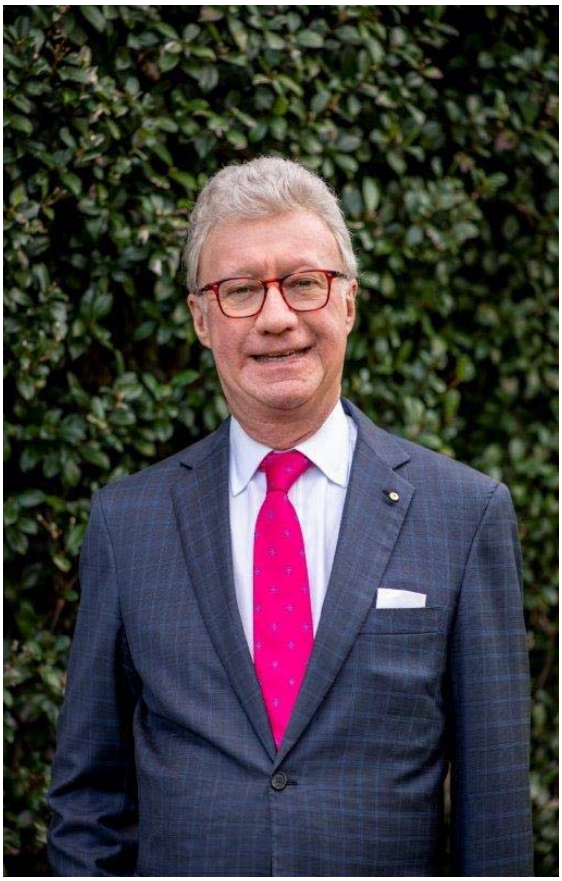
Brisbane City Council 2022 Flood Review

9 MAY 2022

2022 Brisbane Flood Review
Authored by: The Hon Paul de Jersey

Cover: Southbank Promenade during the 2022 Flood Event

Foreword



On 1 March 2022, the Lord Mayor of Brisbane, Councillor Adrian Schrinner announced an independent and comprehensive review be conducted with respect to the 2022 Brisbane Flood event.

The review has been led by the Hon. Paul de Jersey AC CVO QC.

Paul de Jersey was Governor of Queensland 2014 – 2022 and before that a judge of the Supreme Court of Queensland 1985 – 2014, and Chief Justice of Queensland 1998 – 2014. He practised at the Bar 1971 – 1985, culminating in his appointment as Queen's Counsel. He is a Companion of the Order of Australia (AC, 2000) and a Commander of the Royal Victorian Order (CVO, 2021).

He has been greatly assisted in the preparation of this report by Ms Andrea Kenafake, Consultant, and with administrative assistance from Ms Melissa Travers.

Contents

Glossary

AHD	Australian Height Datum
BCC	Brisbane City Council
BCP	Business Continuity Plan
BoM	Bureau of Meteorology
BPDs	Backflow Prevention Device
BRFF	Brisbane River Flood Forecast
CBD	Central Business District
CSA	Community Service Announcement
CWS	City Waste Services
DLDC	Deputy Local Disaster Coordinator
EA	Early Alert – State Run
EWAS	Early Warning Alert System
EWA	Early Warning Alert
FLOOD COP	Dynamic web-based mapping tool developed by Esri Info
FRHP	Flood Resilient Homes Program
GIS	Geographic Information System
LDC	Local Disaster Coordinator
LDCC	Local Disaster Coordination Centre
LDMG	Local Disaster Management Group
LGA	Local Government Area
MOU	Memorandum of Understanding
QFCI	Queensland Floods Commission of Inquiry

QPS	Queensland Police Service
QRA	Queensland Reconstruction Authority
RIMT	Regional Incident Management Teams
SDCC	State Disaster Coordination Centre
SITREPs	Situation Reports
SOPs	Standard Operating Procedures
UU	Urban Utilities
VHPS	Voluntary Home Purchase Scheme

Introduction

I am pleased to present the report of the Brisbane City Council 2022 Flood Review.

The Terms of Reference focus first on the extent of compliance by Council with recommendations made by previous independent inquiries – the 2011 Flood Response Review Board (chaired by former Governor of Queensland Major General Peter Arnison (ret'd) AC CVO and the Queensland Floods Commission of Inquiry (QFCI) led by Commissioner (then) Justice C E Holmes.

The former will be referred to as the "2011 Flood Response Review Board" and the latter as the "QFCI".

The final reports of those inquiries – prompted by the January 2011 flood event, were delivered, respectively, in May 2011 and March 2012.

Unsurprisingly Council has embraced the recommendations of those independent inquiries.

The first of the Terms of Reference invites an "audit" of the extent to which those recommendations have been implemented over the ensuing 10 – 11 years.

The two previous inquiries were, as well as independently conducted, wide-ranging and well informed, as is evident from their reports. Accordingly, for present purposes, those reports contain a valuable store of highly significant background material.

However, 10 – 11 years on, that background needs to be updated, for the demands of public safety and the security of property are not static and weather volatility militates abiding vigilance.

And so not only will that "audit" importantly measure Council's compliance with those recommendations, but recognising their age, the Terms of Reference, secondly, focus on broader issues critical to the safety of people and security of property. In context of the 2022 weather event the current terms measure implicitly the recommendations, the current effectiveness of Council's disaster management framework, the adequacy of Council's public warnings and advice, the effectiveness of planning control and the resilience of riverine and waterways infrastructure.

The establishment of this review pre-supposed the unprecedented nature of the 2022 weather event. But that event occurred, and a similar event may recur, hence an overarching final stipulation in the Terms of Reference for the provision of recommendations for measures reasonable to improve the city's preparation and planning for any such future weather event.

Where the weather is concerned, forecasts necessarily are tentative and this 2022 event was rapidly evolving. One has to be careful about being judgmental about what Council should or should not have done. It is easy to use hindsight to stake the moral high ground, but one has to be realistic and there are certain things that simply could not be accomplished bearing in mind the rapidity of the event.

It is, however, true to say that the 2022 event, given it involved river, creek and overland flow impacts, will likely represent one of the worst-case scenarios for the people of Brisbane; providing now a good basis for assessment of how well we fared and what can be improved.

There is an obvious need to focus on our most vulnerable suburbs.

As to the conduct of the review, submissions on the matters covered by the Terms of Reference were sought from Council and Councillors on 18 March 2022, to be furnished by 8 April 2022. (The submissions of the Councillors may be taken to have reflected the views of their constituents, and in some cases submissions from residents were enclosed.)

As the review developed, additional oral consultations took place, for example the Inspector General of Emergency Management and Moreton Bay Regional Council. Inspections were made of flood affected areas and Council infrastructure.

As reviewer, I am grateful for the helpful and cooperative approach of all who responded to the call for submissions and those who participated in the consultation.

I have been briefed about Council officers' response to this catastrophic event.

It was unsurprising to hear they worked with great dedication and professionalism for long hours – with inevitable effect on their families.

It is appropriate at the beginning of this report that I respectfully commend them. Some people may, naturally, say "well that is what they are paid to do." But these officers went well and truly beyond the limits of duty with their altruistic devotion, and they were no doubt inspired by the support and encouraging leadership of the Council's Chief Executive Officer Mr Colin Jensen, and the Lord Mayor and the Councillors.

