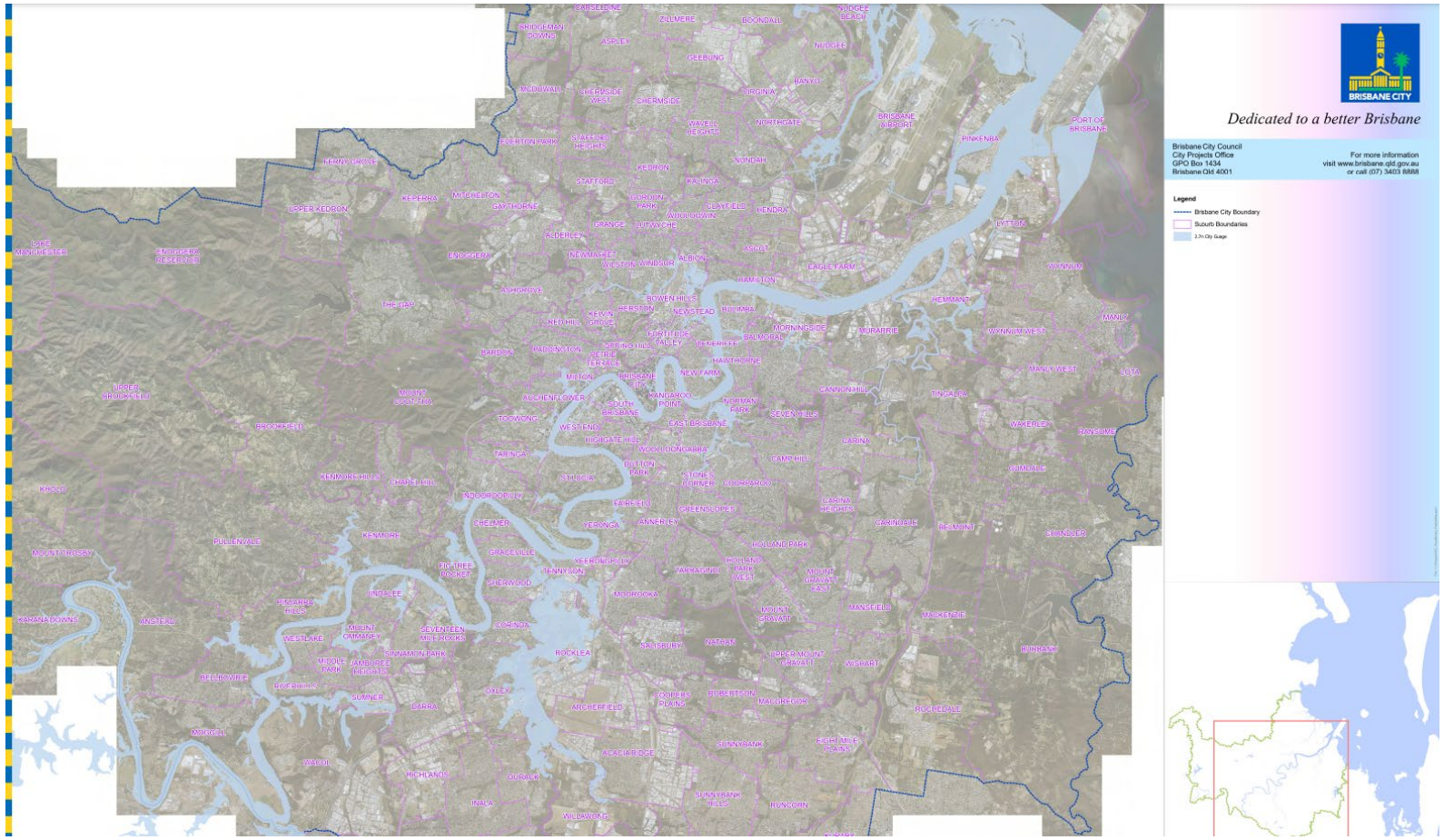
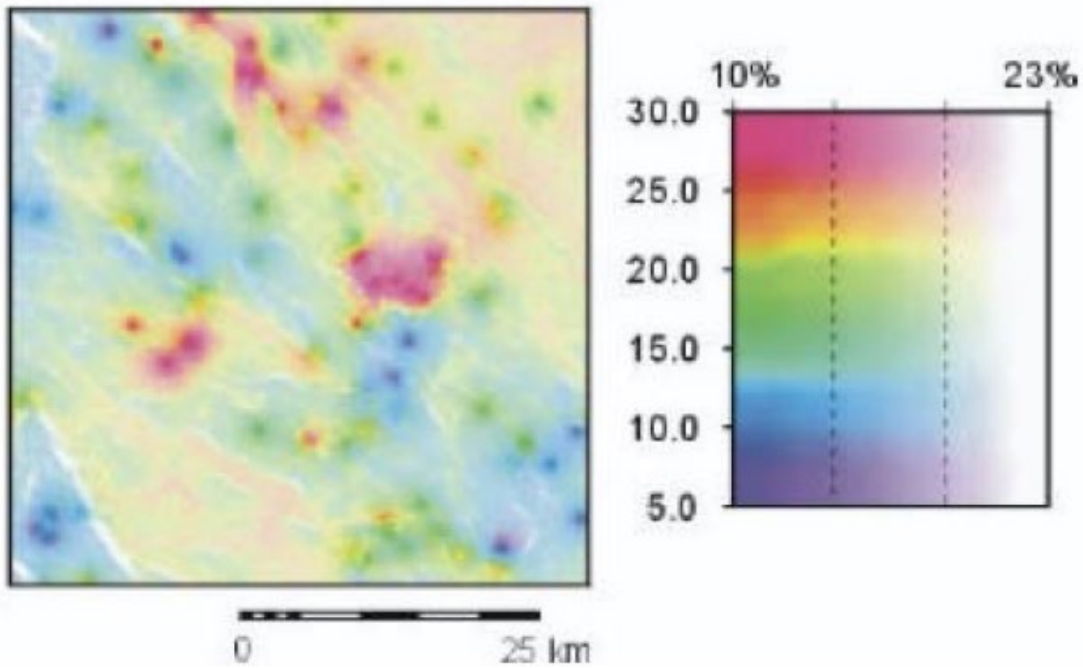
Georeference and rasterize the 2022 forecast

