Building a Flood Resilient

Brany Iezzi & Ouswatta Perera
Flood Policy and Planning
Brisbane City Council

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Overview

- History
  - Historical flood planning and development snap shot
  - January 2011 Flood
- FloodSmart Future Strategy
  - The Why and What of the FloodSmart Future Strategy
- The Four floodplain risk management tools
  - Smart Planning & Building
  - Well Maintained & Improved Structural Assets
  - World Class Response and Recovery
  - Educated & Resilient Community
- Opportunities
- Conclusion

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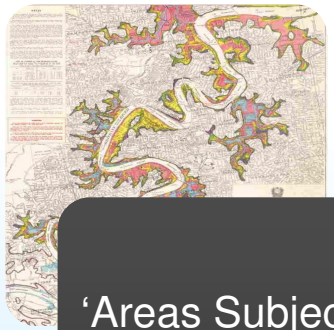
Over 50 years of flood information

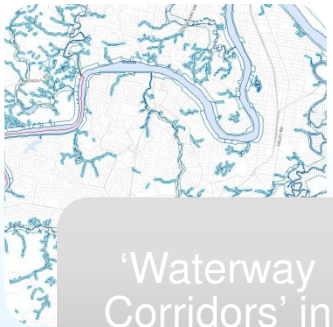
- 1960's — Records of flood levels
- 1970's — Computer models of creeks
- 1980's — First flood maps from historical events
- 1990's — Flood studies and FRLs
- 2000's — GIS flood information

'Drainage Problem Areas' in first Town Plan



'Areas Subject to Flooding' in the Town Plan

'Brisbane Waterways' Policy and Flood Regulation Lines



'Waterway Corridors' in City Plan and Defined Flood Levels

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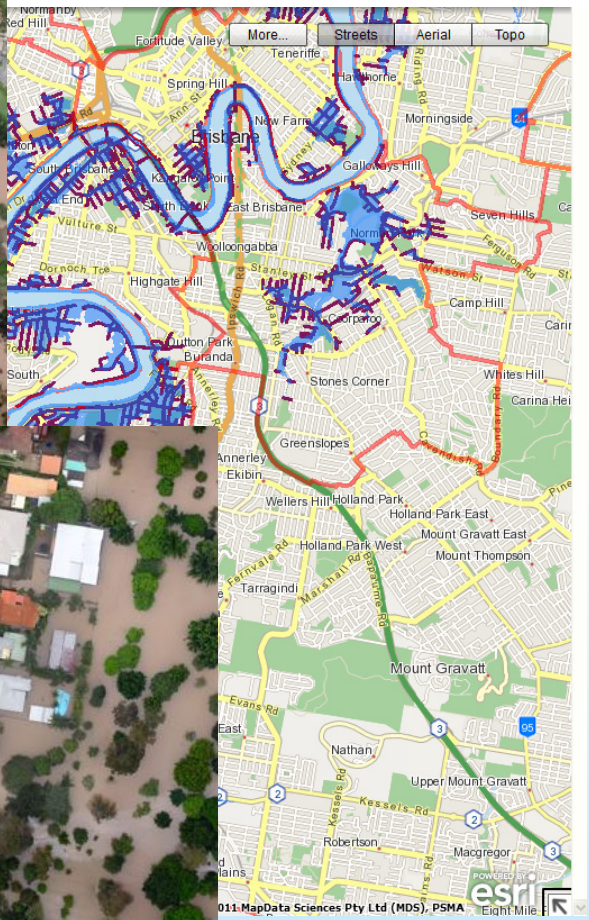
2011 Brisbane River Flood



- 22,000 homes flooded
- 7,600 businesses inundated
- Extensive damage to
  - Infrastructure, assets, waterways
  - Parks
  - Community areas

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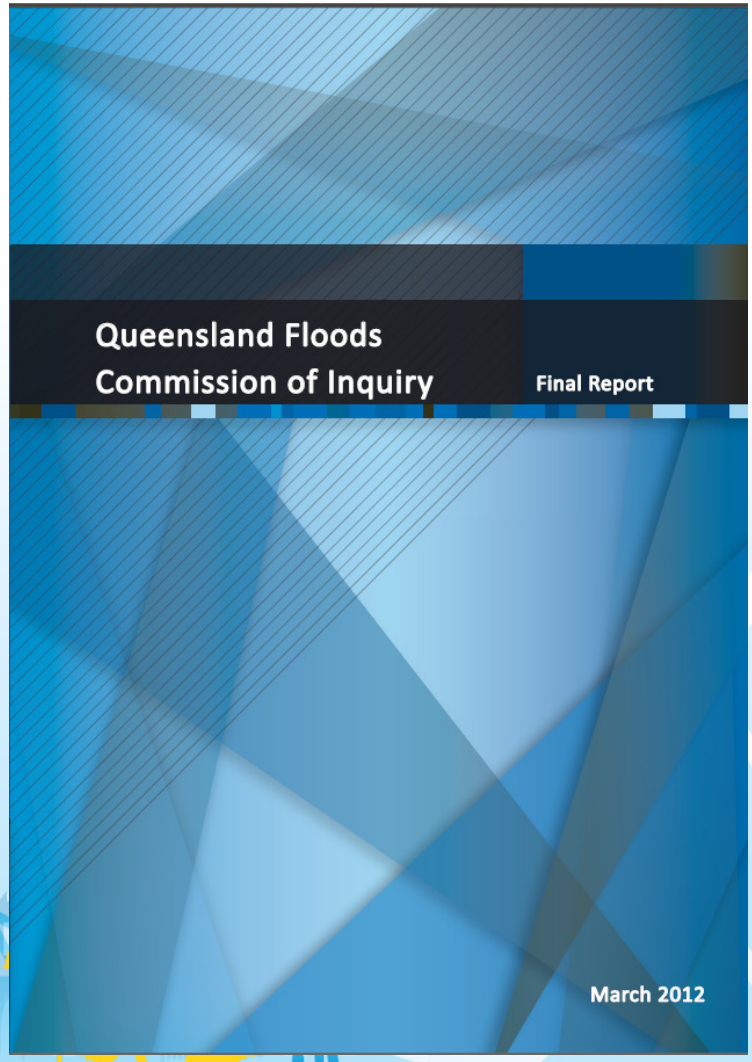
2011 Brisbane River Flood

Harnessing Community Spirit – A Flood of Volunteers – 'Mud Army'

- The Lord Mayor called for volunteers to help clean up. 6,000 turned up the first day and 6,000 the day after
- People pitched in to help others in need.

- Volunteers were everywhere and made a difference to the people who had been flooded

Queensland Floods Commission



- 175 Interim recommendations
- 177 Final recommendations
- 124 recommendation's for Council
  - Floodplain management
  - Planning and building
  - Operational and abandoned mines
  - Emergency response and dam management

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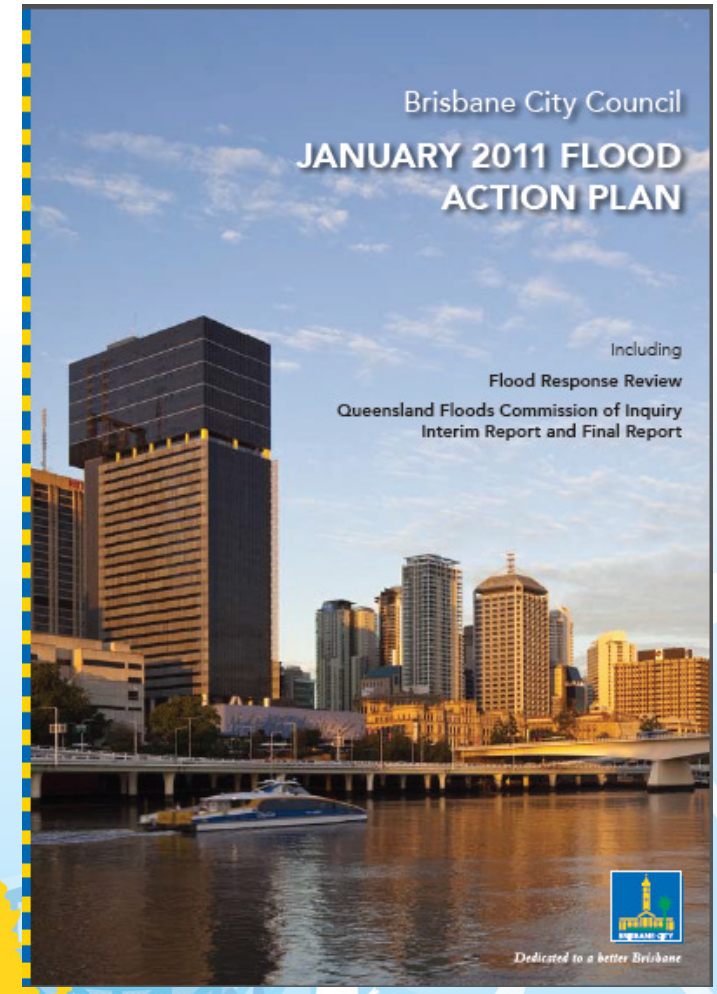
Councils Flood Action Plan



- Response to
  - Qld Floods Commission of Inquiry
  - Internal Flood Response Review Board Actions
  - Total Actions 177

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A long history of flood management

Lord Mayors Taskforce on Suburban Flooding

In February 2005, the Lord Mayor and Civic Cabinet established the Lord Mayor's Taskforce on Suburban Flooding to look at all possible ways of reducing the impacts of creek flooding. The taskforce provided professional recommendations on how to minimise the impact that significant rain can cause in flood-prone areas. Council has been implementing the taskforce report recommendations with a massive funding commitment of $292 million over six years.