In so far as I still may speak for the community, I express sincere appreciation to all Council employees for their marvellous response to the relief effort.

That respectful commendation should also extend to the Lord Mayor and Councillors. From what personally I recall, and have subsequently read, they displayed great devotion to the people of Brisbane, often in trying circumstances – especially with mobile capacities limited and ward offices rendered inoperable due to power loss or at risk of inundation.

Finally, the people of Brisbane …. I have lived here for about 60 of my 73 years and have enormous affection for the City and all its people. Living in Sherwood with grandparents in Moorooka, as but one example, the Rocklea underpass. The mutual community support extended by the people of Brisbane in response to this 2022 event was not only heart-warming, as to be expected, but spectacular.

As we know, Brisbane City Council is the largest local authority in Australia. In carrying out this review, I have been struck by the necessary complexity of the organisation, but more significantly, by the way this complex organisation works so well in practice in the sphere on which I have focused.

In what follows, I dissect, as I am charged to do, Council's response to 2011 and where things sit at the moment in 2022. To allay any impatient reader, may I at once say Council's approach has served the people of Brisbane very well.

The report addresses the Terms of Reference across seven chapters. Chapter One will provide an overview of the characteristics of the Brisbane February 2022 Flood event. The remaining chapters will respond to the specific terms within the Terms of Reference.

Chapter One – The Characteristics of the Brisbane 2022 Flood

This helpful description of the 2022 weather event is taken from Council's submission.

The Weather Event was extremely unusual. The Brisbane City mean annual rainfall is 1,148mm, with 689mm rainfall occurring over the mean wet season from November to March inclusive. During the Weather Event, the Brisbane City Council area experienced between 400 to 1,100mm of rainfall over approximately four to five days (23 to 27 February 2022). The Council-wide average for that period was 795mm. The majority of the rain fell between Friday 25 and Sunday 27 February 2022 with Brisbane receiving 676.8mm of rain, exceeding the previous three-day record of 600.4 mm from 1974. Prior to February 2022, Brisbane had not recorded two consecutive days of over 200mm rainfall. The Weather Event featured three consecutive days of over 200mm rainfall recorded in Brisbane.

The intense and continued rainfall caused flash flooding of creeks and recurring overland flow flooding in the City. Widespread flooding in the Lockyer Creek, Bremer River and Lower Brisbane River catchments culminated in major flooding in the Brisbane River, with a flood peak of 3.85m AHD at the Brisbane City Gauge at around 9.00am on Monday 28 February 2022.

Whilst the Brisbane River flood peak is less than the 4.46m AHD recorded in January 2011, the nature of the 2011 flood event was very different to the Weather Event occurring in February this year. The Weather Event is also distinguishable from the 1974 flood (5.5m AHD) because that event was characterised by cyclonic activity and continual heavy rain for three weeks leading up to the flood.

The 2022 Weather Event was very different to that experienced in 2011 for the following reasons:

The 2022 Weather Event evolved rapidly, and Council received very limited warning. The challenges faced by the Bureau of Meteorology (BoM) are evidenced by the changing forecasts for both the expected Brisbane River peak and the rainfall provided in the period from 4pm on 25 February to 11pm on 27 February 2022 (see ***Graphs 1 and 2*** *below). By contrast, in 2011, before the river rose, Council had three days' notice to prepare and to assist residents to prepare;*

In 2011, the flooding in Brisbane was a result of heavy rainfall over upstream catchment areas, rather than over Brisbane City. The heaviest rains were inland on the western fringe of the Brisbane River Catchment and on the Great Dividing Range. This has led to the 2011 event

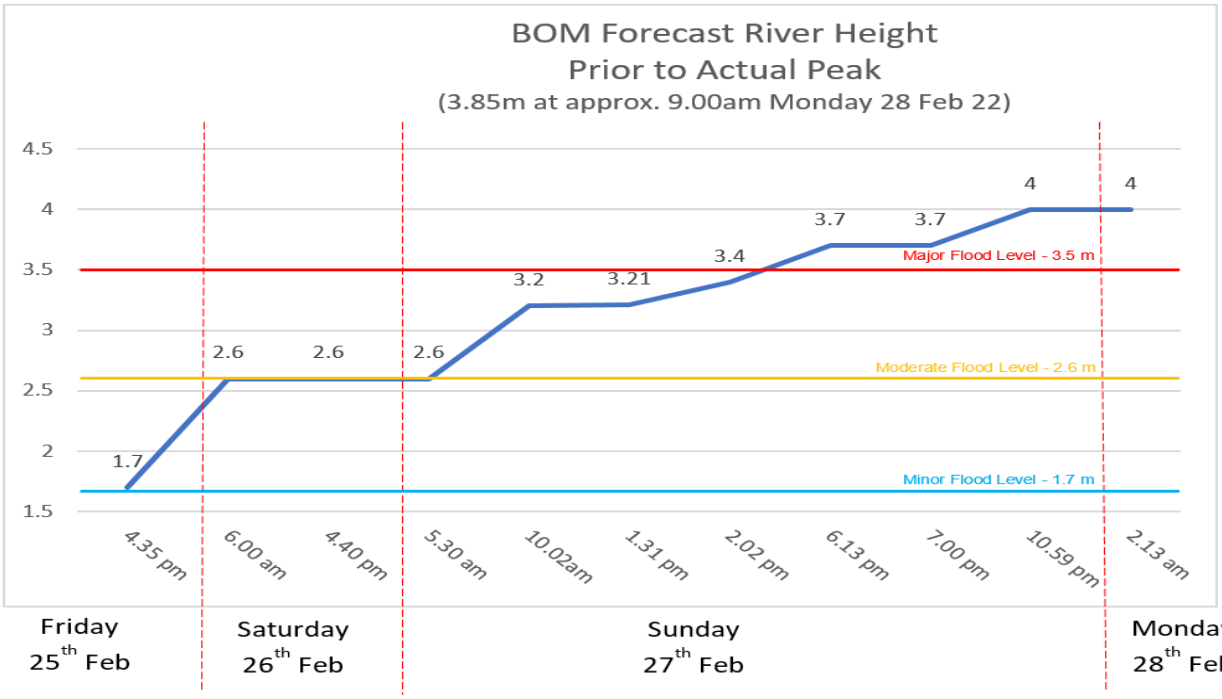
being described colloquially as a "dry" or "sunny day" flood. In 2022, on the other hand, the rainfall was concentrated over Brisbane itself, as well as occurring over a short period of time; The flooding in 2011 was a river flood. The pattern of rainfall experienced caused little, if any, significant creek or overland flow flooding within Brisbane. In contrast, the 2022 Weather Event involved river, creek and overland flow flooding;

Due to the nature of the 2011 flood (and the fact that water from dam releases takes time to travel downstream), any changes in the weather forecasts during that event had a more limited influence on disaster management in the City as there was more time in which they could be addressed;

In 2011, the likely scale of the event could be predicted with more certainty, as the impact was largely contained to river flooding. The scale of the 2022 Weather Event was comparatively difficult to predict, as (in addition to river flooding) it involved significant creek and overland flow flooding which is specific to localised areas. For example, based on Council's preliminary estimates, some creeks experienced a "1 in 2000 year" flood, while others experienced a "1 in 10 year" flood. Further, the BoM does not issue forecasts for creek and overland flow flooding, as it does for the River; and