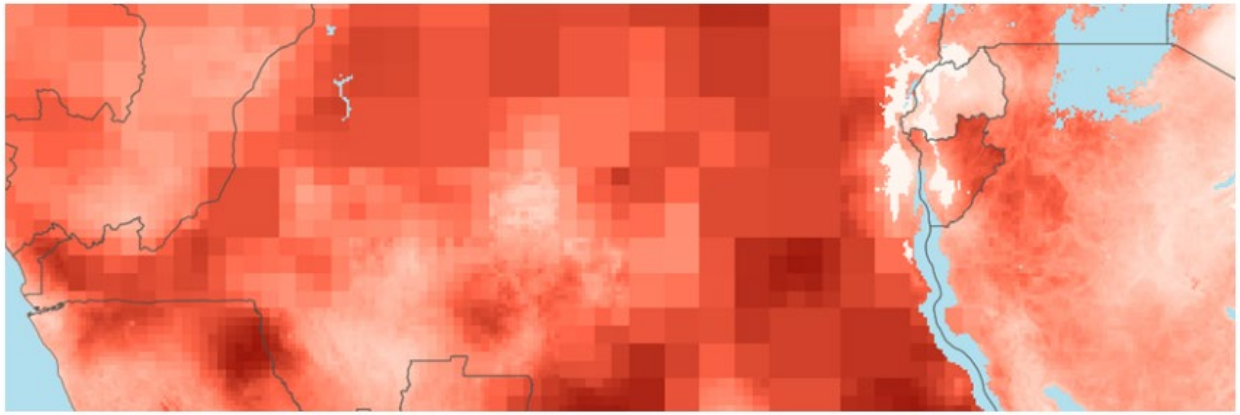


CRICOS No.00213J

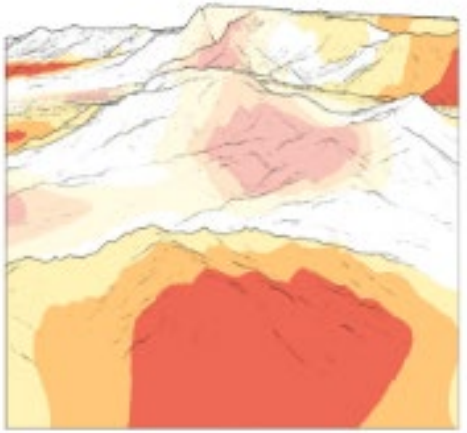
Incorporate uncertainty visualisation techniques



Visser, H., Petersen, A. C., Beusen, A. H. W., Heuberger, P. S. C., & Janssen, P. H. M. (2006). Guidance for uncertainty assessment and communication. Report, 550032001, 2006.