Flood Flag Map

The Flood Flag Map, incorporating overland flow, was introduced to Council's website in 2009. The map indicates Brisbane areas that are at risk of flooding from river, creek, storm tide or overland flow paths. Over 150,000 flood flag maps were downloaded in 2011. The maps are free and available on Council's website or by contacting Council directly.

Early Warning Alert Service

Council provides Brisbane residents with a free severe weather alert that includes notice of severe thunderstorms, destructive winds and potential flooding. The alerts are location-based, so residents only receive warnings if their registered residential address may be impacted. Alerts are sent by email and can also be sent by SMS and a recorded message to a nominated landline.

Visit www.brisbane.qld.gov.au/earlywarning to register for email, home phone or SMS updates in case of an emergency.

Over the past five years Council has invested $600 million towards flood management:

- Extensive pipes and drainage works.
- Backflow devices .
- Flood information online for residents and businesses.
- Lord Mayor's Taskforce on Suburban flooding.

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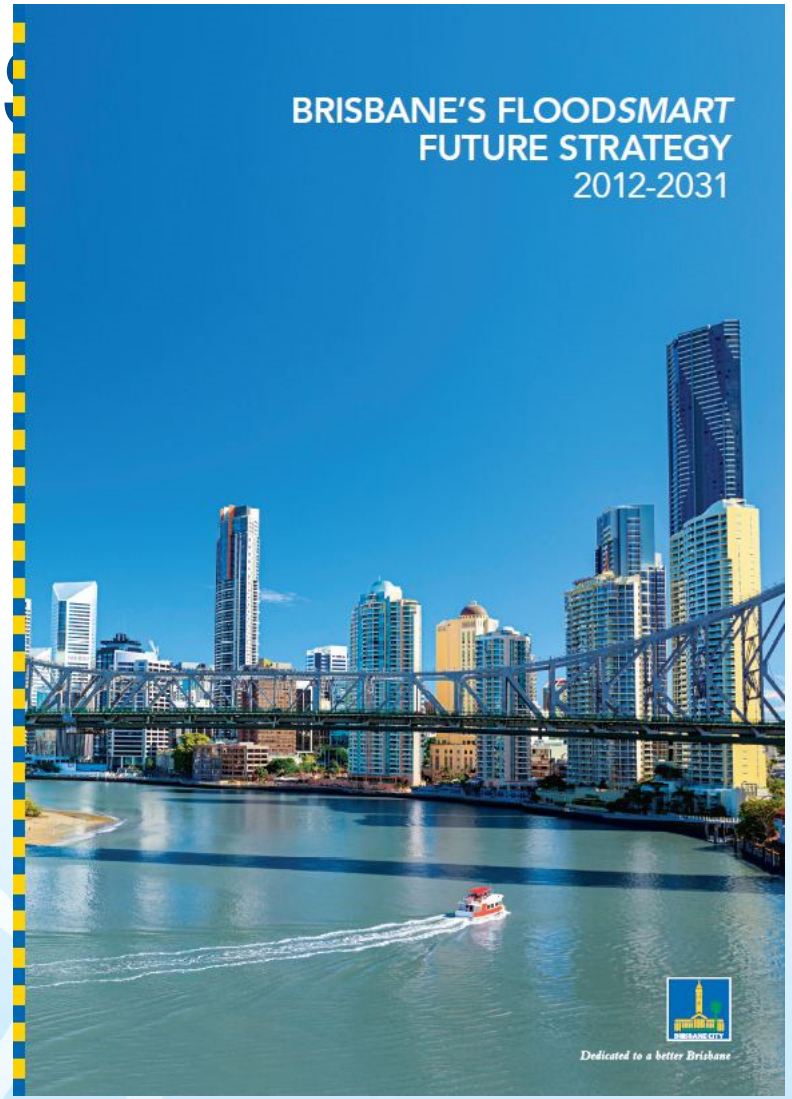
Flood*Smart* Future S

- A Flood*Smart* Future Strategy is part of Council's long standing commitment and plan to manage the risks of flooding.
- It focusses on Brisbane as a city that is **safe**, **confident** and **ready**.



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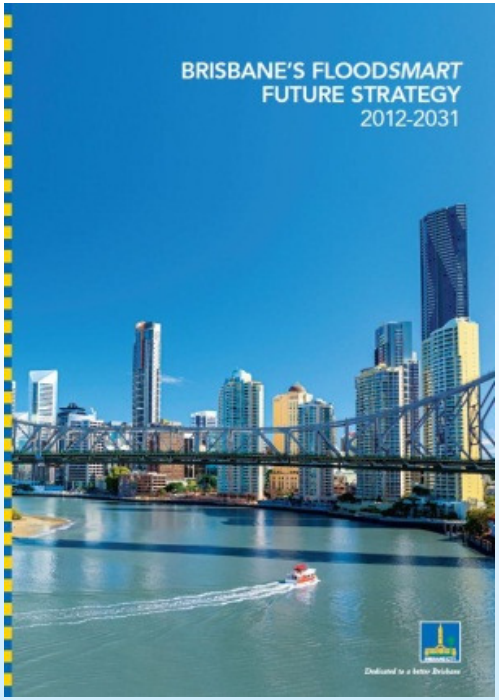
A Flood*Smart* Future

- Flooding is complex, technical and often difficult to explain
- Flooding is also a natural part of living in a sub-tropical climate



We wanted to communicate a **story.**

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Flood*Smart* Future Strategy

Vision - simple message in a short and easily remembered phrase:

"Living with flooding in our city – we are safe, confident, ready"

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The vision was supported by four ‘shared principles’

i.Protecting people’s ***lives, property and well-being*** is a key priority.

ii.Balancing social, economic and environmental objectives promotes the ***responsible development*** of the city appropriate to the risk of flooding.

iii.A ***long-term perspective*** of flooding provides both a consistent direction and ***flexibility*** to adapt to emerging hazards and opportunities.

iv.Integrated use of the flood risk management tools and ***working together with the community*** and agencies will achieve optimal outcomes.

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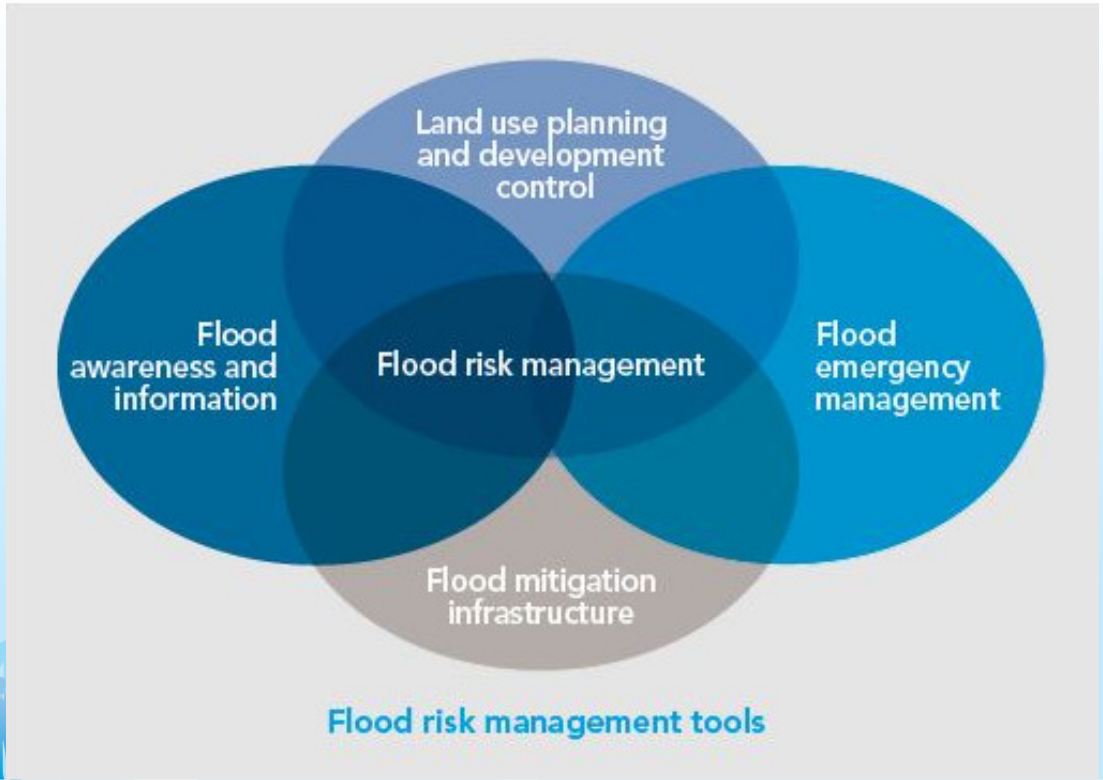
An integrated mix of measures