*Due to the localised impacts of the 2022 Weather Event, a greater number of suburbs and properties were impacted than in 2011 (see **Table 1** below).*

Graph 1 - displays the changes to the forecasted Brisbane River height in the period 25 February 2022 to 1 March 2022



Graph 2 - displays the forecasted rainfall as against the actual average and actual maximum rainfall for Brisbane City

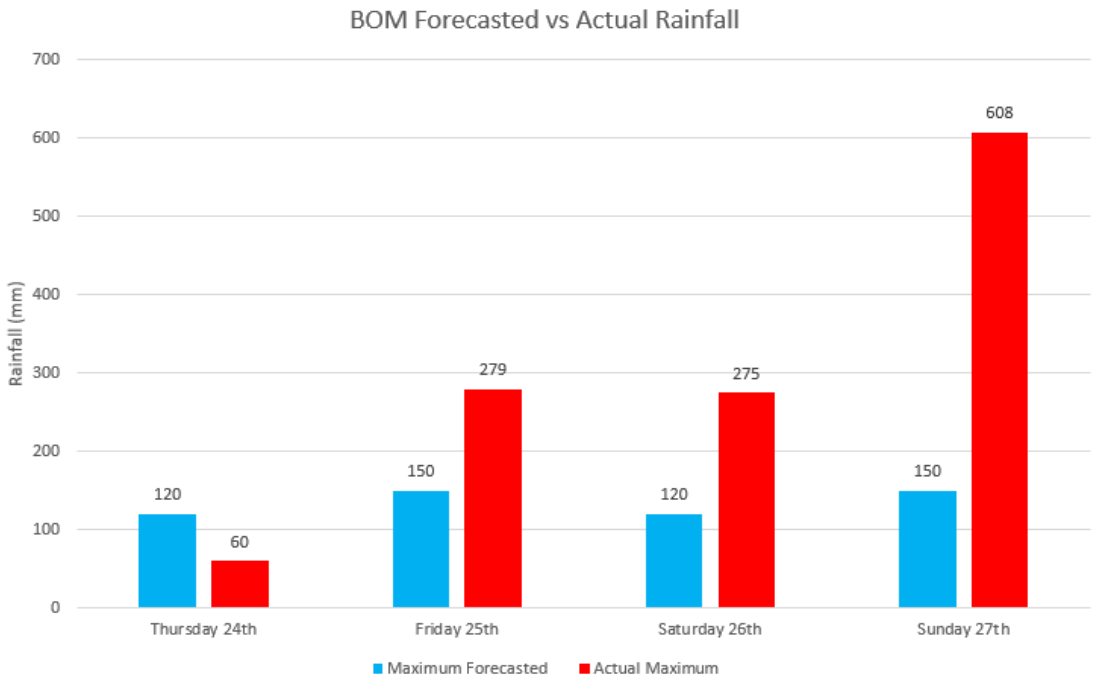


Table 1: displays the no. of suburbs and properties affected by the floods in 2011 and 2022

	Suburbs Affected	Total Properties Affected
2011	94	14,100
2022	177	23,400

Council asks that when making an assessment of Council's approach to decision making during the Weather Event, the assessment should be made in the context of the changing nature of the event, as displayed in the above graphs, and on the basis of the information available to Council at the time of any such decision, as opposed to any hindsight assessment.

Especially in view of the rapidity of the event as it unfolded, that should be accepted.

Chapter Two – Implementation of Recommendations from 2011

The first Term of Reference concerns the extent to which Council has implemented the relevant recommendations of the QFCI Report and the Report of the 2011 Flood Response Review Board.

The recommendations from the latter concern only Brisbane City Council. The recommendations of the QFCI Report extend beyond but include Brisbane City Council.

It is proposed to list first the recommendations of the 2011 Flood Response Review Board (ref **Table 2**) and second, the recommendations of the QFCI Final Report insofar as they relate to Brisbane City Council (ref **Table 3**).

Against each recommendation will be comment on the extent of compliance, taking account of Council's comprehensive submission, that of the Opposition and Independent Councillors and those of Councillors some of whom enclosed submissions from constituents.

What follows reflects Council's 2011 Flood Action Plan, devised to address the recommendations, which it did by 31 October 2016, when that plan was "officially closed".

Table 2: Recommendations of the 2011 Flood Response Review Board

The First Recommendation (business continuity planning)	
Brisbane Flood Report Recommendations	**Council Action**
In relation to Council activities, Information Services Branch reviews its BCPs to ensure the capacity exists to maintain the data centre, including an alternative site capable of taking over without delay and to maintain Council's website at all times, particularly during significant disasters.	• Defined a web demand strategy and implemented revised cloud infrastructure for the website, in conjunction with an approved data centre strategy. • Revised and updated the Information Services Branch BCPs. • Implemented revised web demand strategy and finalised review of key business applications utilising the data centre strategy.
Line of business managers review BCPs to ensure their ongoing robustness and to capture any lessons learnt from the flood event.	• Reviewed and updated all BCPs with data received as a result of the January 2011 floods.
Contracts and arrangements be reviewed to ensure that the BCPs for key external outsourced service and infrastructure providers are understood, robust and able to support Council during times of emergency and disaster.	• Reviewed all critical outsourced contracts and arrangements to include a clause ensuring they are able to support Council during times of emergency and disaster.
In relation to the Brisbane CBD and high-rise residential building inundation, that Council considers hosting a symposium for all affected parties with a view to identifying best practice approaches to ensure improved flooding resilience.	• Council planned, booked and conducted a symposium with all affected parties.
Extent of Compliance Sufficient and satisfactory	

The Second Recommendation (training)	
Brisbane Flood Report Recommendations	**Council Action**
Further emphasis be placed on Individual and team training, including opportunities to attend Emergency Management Australia Disaster and Emergency Response courses.	• Conducting exercises between Council's Crisis Communication Team and LDCC. • Conducting exercises between RIMT and LDCC to ensure new SOPs are effective and understood. • Consistently updating the Disaster Operations Learning Framework. • Delivering ongoing range of in-house and accredited training programs and professional development opportunities, which cover leadership, disaster operations and LDCC functional capabilities. • Providing mandatory training for each member of the disaster management workforce including: - Queensland Disaster Management Arrangements - Brisbane Incident Management System training package • Conducting disaster management exercises to assess and validate capability. Training is outlined in the Council Training Calendar. • Attending external conferences, events, exercises and trainings including: - Annual Disaster & Emergency Management Conference - Disaster Management Officer Network meetings and online forums - BoM Seasonal Weather Briefings - "Exercise Glorious" run by Moreton Bay Regional Council – bushfire scenario (6 May 2021) - 'FLOOD-EX21 – Local Recovery Discussion' run by Queensland Reconstruction Authority – flood scenario – 20 September 2021 - Intelligence function training run by Protegas – 3 sessions between August to September 2021 • Hosting and running a number of exercises that involved partner agencies.