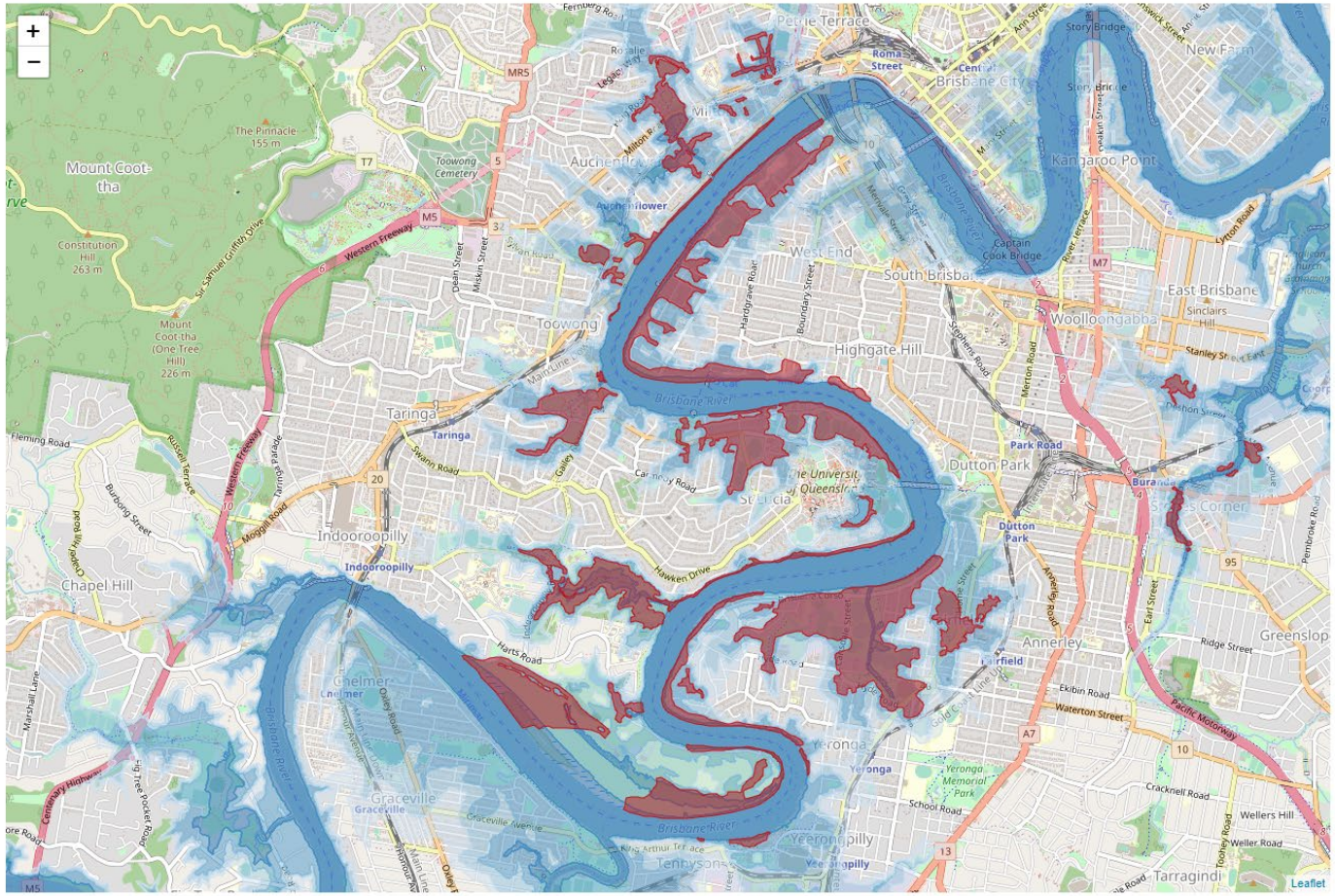


https://www.lancaster.ac.uk/data-science-of-the-natural-environment/blogs/visualising-spatial-uncertainty



Dübel, S., Röhlig, M., Tominski, C. and Schumann, H., 2017, February. Visualizing 3D terrain, geo-spatial data, and uncertainty. In *Informatics* (Vol. 4, No. 1, p. 6). MDPI.