- Structural flood mitigation
- A hazard-based approach to land use planning
- Providing good quality flood information
- World-class emergency management.



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What is Flood Risk Management?

1. **Identify & analyse risk** for a full range of flood events including; Creek, River, Storm Tide Overland Flow and Sea Level Rise.

Understand flooding: levels, velocity, depth & probability

Understand consequences:

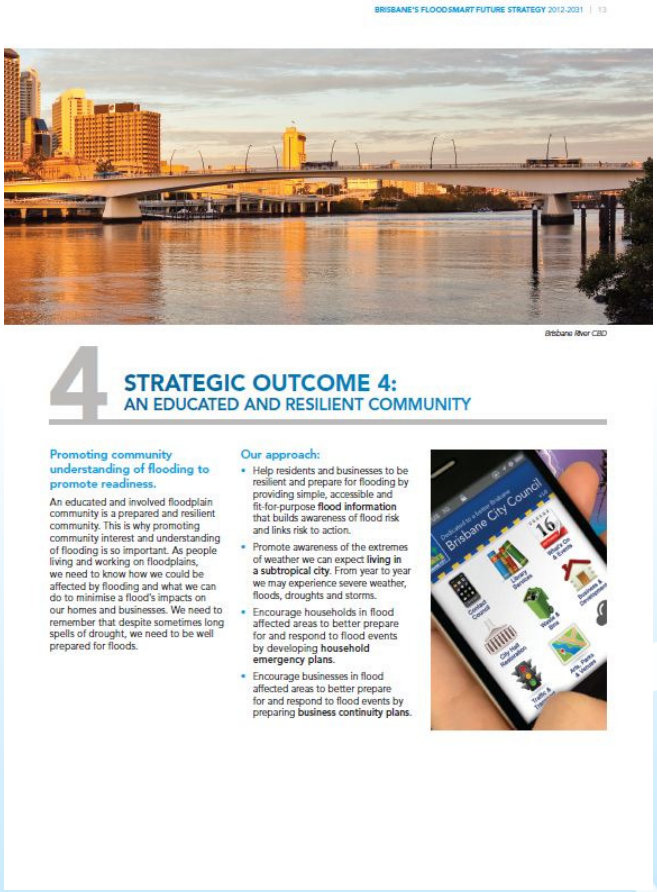
number of people, vulnerability, damages

2. **Identify & implement a range of management measures** to manage risk.

- **Land Use Planning and Building and Development**
- **Flood Mitigation Work**
- **Flood Awareness, Education & Adaptation**
- **Disaster Response**

Source: SCARM, Floodplain Management in Australia Best Practice Principles & Guidelines, 2000, pg V

The six strategic outcomes


BRISBANE'S FLOODSMART FUTURE STRATEGY 2012-2031 | 13

Brisbane River CBD

4 STRATEGIC OUTCOME 4: AN EDUCATED AND RESILIENT COMMUNITY

Promoting community understanding of flooding to promote readiness.

An educated and involved floodplain community is a prepared and resilient community. This is why promoting community interest and understanding of flooding is so important. As people living and working on floodplains, we need to know how we could be affected by flooding and what we can do to minimise a flood's impacts on our homes and businesses. We need to remember that despite sometimes long spells of drought, we need to be well prepared for floods.

Our approach:

- Help residents and businesses to be resilient and prepare for flooding by providing simple, accessible and fit-for-purpose **flood information** that builds awareness of flood risk and links risk to action.
- Promote awareness of the extremes of weather we can expect **living in a subtropical city**. From year to year we may experience severe weather, floods, droughts and storms.
- Encourage households in flood affected areas to better prepare for and respond to flood events by developing **household emergency plans**.
- Encourage businesses in flood affected areas to better prepare for and respond to flood events by preparing **business continuity plans**.

1. A Risk-based Approach to Flood Management.
2. An Integrated and Adaptive Approach.
3. Smart Planning and Building
4. An Educated and Resilient Community.
5. World Class Response and Recovery.
6. Maintaining and Improving our Structural Assets.

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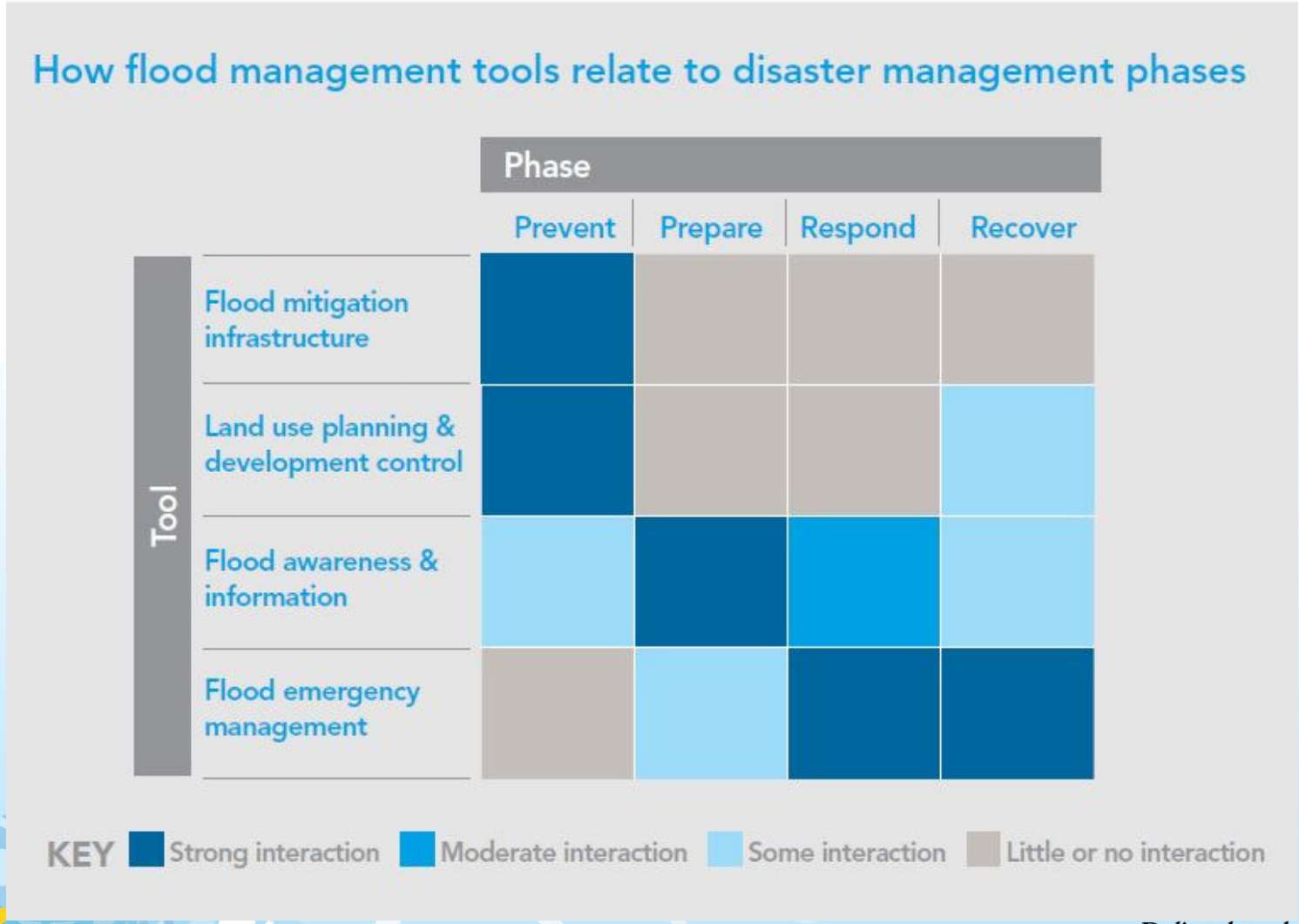
Integration with Disaster Management