Workforce planning to reflect a needs analysis including disaster management related job descriptions, and a specific Council term be developed to describe “internal volunteers” to avoid confusion and to reflect the professional nature of the training and tasks.	• Identified the training needs of disaster management related employee roles and job descriptions and included these in the updated training program, including an updated definition of internal volunteers.
Annual exercises continue to be conducted with a theme of “Brisbane Ready for Summer”	• Implemented annual “Brisbane Ready for Summer” exercise program
Extent of Compliance Sufficient and satisfactory	

The Third Recommendation (further training)	
Brisbane Flood Report Recommendations	**Council Action**
Further training and development occur for senior appointments including LDCC Incident Controllers and group leaders as well as for more junior appointments.	• Training was delivered to the senior LDCC Incident Controllers and Group Leaders, as well as more junior appointments.
The Disaster Intelligence Group‘s structure, manning and core competencies be reviewed, and further staff training be conducted.	• Reviewing and updating the Disaster Intelligence Group Standing Operating Procedures and competencies. • Continually creating, delivering and conducting new training material. • Testing all new SOPs in a simulated disaster activity to ensure new procedures are effective and understood.
The Forward Planning Group’s responsibilities to the BCLDMG and to the LDCC be examined to remove ambiguity.	• Reviewed and amended the Forward Planning Group SOPs • Tested new SOPs in a simulated disaster activity to ensure new procedures are effective and understood.
Ensuring that SITREPs are well drafted and widely distributed on a regular basis using multiple communications channels.	• Updated LDCC and RIMT SITREPs procedures and distribution lists.
Developing a readily accessible database of frequently asked questions to address “who does what” to support the LDCC staff and agencies (this could also	• Developed a readily accessible database of frequently asked questions to address “who does what” to support LDCC staff and agencies.

include information available on Council's Call Centre database)	
Synchronising the shifts of Council and agencies staff working in the LDCC to better facilitate handover briefings.	• Created a common SOP for LDCC and business unit shifts. • Tested new SOPs in a simulated disaster activity to ensure new procedures are effective and understood.
Improvements to logging incoming and outgoing information and tasking.	• Identified opportunities for improvement to logging of incoming and outgoing information and tasking. • Updated SOPs for logging of incoming and outgoing information and tasking. • Tested new SOPs in a simulated disaster activity to ensure new procedures are effective and understood.
Formalising the written briefing processes for handovers between shifts.	• Created a shift handover procedure and reviewed the email address lists for the LDCC and RIMTs. This shift handover procedure was communicated to relevant staff. • Tested new SOPs in a simulated disaster activity to ensure new procedures are effective and understood.
Extent of Compliance Sufficient and satisfactory. It should be noted Councillors in their submissions have called for more training to better prepare them for a disaster event. Recommendations follow in **Chapter Four** in light of the 2022 experience.	

The Fourth Recommendation (Flood Information Centre)	
Brisbane Flood Report Recommendations	**Council Action**
Review and update Standing Operating Procedures (SOPs), including a major update of selected Brisbane River and Creek Flooding SOPs, river flood maps and storm tide maps, property counts and critical infrastructure lists.	• Prepared a scope for both the river flood maps and critical infrastructure lists project. • Revised the River Flooding SOPs. • Created new Creek Flooding SOPs. • Tested new SOPs in a simulated disaster activity to ensure new procedures are effective and understood.

	• Updated the river flood maps, storm tide maps, property counts and critical infrastructure lists.
Upgrade the BRFF Reporting System to the most extreme flood event (Probable Maximum Flood) and to include a flood forecast system for Brisbane creeks.	• Prepared an Implementation Plan and Technological Requirements for system upgrades. • Identified new system/processes for a Creek Flood Forecast System. • Commence forecast reporting system.
Conduct additional training and exercises including with the LDCC and Queensland Government agencies and develop better communications protocols.	• Continually involving the Flood Information Centre in the LDCC exercise when SOPs are being tested in a simulated disaster activity to ensure new procedures are effective and understood.
Provide computers capable of GIS modelling tasks and 3D visualisation analysis.	• Purchased and installed computers capable of GIS modelling tasks and 3D visualisation analysis.
Provide a dedicated flat screen television for situation awareness and news monitoring.	• Purchased and installed a dedicated flat screen television for monitoring.
Extent of Compliance Sufficient and satisfactory at the time, although creek forecasting proved to be an issue in 2022.	

The Fifth Recommendation (early warning alert service)	
Brisbane Flood Report Recommendations	**Council Action**
that Council examine and develop the range and variety of early warning systems and alert measures; including the proposed National Emergency Warning System, social media platforms and further improve the effectiveness of door knocking."	• Constantly identifying opportunities to improve Early Warning Alert Service. • Investigating and implementing the use of crowd-sourcing tools where necessary to improve the ability to collate, intelligently analyse and distribute information. • Identifying opportunities for improvement to alert measures and methods. • Contracting additional services where required. • Updating SOPs as required
Extent of Compliance Sufficient at the time. Refer to **Chapter Five** for recommendations following the 2022 experience.	

The Sixth Recommendation (Regional Incident Management Team)	
Brisbane Flood Report Recommendations	**Council Action**
A senior officer be assigned to mentor each RIMT Manager and conduct high level discussions with the LDCC.	• Continue to assign a senior officer to the RIMT and update SOPs.
Dedicated RIMT operations rooms be established.	• Identified and assessed suitability of RIMT sites. • Updated the SOPs for LDCC and RIMTs. • Established the ability (and facilties) to “stand up” the RIMT operation room at short notice. • Tested new SOPs in a simulated disaster activity to ensure new procedures are effective and understood.
Planning for alternative RIMT sites, in the event that the primary sites become unusable, be conducted	• Identified possible alternative RIMT sites. • Assessed suitability of alternative RIMT sites. • Formalised arrangements with current owners of RIMT sites. • Developed a contingency plan for relocation in the event that a RIMT site becomes unusable. • Updated the RIMT SOPs to include the RIMT site contingency plan, completed an alternative site relocation plan. • Approved alternative RIMT sites.
Extent of Compliance Sufficient at the time. Refer to **Chapter Five** for recommendations following the 2022 experience.	

The Seventh Recommendation (evacuation centres)	
Brisbane Flood Report Recommendations	**Council Action**
Greater decentralisation of evacuation centres, particularly for communities that are known to be prone to isolation by flooding.	• The Environmental Health Officer conducted audits of Council-owned sites and privately owned sites and briefed on each of the existing sites.

	• Worked with the locally elected officials, community groups and Queensland Police Service to consider establishing Community Support Centres/ Community Information Centres. • Completed interim Isolated Communities Sub-Plan of the Disaster Management Plan. • Implemented final isolated Communities Sub-Plan of the Disaster Management Plan, following community and key stakeholder engagement.
Early and close liaison with Red Cross, particularly regarding registration of evacuees and vetting of volunteers	• Entered into a MOU with the Red Cross. • Reviewed the MOU SOP for evacuee registration and volunteer/staff vetting and amended the MOU as required.
Early and close liaison with Queensland Police Service (QPS) in regard to exclusion of persons not suitable to be in a general public evacuation centre.	• Reviewed the Red Cross MOU and updated the SOP regarding QPS role.
The special needs of frail, aged, incapacitated, nursing home and oxygen-dependent evacuees for whom separate and special arrangements need to be made.	• Updated the Evacuation and Emergency Human Services Plan and SOP to include information on how to manage special needs evacuees.
Social, cultural and religious diversity of evacuees, including those with a non-English speaking background.	• Updated the Evacuation and Emergency Human Services Plan and SOPs.
Purchase and supply of special items such as personal hygiene kits and baby requisites.	• Updated the Evacuation and Emergency Human Services Plan and SOPs.
Extent of Compliance Sufficient and satisfactory: these issues are further addressed in **Chapter Four** in light of the 2022 experience.	