Our solution: a web-based, interactive platform to present real-time predictions



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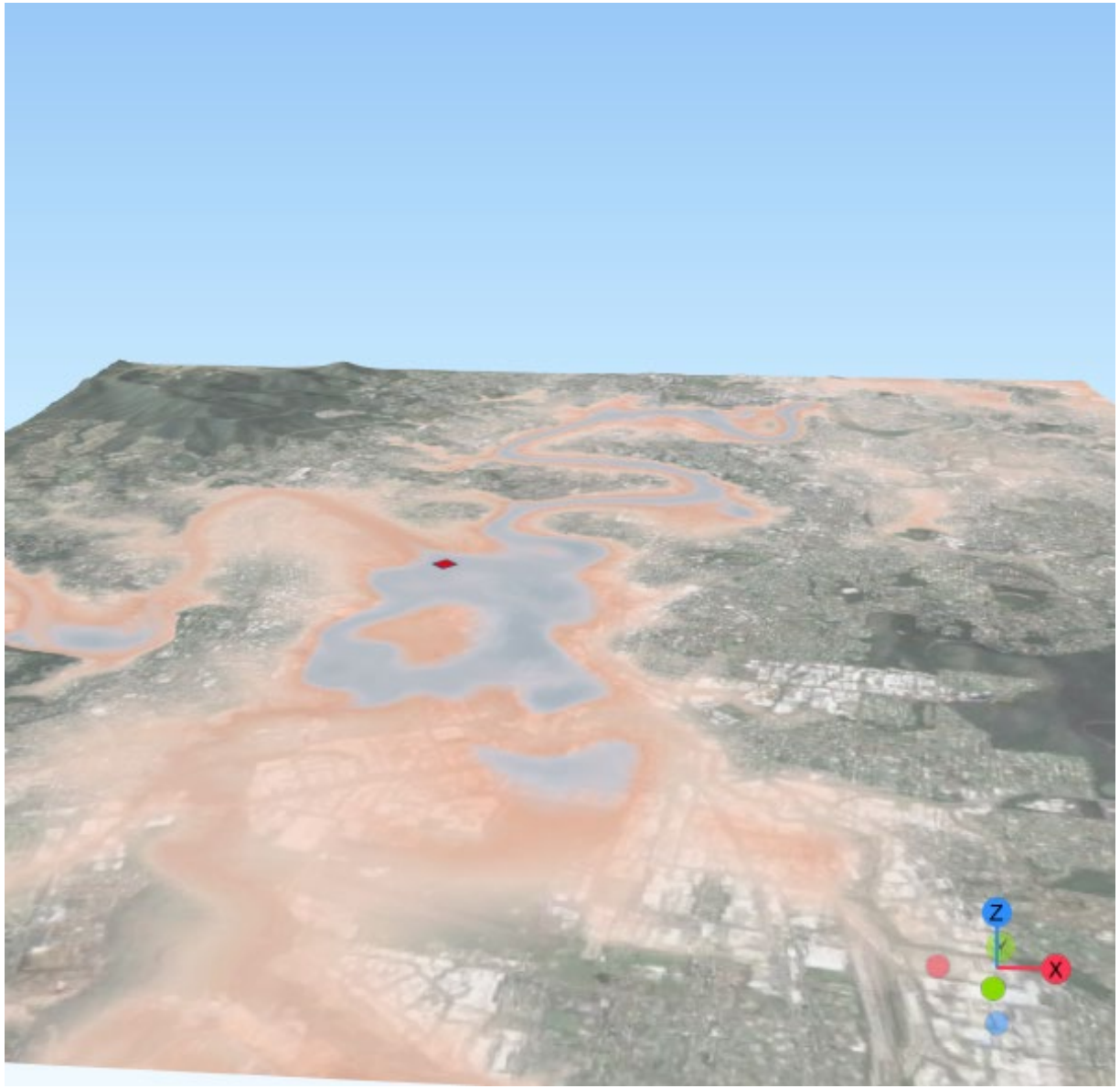

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Take-home message

- We should use available real-time data to update predictions of flood extent

- Flood maps should be:
  - Interactive
  - Easily interpretable
  - Updated regularly
  - Representing uncertainty