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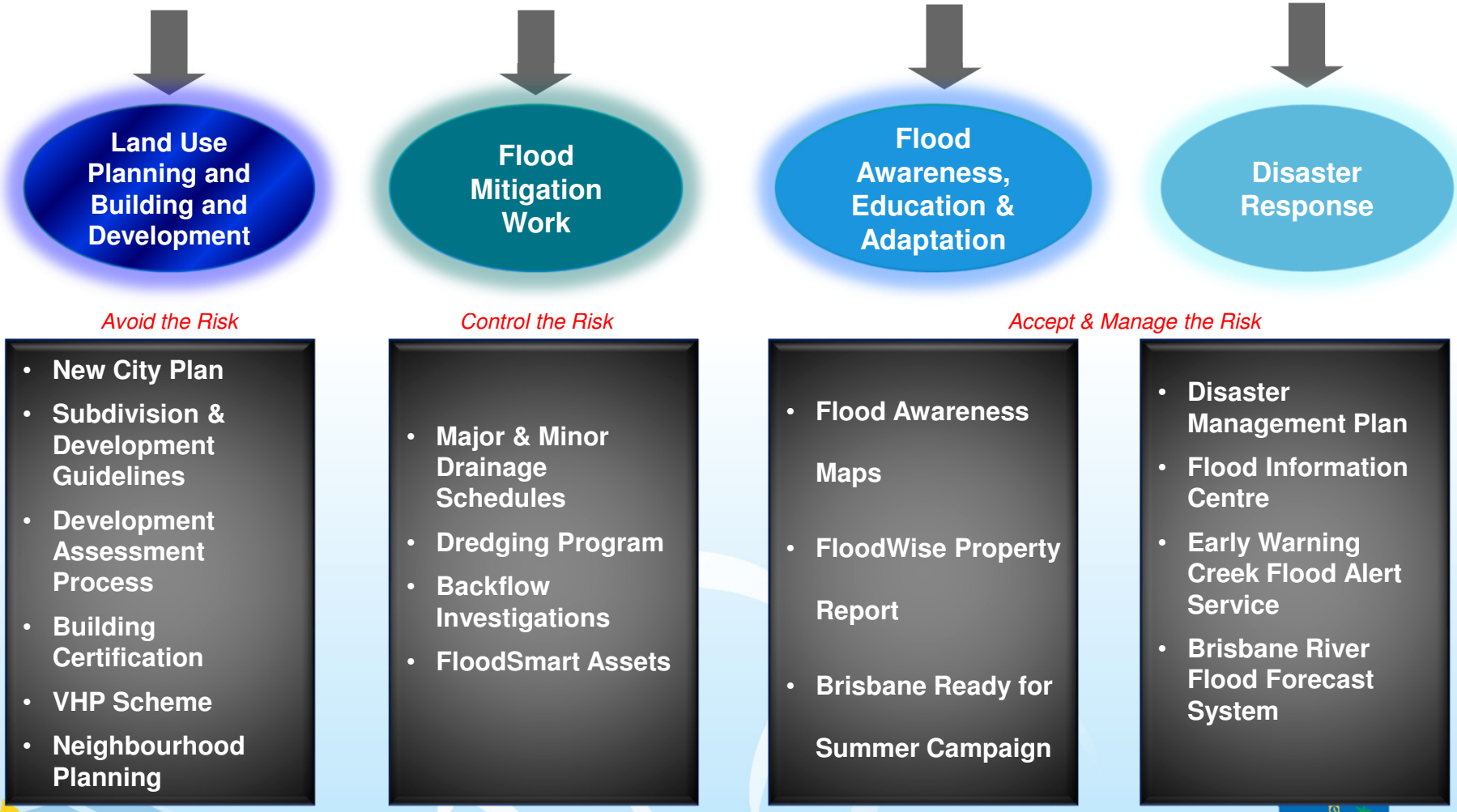
Current Activities



Why we need to be Flood*Smart*

- Enabler for economic growth
- Encourages integrated smart multiple outcome solutions
- Right development in the right place
- Creating a liveable & prosperous City

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Smart Planning and Building

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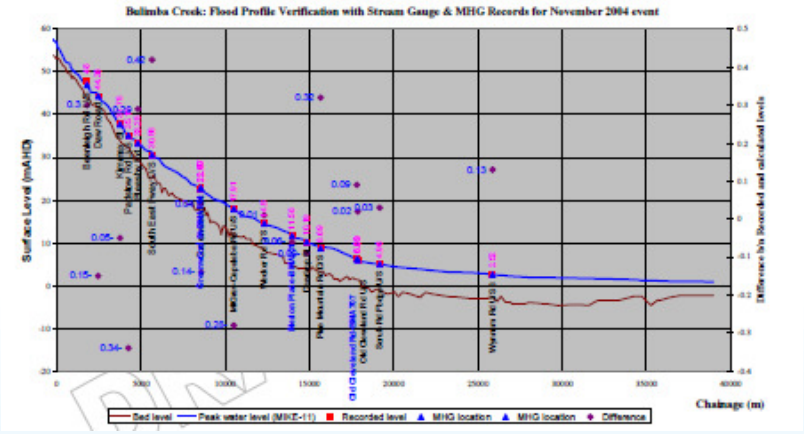
Our Flood Studies and Plans



- Seventeen creek flood studies completed
- Ten draft Catchment Floodplain Management Plans developed

- Contributed to Wivenhoe Dam Optimisation Study and ongoing Brisbane River Flood Studies program
- Completed a coastal study
- Commissioned an innovative approach to modelling overland flow flooding city-wide

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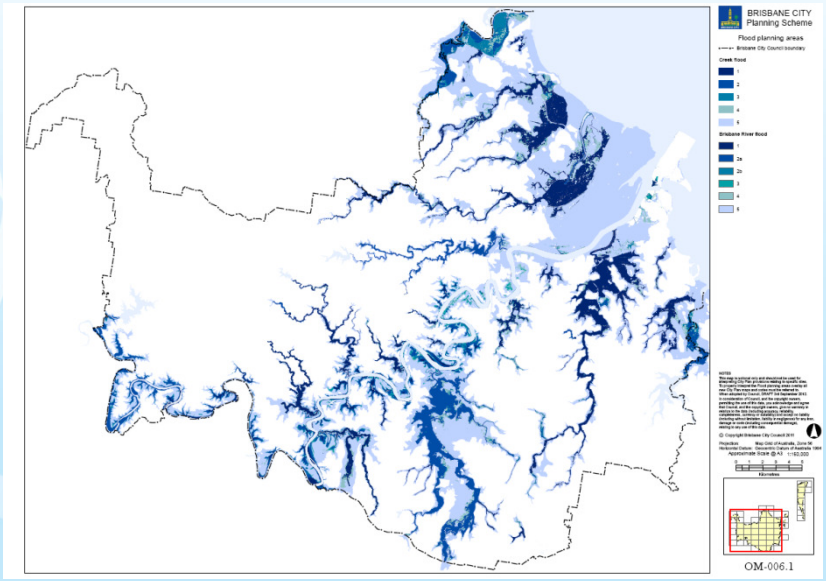
Risk Assessment – Understanding flooding

- Creek, River, overland flow and coastal flooding
- Beyond 1% probability
- Depth and velocity
- Warning times
- Duration of flooding
- Ease of evacuation
- Consideration of coastal hazards - storm tide, future tidal inundation, sea level rise and increased rainfall intensity



Matching Development with Risk.