The Eighth Recommendation (sandbagging)	
Brisbane Flood Report Recommendations	**Council Action**
that estimates be developed of likely sandbag demand for regions during future flood events and that the best situated potential sites for filling and distribution points in each region be identified	• Council developed flooding scenarios (including river, king tide and creek flooding scenarios). • Estimated sandbag requirements based on the flooding scenarios developed. • Developed processes to determine how to best distribute the sandbags. • Amended the LDCC SOPs.
Extent of Compliance This was a sufficient response to this 2011 recommendation, although the matter is to be revisited post the 2022 event. See **Chapter Four**.	

The Ninth Recommendation (traffic flow)	
Brisbane Flood Report Recommendations	**Council Action**
that the Council consider developing advanced plans, in consultation with QPS, to improve traffic flow in flood recovery congested areas including converting some streets into one way, route designation for heavy vehicles and identification for residents' vehicles.	• Council procured four more radio base stations and worked in consultation with Queensland Police Service to assist in the development of relevant and suitable Traffic Management Plans.
Extent of Compliance This was a compliant response	

The Tenth Recommendation (terminology)	
Brisbane Flood Report Recommendations	**Council Action**
that the term, DFL, be used exclusively in public documents concerning flood planning levels for Brisbane, regardless of the cause of the flooding.	• Conducted a risk-based review of all documents and identified critical and noncritical documents to be reviewed and amended.

	• Implemented the use of Defined Flood Level (DFL) terminology in critical documents. • Evaluated options and made recommendations for amendments to noncritical documents. • Developed and implemented plan and implemented amendments to noncritical documents.
Extent of Compliance Sufficient and satisfactory.	

The Eleventh Recommendation (description of flood levels)	
Brisbane Flood Report Recommendations	**Council Action**
that Council use a more readily understandable description of flood levels (to reflect BoM descriptions)	• Ensuring severe weather early warning alert message services were consistent with Bureau of Meteorology alerts. • Developing and implementing strategies to address this recommendation based on the analysis of current flood level communication issues and existing communication products. • Developing and implementing a community engagement strategy to determine and test the most effective flood level information.
Extent of Compliance Sufficient and satisfactory at the time. This issue is addressed further in **Chapter Five** in light of the 2022 experience.	

The Twelfth Recommendation (more localised flood information)	
Brisbane Flood Report Recommendations	**Council Action**
that effort continue to be put into providing more localised (property, street, suburb and Ward) information regarding inundation and flood level forecasts through a range of channels including the EWAS, FloodWise Property Report and Flood Flag Maps (including rate notices to draw attention to the	• Incorporated a registration drive for Early Warning Alert Service as part of Council's ongoing community education programs, including the "Summer Storm" campaign. • Developed interim flood level maps based on the Temporary Local Planning Instrument.

existence of the FloodWise Property Report) and flood markers.	• Updated FloodWise Property Reports to refer to both the Defined Flood Level and the 2011 flood levels. • Included information in Council rates notices directing residents to the availability of flood information. • A feasibility study was undertaken to determine additional information to be incorporated into the existing FloodWise Property Reports, such as a king tide, flood flag, creek names and two-year Average Reoccurrence Interval (50% chance) flood levels for each property. • Investigate the opportunity to reflect gauge height information for the three-gauge locations at City, Jindalee and Moggill, in a range of information products including media releases, website information and amendments to the FloodWise Property Reports to link to the BRFF Reporting System. • Installed flood markers throughout Brisbane. • Constantly implemented additional functionality/information into FloodWise Property Reports. • Updated the Flood Awareness Maps to include the latest flood studies and models. The map was updated in March 2020 to include the latest amendment to the Brisbane River Catchment Flood Study and latest data for Cubberla Creek, Wolston Creek and Cabbage Tree Creek. • Updated and consistently maintaining the FloodWise Property Report database. Council updated the reports on 12 June 2020 to include the latest flood modelling for the Brisbane River, Cubberla Creek, Wolston Creek, Cabbage Tree Creek, Moggill Creek, Perrin Creek, Stable Swamp Creek and Breakfast Creek. • Maintained regular updates and annual audit of the BRFF Reporting System, including links to the property database updated and signed off before flood season annually.
Extent of Compliance Sufficient and satisfactory. These issues are further addressed in **Chapters Four and Five** in light of the 2022 experience.	

The Thirteenth Recommendation (the flood flag map)	
Brisbane Flood Report Recommendations	**Council Action**
that the Flood Flag Map be further developed to enable NearMap data obtained on the morning of 13 January 2011 to be included and accessed.	• Council continues to investigate opportunities to display additional information on the Flood Awareness Maps, which has superseded and replaced the previous Flood Flag Map Service.
Extent of Compliance Sufficient and satisfactory.	

The Fourteenth Recommendation (the flood COP system)	
Brisbane Flood Report Recommendations	**Council Action**
that Council investigate the Flood COP system and examine its utility, in conjunction with handheld devices, to improve the efficiency and effectiveness of data collection, the provision of information, the prioritisation of tasks and the deployment of resources.	• Council is consistently investigating and testing new systems/products available, with the most viable products being purchased and implemented in the new system, followed by staff training as needed.
Extent of Compliance Sufficient and satisfactory.	

The Fifteenth Recommendation (flood maps)	
Brisbane Flood Report Recommendations	**Council Action**
that Council further develop its capabilities to produce flood maps for a larger set of scenarios based on a range of 2000 to 20,000 m3/s in electronic and hard copy format.	• Council's Flood Awareness Map is being updated on an ongoing basis to include incoming data and improve functional capabilities.
Extent of Compliance Sufficient at the time. See subsequent recommendations **Chapters Four and Five** based on the 2022 experience.	

The Sixteenth Recommendation (Pullenvale Ward)	
Brisbane Flood Report Recommendations	**Council Action**
That Council review the disaster management arrangements for a major flooding situation as they apply to Pullenvale Ward.	• Developed Isolated Communities Sub-Plan of the Disaster Management Plan to include Pullenvale Ward, following engagement with locally elected officials, community groups and Queensland Police Service.
Extent of Compliance Sufficient and satisfactory at the time, but of continuing significance post the 2022 event. See **recommendation 2.1** below.	

The Seventeenth Recommendation (Tennyson Ward)	
Brisbane Flood Report Recommendations	**Council Action**
That Council review the disaster management arrangements for a major flooding situation as they apply to Tennyson Ward to ensure the ongoing provision of a flood-free Ward Office.	• Council conducted an investigation into the existing disaster management arrangements in respect of the Tennyson Ward, and prepared revisions to the existing arrangements following that investigation.
Extent of Compliance Sufficient and satisfactory at the time, however, the Tennyson Ward Office remains at risk of inundation. See further below **recommendation 2.2**.	

The Eighteenth Recommendation (the role of Councillors)	
Brisbane Flood Report Recommendations	**Council Action**
that Council examine appropriate ways for Councillors to assist during disaster events, particularly given their community leadership responsibilities and their detailed local knowledge of circumstances and capabilities that exist in their Wards, in a way which does not cut across the existing and appropriate	• Council is consistently documenting the needs and responsibilities of Councillors. Accordingly, the SOPs have been updated to include a Councillor Liaison cell in the LDCC. • Councillors are briefed to ensure assistance during disaster events.

arrangements detailed in Council's disaster management arrangements.	
Extent of Compliance Sufficient and satisfactory at the time: further addressed in **Chapter Four** in context of the 2022 experience.	