Flood Planning Area	Description	What does the code mean for development?
1	**FPA1** Flooding is very likely and/or there may be very deep and/or very fast moving water.	Any new development would be subject to the highest development assessment requirements. This area is generally best suited to environmental and recreation uses.
2	**FPA2** Flooding is likely and there may be deep and/or fast moving water.	New development may be subject to additional development requirements to address flood impacts – such as being high-set with specialised stronger building design.
3	**FPA3** Flooding is likely and there may be deep and/or moderate-fast moving water.	New development may be built in this area but may need modifications such as houses being built on stumps.
4	**FPA4** Flooding is likely and there may be shallow and/or slow moving water.	New development that can mitigate flood impacts with slight building modifications may be allowed to be built in this area – such as meeting minimum floor heights.
5	**FPA5** There is no recent history of flooding but there is potential for flooding.	No flood overlay code requirements apply to houses. New development such as essential community services like hospitals may be built in this area – by meeting minimum floor heights.
Local Overland Flow	Water may rise quickly and move with speed but will recede quickly.	Minimum standards for floor heights apply to houses. Other development will be designed to not increase flooding impacts on neighbouring properties.

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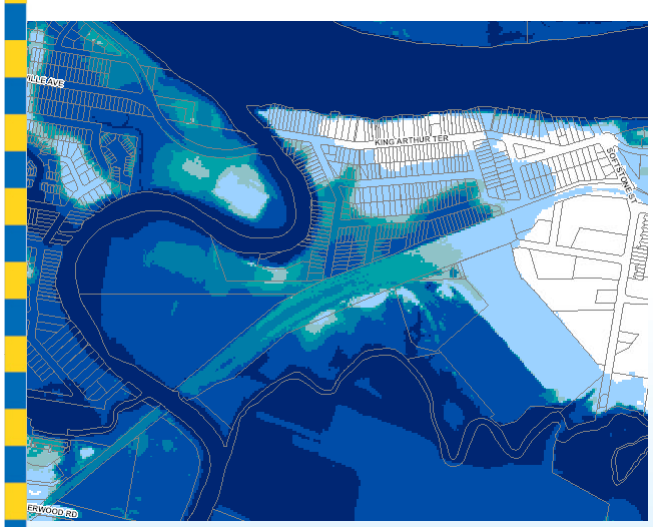
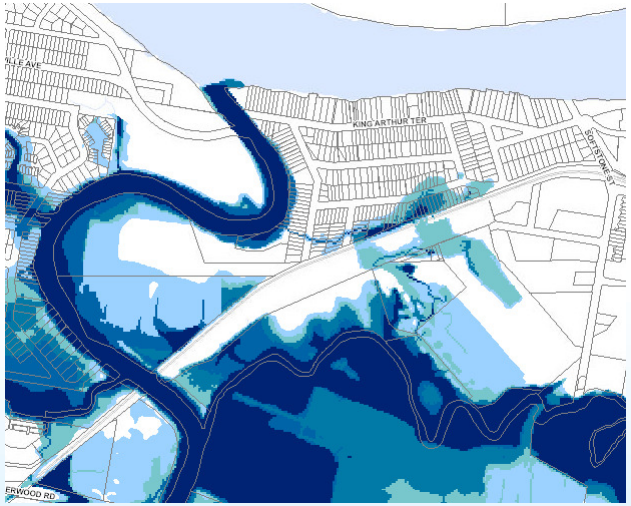
Examples of flood overlay mapping



Brisbane River flood planning area sub-categories



Creek/waterway flood planning area sub-categories

Overland flood planning area sub-category

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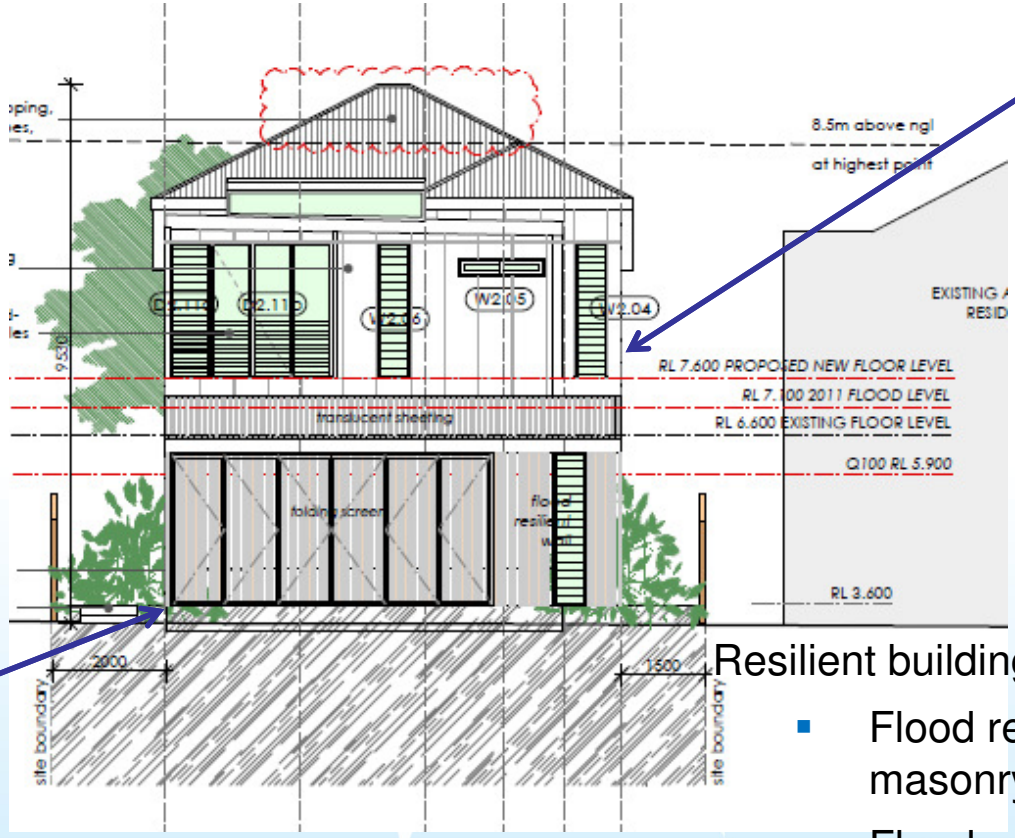
Resilient dwellings



Upstairs areas above flood level

Ground floor rooms not used as habitable rooms

Resilient building materials used e.g.:

- Flood resistant render over masonry block walls
- Flood proof joinery
- Hard wood timbers
- Water resistant flooring

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Well Maintained & Improved Structural Assets

- *Historical focus of flood management*
- *Significant investment in the 1980's following 1974 flood*

Above: Kedron Brook at Gilbert Road. The old timber bridge and narrow channel were subject to frequent flooding.

Below: The same area after mitigation works.

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Well Maintained & Improved Structural Assets

Stormwater Relief Drainage

- *Asset Value of $2.9 billion*
- *2,700km of pipes/culverts*

Investment on Backflow Prevention Devices

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Well Maintained & Improved Structural Assets