The Nineteenth Recommendation (flood markers)	
Brisbane Flood Report Recommendations	**Council Action**
that permanent flood markers be installed on key roads that are known to become flood affected to complement other public awareness and safety campaigns.	• Marker installation locations have been identified. • Markers have been designed, manufactured, installed and documented.
Extent of Compliance This was a sufficient response at the time. The issue is addressed further in **Chapter Four**.	

The Twentieth Recommendation (donated goods)	
Brisbane Flood Report Recommendations	**Council Action**
That Council develop a process for handling donated goods separately from evacuation centres.	• A process for handling donated goods separately from evacuation centres was developed and included in the Volunteer Guidelines.
Extent of Compliance Compliant	

The Twenty-First Recommendation (the volunteer effort)	
Brisbane Flood Report Recommendations	**Council Action**
that Council implement strategies in relation to volunteer clean-up activities for:	• A pro forma briefing sheet for flood volunteers was developed. • Volunteer Guidelines have been further developed and expanded by Council to include all recommendations listed regarding the volunteer effort.

Development of a proforma briefing sheet for volunteers based on experience gained in this flood event. Identification of house team leaders to liaise with residents so that clean up activity is in accordance with the residents' wishes. Ensuring the provision of appropriate health care arrangements to accompany deployed volunteer groups. In conjunction with QPS, developing processes to ensure the security of flooded residents' dwellings during volunteer cleanup activity. Making provision for a co-ordination cell within the LDCC particularly for individual volunteers.	
Extent of Compliance In response, a pro-forma briefing sheet for flood volunteers was developed and volunteer guidelines were revised and expanded. This was a satisfactory response from Council to the 2011 recommendation. This issue is further addressed in **Chapter Four**.	

The Twenty-Second Recommendation (waste collection)	
Brisbane Flood Report Recommendations	**Council Action**
that Council develop a comprehensive single list of potential sites suitable for temporary waste collection, incorporate a liaison officer from the CWS team into the LDCC; and strengthen the link between procurement and waste management during a disaster by establishing a dedicated liaison officer position in the CWS team.	• A comprehensive single list of potential sites suitable for temporary waste collection was developed. • The SOPs were updated to include CWS Liaison Officer(s) in the LDCC.
Extent of Compliance This was a sufficient response to the 2011 recommendation. This issue is further addressed in **Chapter Four**.	

The Twenty-Third Recommendation (flood risk management)	
Brisbane Flood Report Recommendations	**Council Action**
that in relation to planning, Council undertakes a completed Flood Risk Management analysis for the area of Brisbane affected by flooding from the Brisbane Rivera and associated tributaries in line with the National Flood Risk Advocacy Group and other relevant guidelines. This would require a detailed assessment of the benefits and costs of a full range of flood mitigation options.	• Council participated in a State Government led project to complete a Flood Risk Management analysis for the area of Brisbane affected by flooding, as part of or following a whole of Brisbane River catchment hydrology and flood study. These comprehensive studies included a whole of Brisbane River Catchment flood study, which extended beyond the Dam catchments, and included tributaries such as the Bremer River and Lockyer Creek along with major creek inflows such as Oxley Creek.
Extent of Compliance Sufficient and satisfactory	

The Twenty-Fourth Recommendation (backflow prevention devices (BPDs))	
Brisbane Flood Report Recommendations	**Council Action**
That Council investigate the feasibility of the installation of devices to prevent backflow from river flooding in locations such as in parts of the CBD and in high rise buildings which would not have been flooded otherwise, where all those potentially affected by backflow flooding have responsibility for oversight of the maintenance of the device in working order; and No BPDs should be incorporated into the stormwater network system unless a complete risk-based flood management analysis has confirmed that this is the best option.	• Data was gathered to inform the potential application of backflow prevention technology in three case study areas being the CBD, Rosalie/Milton and New Farm. • Community input was sought on backflow issues in the three case study areas via Talk to Council sessions, Living in Brisbane newsletter and direct mail. • Technical investigations were conducted to assess the risks, issues and opportunities associated with backflow prevention technology in the three case study areas. Further community consultation in each of the case study areas at the conclusion of the investigation. • A desktop review was carried out concurrently in order to identify other sites across the city that flooded in January 2011 which may warrant a more detailed investigation and analysis as detailed above. The desktop review was also followed by community consultation in identified areas

Extent of Compliance This was an appropriate response to this 2011 recommendation. This is the subject of further discussion in **Chapter Three**.

The Twenty-Fifth Recommendation (levees)	
Brisbane Flood Report Recommendations	**Council Action**
that Council investigate the feasibility and appropriateness of establishing local levees to protect areas of strategic significance such as the Rocklea Markets. This will require a complete risk based flood management analysis	• On 26 April 2012 the then Queensland Premier Campbell Newman wrote to the Lord Mayor accepting ownership of several recommendations from the Brisbane Flood Report, including REC016.1, and this recommendation was subsequently transferred to the Queensland State Government. • Council points out that it otherwise continually supports the investigation by property owners to assess the feasibility and appropriateness of establishing levees, and Council has provided a framework to be used by property owners who wish to undertake this assessment. Council works collaboratively with areas of strategic significance, such as the Rocklea Markets, to undertake risk based flood management analysis.
Extent of Compliance This was an adequate response from Council.	

Conclusion

Council responded appropriately to the recommendations of the 2011 Flood Response Review Board. Many of the issues involved there are of continuing currency and fall to be re-assessed in light of the 2022 experience, as covered in the chapters following.

However as to recommendation 16, given Pullenvale remains at risk of being an isolated community during any flood event the isolating communities Sub-Plan of the Disaster Management Plan should be regularly reviewed to ensure optimal deployment of relief assistance. It is also recommended that Council continue to review the provision of a flood proof Ward Office for the Tennyson Ward. (See **Recommendation 2.1 and 2.2**).

Table 3: Recommendations of the Final QFCI Report as relevant to Brisbane City Council

Following the publication of the interim and final reports of the QFCI, Council conducted a comprehensive analysis of the recommendations relevant to it. In many cases, action addressing the matters recommended had already been taken or was subsequently taken.

Within its submission to this review, Council has provided an update on the actions taken against the QFCI recommendations. Most have subsequently been addressed.

For the purpose of this review, only the final QFCI report recommendations have been reproduced. The numbering is taken from the QFCI final report. A summary of compliance is provided at the end.

QFCI Recommendation	Council Action
2.1 The steering committee of the Wivenhoe Dam and Somerset Dam Optimisation Study should consider whether it would be more effective for the floodplain management investigation to be removed from the Wivenhoe Dam and Somerset Dam Optimisation Study.	• As a member of the Steering Committee, Council has agreed to remove floodplain management investigations from the Wivenhoe Dam and Somerset Dam Optimisation Study.