Voluntary Home Purchase Scheme

-Voluntary purchase of homes affected by a 50% annual chance creek flood event

-107 properties purchased for over $55 million

-Focus on creek & local flooding

-Previously 30% take up – post flood 100%

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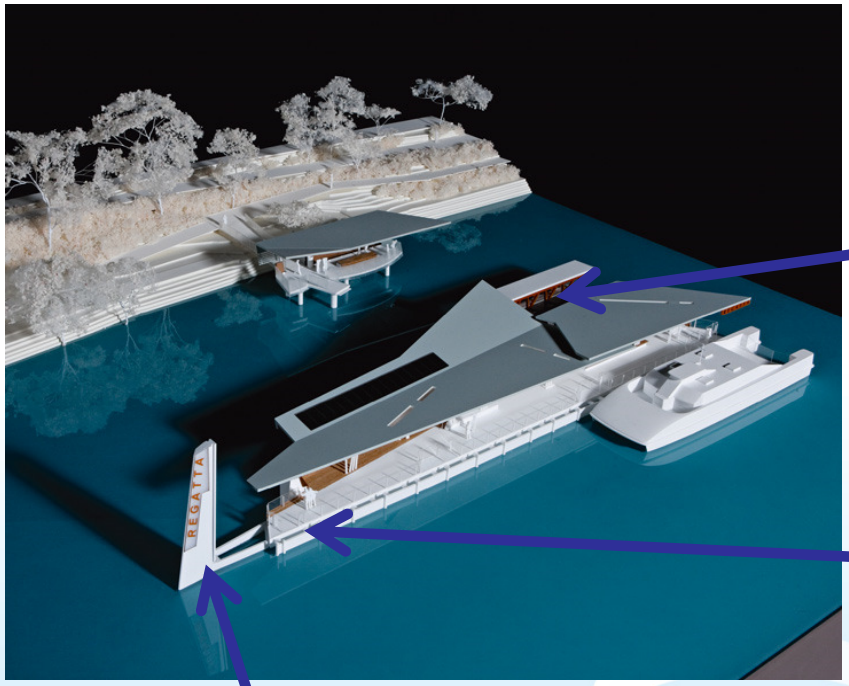
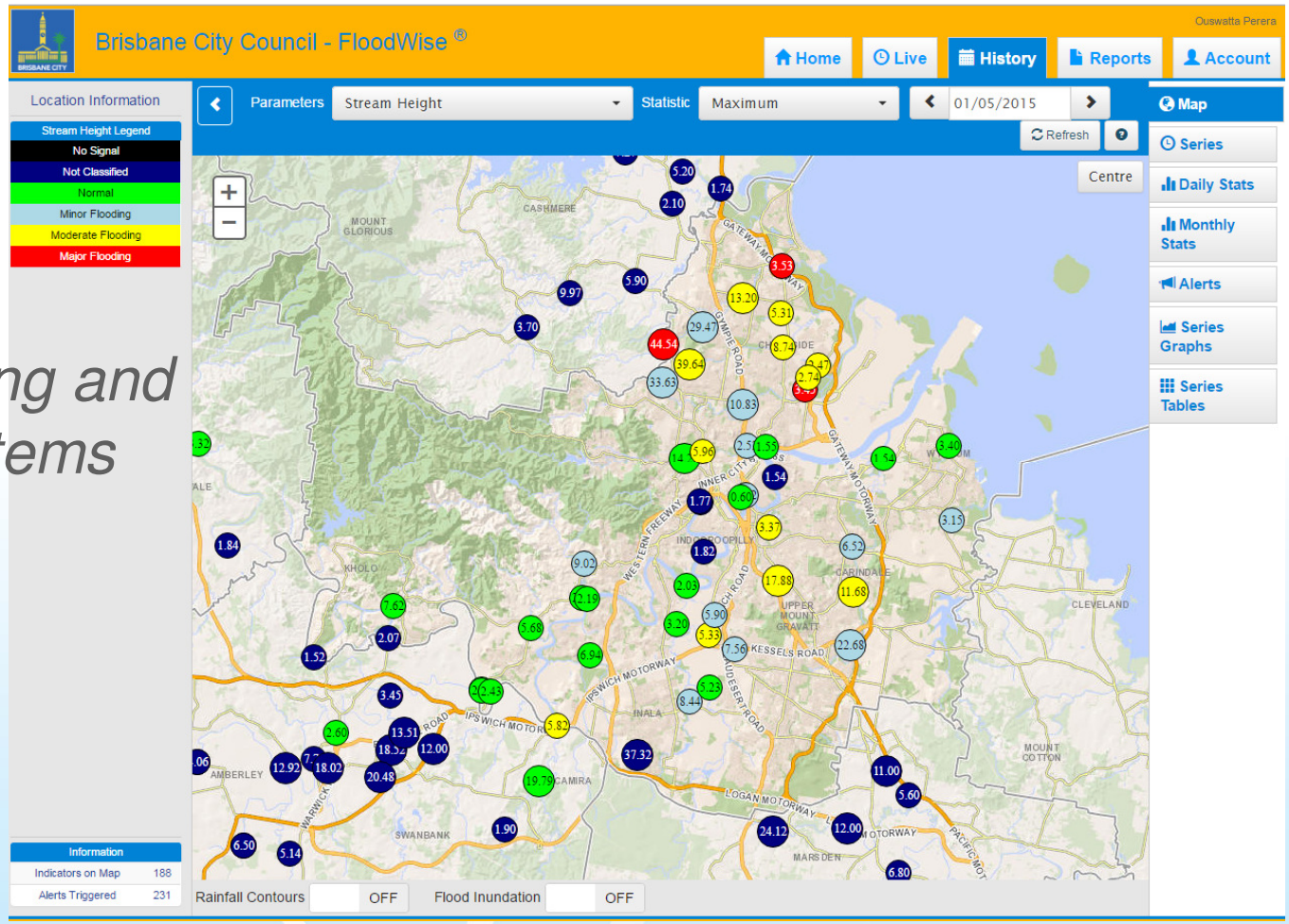
New generation ferry terminals – Brisbane River



- Detachable gangway
  - Detach at shore end
  - Rise and fall with flood waters
  - Swings behind pontoon to avoid debris
- Hull shaped base/pontoon
- Single pier
  - 11 metres high
  - Capacity to deflect heavy objects
  - Avoids impact on pontoon in flood event

World Class Response & Recovery

- *24/7 monitoring and reporting systems*



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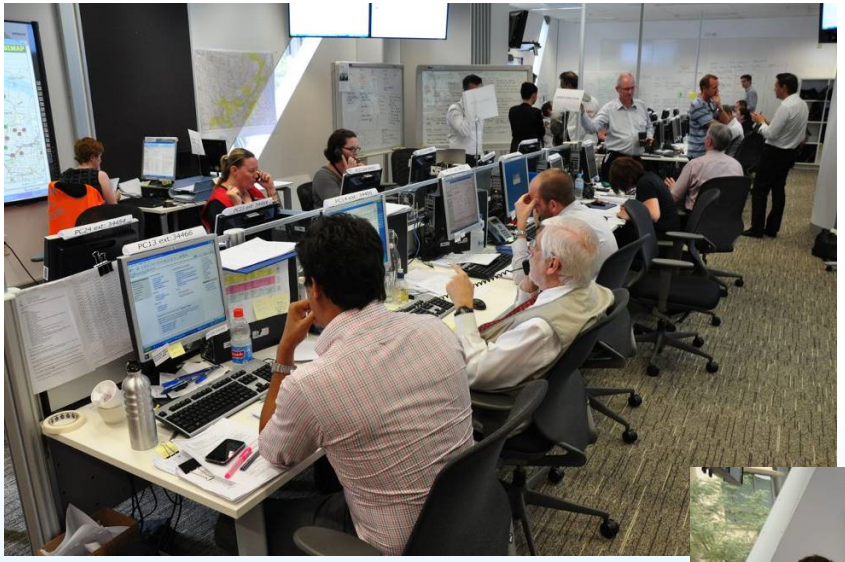
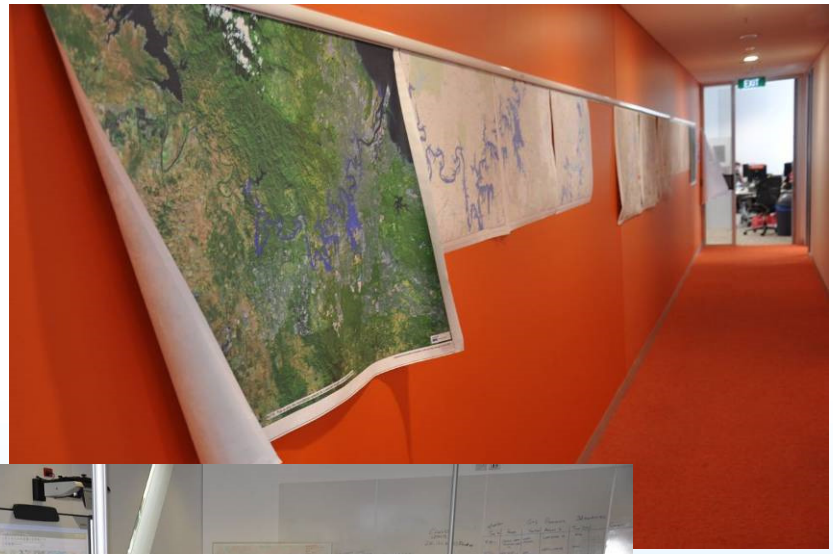
World Class Response & Recovery