QFCI Recommendation	Council Action
2.2 Brisbane City Council, Ipswich City Council and Somerset Regional Council and the Queensland Government should ensure that, as soon as practicable, a flood study of the Brisbane River catchment is completed in accordance with the process determined by them under recommendation 2.5 and 2.6. The study should:	• Council has worked with the Queensland Government, Ipswich City Council and Somerset Regional Council on a collaborative approach to produce a Terms of Reference to outline the scope, objectives, methodology, estimated costs and responsibilities for the study. • The Brisbane River Catchment Flood Study released by the Queensland Government in May 2017 to support a greater understanding of flood behaviour in the area. The Flood Study involved a partnership between the Queensland Government, Seqwater, and the local governments of Brisbane, Ipswich, Somerset and Lockyer Valley. The Flood Study

• be comprehensive in terms of the methodologies applied and use different methodologies to • corroborate results • involve the collation, and creation where appropriate, of the following data: o rainfall data including historical and design data and radar o stream flow data o tide levels o inundation levels and extents o data on the operation of Wivenhoe and Somerset dams o river channel and floodplain characteristics including topography, bathymetry, development • and survey data • involve determining the correlation between any of the data sets above • produce suitable hydrologic models run in a Monte Carlo framework, taking account of variability over the following factors: - spatial and temporal rainfall patters - saturation of the catchment - initial water level in dams - effect of operating procedures - physical limitations on the operation of the dams - tidal conditions - closely occurring rainfall events • validate hydrologic models to ensure they reproduce: - observed hydrograph attenuation	considered a range of factors including location of rainfall, ground conditions, sea levels and dam water levels. • The Brisbane River Catchment Flood Study partners, including the Council, continue to work together to implement recommendations from the Brisbane River Strategic Floodplain Management Plan released April 2019.

- probability distributions of observed values for total flood volume and peak flow - timing of major tributary flows - observed flood behaviour under no dams conditions and current conditions • produce a suitable hydraulic model or models that: - are able to determine flood heights, extents of inundation, velocities, rate of rise and duration • of inundation for floods of different probabilities - are able to deal with movement of sediment and changes in river beds during floods - are able to assess historical changes to river bathymetry - are able to be run in a short time to allow detailed calibration and assessment work - characterise the backwater effect at the confluence of the Brisbane and Bremer rivers and other confluences as appropriate • involve analysis of the joint probability of floods occurring in the Brisbane and Bremer rivers (and any • other pair of rivers if considered appropriate) • be iterative, and obtain a short-term estimate of the characteristics of floods of different probabilities in all significant locations in the catchment (at least Brisbane City, Ipswich City and at Wivenhoe Dam) in order to determine the priorities for the rest of the study.	

QFCI Recommendation	Council Action
2.4 A recent flood study should be available for use in floodplain management for every urban area in Queensland. Where no recent study exists, one should be initiated.	• A prioritised schedule for the delivery of flood studies across Brisbane's creek catchments was completed for the high priority catchments in 2015 (eg Norman, Oxley, Bulimba, Breakfast). By end of June 2015, 17 creek flood studies had been completed, covering 82% of Council's urban area. • Citywide Creek and Overland Flow Path Modelling project was completed in 2017. The Project built a citywide hydrologic and hydraulics model of Brisbane's overland flow paths and un-modelled creeks. • Multiple flood studies have subsequently been completed by Council and the results of which are incorporated regularly into Council's online flood awareness tools including the Flood Awareness Map service and FloodWise Property Report service. • Council conducts ongoing updates to flood studies as a result of introduction of legislative standards, climate change, rainfall data and state planning policies. • The Council have set a target of, on average, 1 flood study per year with prioritisation and determination of critical/urgent areas needing upgrades.

QFCI Recommendation	Council Action
2.5 The Queensland Government, in consultation with councils, should determine which urban areas in Queensland do not have access to flood information from a current flood study. The Queensland Government should rank those areas in order of priority in accordance with their need for updated flood information by reference to factors including: a) population b) sophistication of land use planning and emergency management measures already in place in those areas	• Council consulted and coordinated with State Government to conduct the recommended flood study. • The Queensland Government, through the Queensland Reconstruction Authority, has written to every local government in Queensland seeking details of the extent of existing flood studies. In addition, the Queensland Reconstruction Authority has developed a secure web page which allows councils to provide flood information and upload flood studies/data that exists for its local government area. This information will be used to develop a list of priority towns requiring flood investigations, in accordance with the factors identified by the Commission.

c) currency of any flood risk information available to the council d) approximate frequency of damaging floods in the area according to the historical record.	

QFCI Recommendation	Council Action
2.6 By reference to the order of priority determined in accordance with recommendation 2.5 *(in the QFCI final report)*, the Queensland Government and councils should together ensure that the council responsible for each urban area in Queensland has access to current flood study information. This will include determining: a) a process or processes by which the flood studies will be completed, including the involvement of the Queensland Government and relevant councils b) how, and from whom, the necessary technical and financial resources will be obtained c) a reasonable timeframe by which all flood studies required will be completed.	• A prioritised schedule for the delivery of flood studies across Brisbane's creek catchments was completed for the high priority catchments in 2015 (eg Norman, Oxley, Bulimba, Breakfast). By end of June 2015, 17 creek flood studies had been completed, covering 82% of Council's urban area. • Citywide Creek and Overland Flow Path Modelling project was completed in 2017. The Project built a citywide hydrologic and hydraulics model of Brisbane's overland flow paths and un-modelled creeks. • Multiple flood studies have subsequently been completed by Council and the results of which are incorporated regularly into Council's online flood awareness tools including the Flood Awareness Map service and FloodWise Property Report service. • Council conducts ongoing updates to flood studies as a result of introduction of legislative standards, climate change, rainfall data and state planning policies • The Council have set a target of, on average, 1 flood study per year with prioritisation and determination of critical/urgent areas needing upgrades. • Council have also documented the process for completing flood studies, including: o how studies are undertaken; and o involvement of elected representatives (Queensland Government and other relevant agencies).

QFCI Recommendation	Council Action
2.7 As far as practicable, councils should maintain up-to-date flood information.	• In line with Council's response to flood information recommendations, Council continue to continually update and review available data to ensure the information provided is up-to-date.

QFCI Recommendation	Council Action
2.8 When commissioning a flood study, the body conducting the study should: • check whether others, such as surrounding councils which are not involved in the study, dam operators, the Department of Environment and Resource Management, and the Bureau of Meteorology, are doing work that may assist the flood study or whether any significant scientific developments are expected in the near future, and decide whether to delay the study • discuss the scope of work with the persons to perform the flood study as well as surrounding councils which are not involved in the study, dam operators, the Department of Environment and Resource Management, and the Bureau of Meteorology.	• Council have also documented the process for completing flood studies, including: o how studies are undertaken; and o involvement of elected representatives (Queensland Government and other relevant agencies). • Consulting with stakeholders on the documented process on an ongoing basis.

QFCI Recommendation	Council Action
2.9 Elected representatives from councils should be informed of the results of each flood study relevant to the council's region and consider the ramifications of the study for land planning and emergency management.	• Council has also documented the process for completing flood studies, including: o how studies are undertaken; and o involvement of elected representatives (Queensland Government and other relevant agencies).

	• Consulting with stakeholders on the documented process on an ongoing basis.