- *Co-ordinated approach*
- *Working together with external partners*

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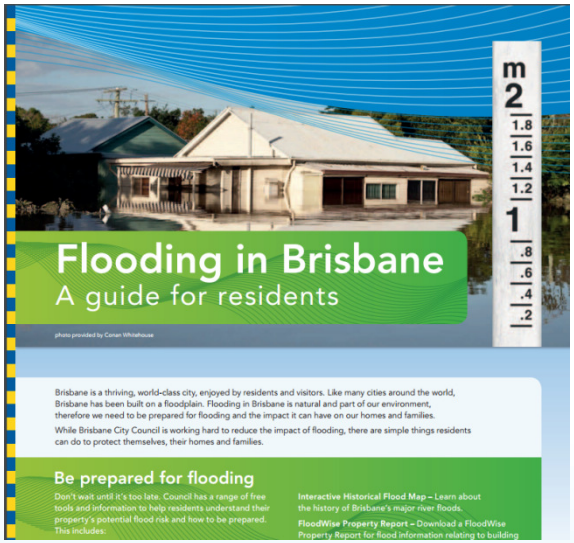
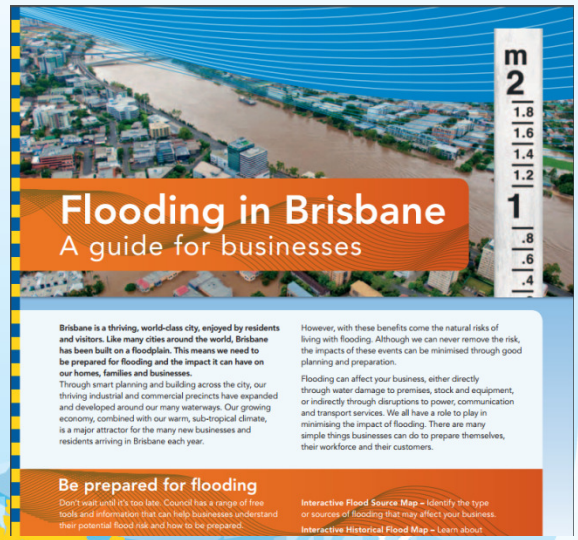
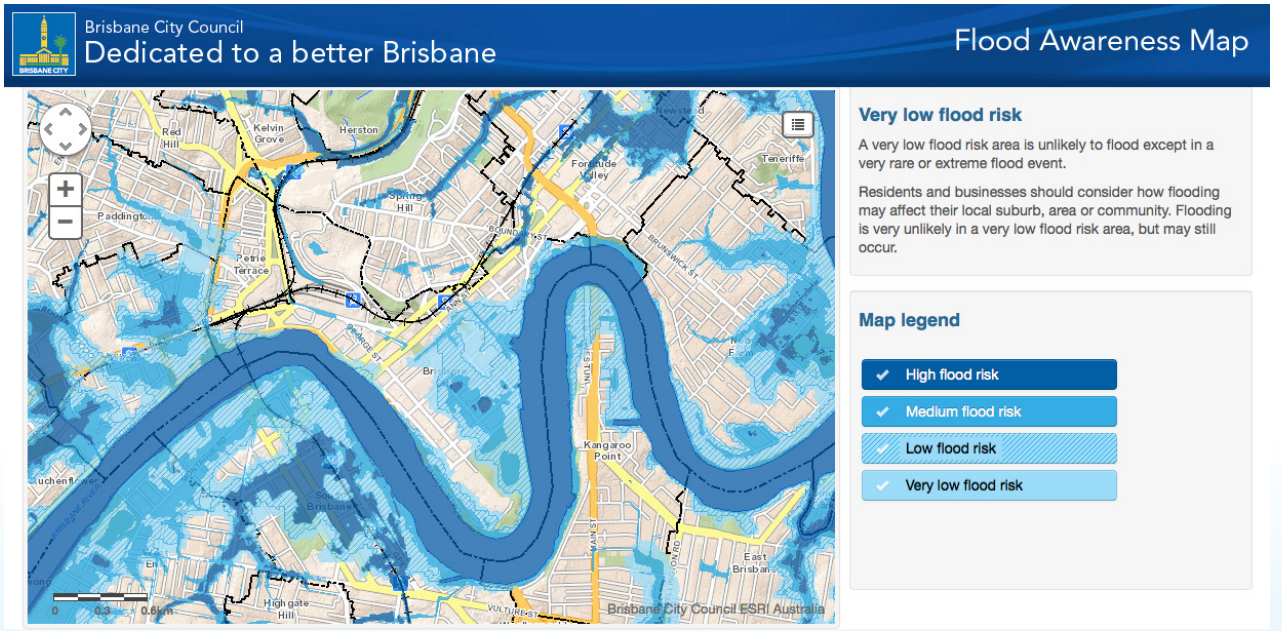
Educated & Resilient Community







- Interactive Flood Awareness Map
- Comprehensive flood preparedness guides to residents and businesses
- Simple & accessible, fit for purpose – ***link to actions***

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Educated & Resilient Community

Brisbane City Council
FloodWise Property Report

Report Reference
1464875866482
02/06/2016 23:57:46

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THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

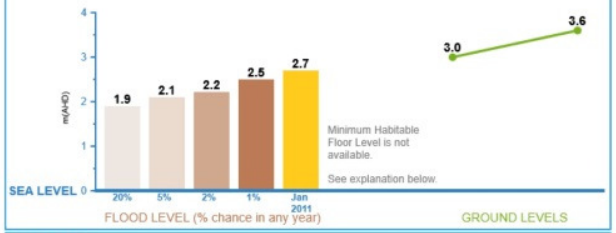
The FloodWise Property Report provides property or lot-based flood information for building and development requirements. This report provides information on estimated flood levels, habitable floor level requirements and more technical information on the four sources of flooding: river, creek / waterway, storm tide and overland flow. Refer to the Useful Definitions section for a glossary of terms.

To find out more about how the contents of this report may affect building or development on this property, please visit www.brisbane.qld.gov.au/planning-building.For more general information about understanding your flood risk and how to prepare your property, family or business for potential flooding visit www.brisbane.qld.gov.au/beprepared

THIS IS A REPORT FOR:

Rateable Address: 128 COMMERCIAL RD, TENERIFFE QLD 4005
Lot Details: L.8 SP.139999

FLOOD LEVEL INFORMATION



EXPLANATION

m(AHD) - Metres Australia Height Datum. The level of 0.0m AHD is approximately mean sea level.

Flood Levels - The Flood level bar chart above shows the possible flooding level and percentage chance of that level being reached or exceeded in any year. If an orange bar shows, it is the calculated January 2011 flood level at this address or lot.

Minimum Habitable Floor Level - Applies to residential development only. Please refer to Council's planning scheme to learn how this may affect you. If a property is in an overland flow path, or a large allotment, a minimum habitable floor level cannot be provided. Refer flood and planning development flags below.

Ground Levels- The green line above shows this property's approximate lowest and highest ground levels based on latest available information (2009 airborne laser survey) to Council. If you are building, please confirm with a surveyor.

For further information and definitions please refer to the Useful Definitions page

FLOOD AND PLANNING DEVELOPMENT FLAGS

DEVELOPMENT FLAG(S)

This property may also be affected by one or more flood or property development overlays or flags. These include: OVERLAND FLOW PATH,LARGE ALLOTMENT

Please review the technical summary over page and refer to Council's planning scheme for further information.

Brisbane City Council
FloodWise Property Report

Report Reference
1464925519875
03/06/2016 13:45:19

tter Brisbane

. SUMMARY

FloodWise Property Report contains more detailed flood information for this property so surveyors, builders, certifiers, ineers can plan and build in accordance with Council's planning scheme. For more information about building and sbane please visit www.brisbane.qld.gov.au/planning-building or talk to a Development Assessment Planning via Council's Contact Centre on (07) 3403 8888.

'ORT FOR:

is: 17 ROSS ST, NEWSTEAD QLD 4006
Multiple Lots (Refer Appendices)

rning

ing reported on contains multiple lots. This report is a summary for the entire Property. To obtain a Lot specific report, earch tool to search for the specific Lot you wish to report on.

FORMATION (Summary)

provides a summary of flood information for this property. More detailed flood level information is provided in the of this report.

PROPERTY SUMMARY	LEVEL (mAHD)
Minimum Ground Level	0.7
Maximum Ground Level	4.2
Min Habitable Floor Level	Contact Council
Residential Flood Level (RFL)	2.7
Residential Flood Level Source	RIVER
Source of Highest Flooding	RIVER
Flooding may also occur from	STORMTIDE,RIVER,CREEK/WATERWAY

EAK FLOODING LEVELS

splays the peak estimated flood levels by probability for this property. Estimated flood level data should be used in pplicable planning scheme requirements - Refer to Flood Planning Development Information.

and flow flooding level maybe higher than the levels below from other sources.

DESCRIPTION	LEVEL (mAHD)	SOURCE
20% AEP	1.9	STORMTIDE
5% AEP	2.1	STORMTIDE
2% AEP	2.2	STORMTIDE
1% AEP	2.5	STORMTIDE
January 2011	2.7	RIVER
DFL	2.5	STORMTIDE
RFL	2.7	RIVER

Property specific flood reports

Mobile apps

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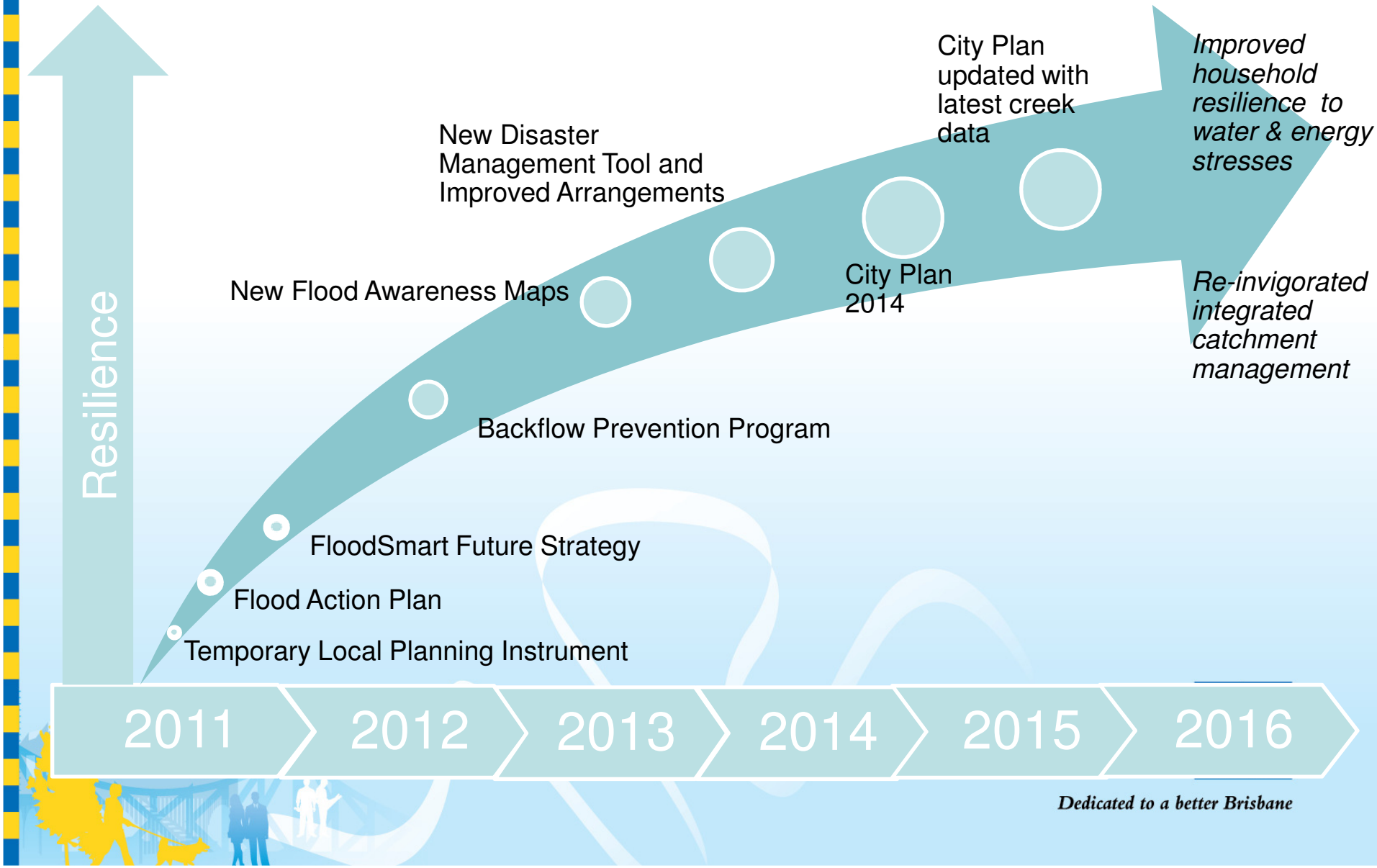
Building Our Resilience



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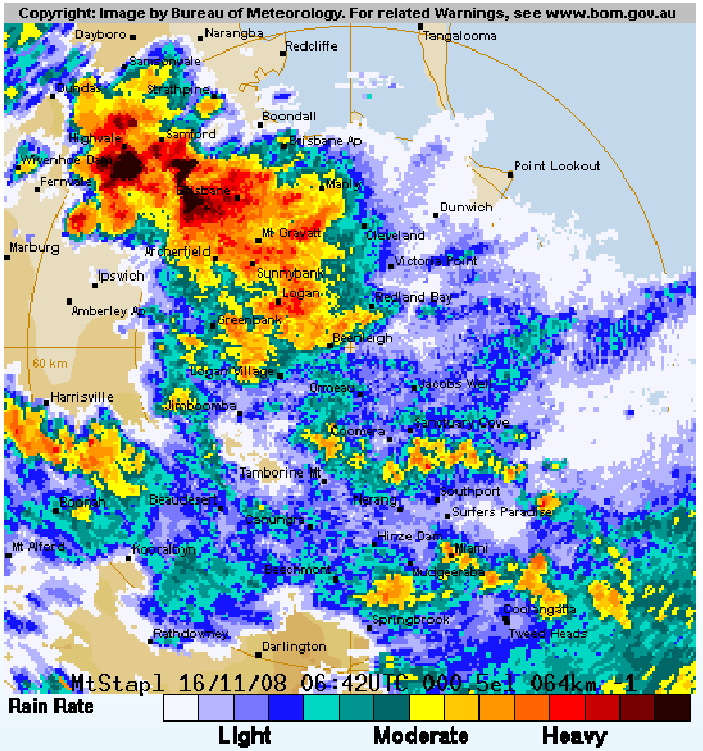
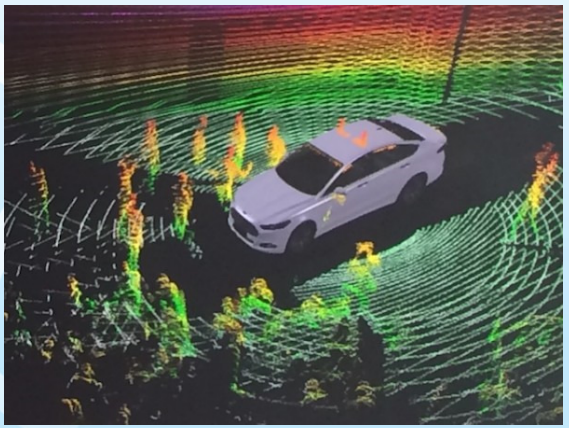
Opportunities

- *Use of forecast radar for real-time modelling*
- *Harness the social media for data gathering*
- *Drones for flood surveys*
- *Use 3D scanning data from autonomous vehicles*





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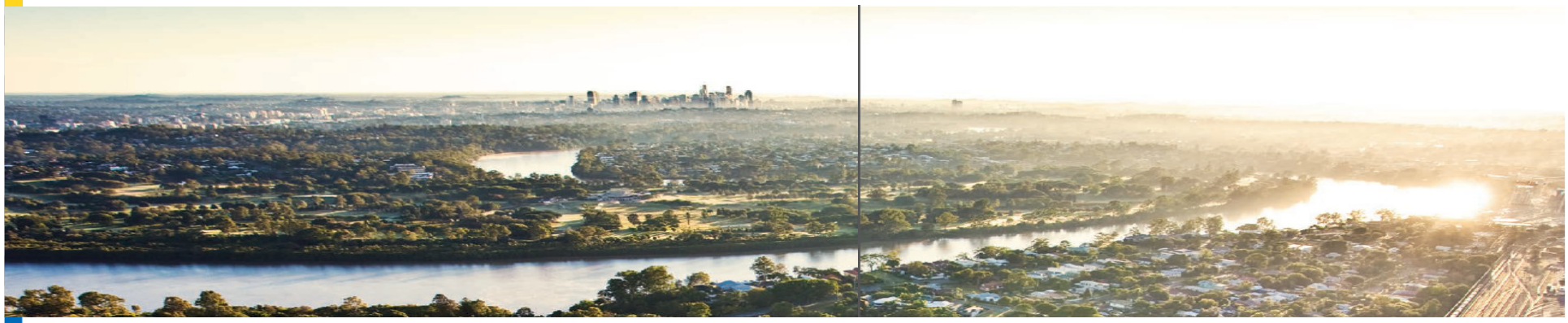
Conclusions



- Flood risk management means understanding flood risk and *developing flexible, innovative multiple benefit solutions*
- Not one solution but *passionate* flood risk management, land use planning, emergency management and communications *professionals* – many activities of significant investments and much expertise within Brisbane City Council
- Requires *working together* with many partners across local, state and federal governments, residents, business and industry.

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Thank you!

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