QFCI Recommendation	Council Action
2.10 Elected representatives from all agencies involved in a flood study should be informed of recommendations made for future work, and determine, on a risk basis, whether that further work is to be completed	• Council has also documented the process for completing flood studies, including: o how studies are undertaken; and o involvement of elected representatives (Queensland Government and other relevant agencies). • Consulting with stakeholders on the documented process on an ongoing basis.

QFCI Recommendation	Council Action
2.12 Councils in floodplain areas should, resources allowing, develop comprehensive floodplain management plans that accord as closely as practicable with best practice principles.	• A flood risk management strategy for Brisbane was developed, along with a prioritised schedule for the delivery of creek floodplain management plans. • Council has ongoing program supporting the development of Catchment Flood Risk Management Plans. • By June 2016, Council had completed 10 top priority Catchment Floodplain Management Plans, incorporating more than 10 creek catchments. • Council updated Local Floodplain Management Plan to include a comprehensive and up-to-date assessment of all sources of Brisbane's flood risk and consolidate a range of existing studies, information and management measures in a single place. • Implemented data from creek flood studies updated post 2018 into the Local Floodplain Management Plan (Bulimba Creek Flood Study 2021 and Cabbage Tree Creek Flood Study 2019)

QFCI Recommendation	Council Action
2.13 For urban areas or areas where development is expected to occur: a) councils with the requisite resources should develop a flood map which shows 'zones of risk' (at least three) derived from information about the likelihood and behaviour of flooding b) councils without the requisite resources to produce a flood behaviour map should develop a flood map which shows the extent of floods of a range of likelihoods (at least three)	• Developed an approach and program to flood risk mapping in order provide up-to-date information which supports both planning and development and public awareness of flooding. The flood risk mapping program considers zones of risk, likelihood and behaviour. • Council offers a number of tools that are being updated on an ongoing basis. For example: o Council provides highly detailed FloodWise Property Reports which show the risk and type of flooding at specific searchable properties. This includes non-urban areas or limited development areas. o The Interactive Flood Awareness Map also provides extensive flooding information, incorporating historical data. The Map covers the entirety of the Brisbane Region. o The Brisbane City Council City Plan 2014 also provides for the entire Brisbane Region and allows users to include overlays to filter through relevant flood information.

QFCI Recommendation	Council Action
2.14 For non-urban areas or areas where limited development is expected to occur councils should consider, on a risk basis, what level of information about flood risk is required for the area, and undertake the highest ranked of the following options which is appropriate to that need and within the capacities (financial and technical) of the council: a) a map showing 'zones of risk' (at least three) derived from information about the likelihood and behaviour of flooding b) a map showing the extent of floods of a range of likelihoods (at least three)	• Developed an approach and program to flood risk mapping in order provide up-to-date information which supports both planning and development and public awareness of flooding. The flood risk mapping program considers zones of risk, likelihood and behaviour. • Council offers a number of tools that are being updated on an ongoing basis. For example: o Council provides highly detailed FloodWise Property Reports which show the risk and type of flooding at specific searchable properties. This includes non-urban areas or limited development areas. o The Interactive Flood Awareness Map also provides extensive flooding information, incorporating historical data. The Map covers the entirety of the Brisbane Region.

c) a flood map based on historic flood levels that have been subjected to a flood frequency analysis to estimate the annual exceedance probability of the selected historical flood d) a historic flood map without flood frequency analysis e) the Queensland Reconstruction Authority Interim Floodplain Assessment Overlay as a way to determine those areas for which further flood studies are required, or f) the Queensland Reconstruction Authority Interim Floodplain Assessment Overlay (preferably refined using local flood information) as a trigger for development assessment.	o The Brisbane City Council City Plan 2014 also provides for the entire Brisbane Region and allows users to include overlays to filter through relevant flood information.

QFCI Recommendation	**Council Action**
2.15 Councils should ensure that areas for which there has been no assessment of the likelihood of flooding are indicated on a map and that, as part of the development assessment process for these, there is at least some enquiry into whether a site proposed for development could be subject to flooding.	• Existing flood maps (including, but not limited to, Brisbane River and Creeks, Local Stormwater Management Plans, Stormwater Management Plans, maps provided through a Development Application, Flood Flag and Overland Flow Maps) are continually being reviewed to identify where no assessment of flood risk has occurred. • Implemented approved changes to Council's assessment processes, where necessary.

QFCI Recommendation	**Council Action**
2.16 Councils and the Queensland Government should display on their websites all flood mapping they have commissioned or adopted.	• Council continues to provide free flood maps on Council's website. Ranging from colour-coded maps, flood flag maps, floodWise property reports, rates notice inserts, flood markers and geospatial mapping that depicts inundation at certain river heights, including: o Interactive Flood Awareness Map: provides general awareness on possibility of flooding in a local area, including historic flooding

	information. A 'Flooding fact sheet – an explanation of technical flood terms' is provided to assist the public in using the Map. o FloodWise Property Reports show the risk and type of flooding at specific searchable properties o Development.i provides access to past and current application details and basic property information for the local government area. o General flood awareness fact sheets are provided, such as the *Residents guide to flooding – types of flooding* guide.

QFCI Recommendation	**Council Action**
2.17 Flood maps, and property specific flooding information intended for use by the general public, should be readily interpretable and should, when necessary, be accompanied by a comprehensible explanatory note.	• Council continues to provide free flood maps on Council's website. Ranging from colour-coded maps, flood flag maps, flood-wise property reports, rates notice inserts, flood markers and geospatial mapping that depicts inundation at certain river heights: o Interactive Flood Awareness Map: provides general awareness on possibility of flooding in a local area, including historic flooding information. A 'Flooding fact sheet – an explanation of technical flood terms' is provided to assist the public in using the Map. o FloodWise Property Reports show the risk and type of flooding at specific searchable properties o Development.i provides access to past and current application details and basic property information for the local government area o General flood awareness fact sheets are provided, such as the Residents guide to flooding – types of flooding guide. • All interactive tools and maps displayed on Council's website are being reviewed on an ongoing basis as new data becomes available.

QFCI Recommendation	**Council Action**
2.18 Councils that do not currently do so should consider offering an online database which allows the	• Council continues to provide free flood maps on Council's website. Ranging from colour-coded maps, flood flag maps, flood-wise property

public to conduct a search on a parcel of land to find development approvals relevant to that parcel of land.	reports, rates notice inserts, flood markers and geospatial mapping that depicts inundation at certain river heights: o Interactive Flood Awareness Map: provides general awareness on possibility of flooding in a local area, including historic flooding information. A 'Flooding fact sheet – an explanation of technical flood terms' is provided to assist the public in using the Map. o FloodWise Property Reports show the risk and type of flooding at specific searchable properties o Development.i provides access to past and current application details and basic property information for the local government area o General flood awareness fact sheets are provided, such as the Residents guide to flooding – types of flooding guide. • All interactive tools and maps displayed on Council's website are being reviewed on an ongoing basis as new data becomes available.

QFCI Recommendation	**Council Action**
4.6 Councils should consider using limited development (constrained land) zone in their planning schemes for areas that have a very high flood risk.	• Developed an approach to zoning and flood risk. • Commenced industry engagement on the flood code approach. • Adopted a new flood code into the planning scheme as part of Council's *New City Plan*. The *Brisbane City Plan 2014* offers an option to include a 'flood overlay' which details certain development restrictions for certain flood zones.

QFCI Recommendation	**Council Action**
5.3 If the Queensland Government does not include a requirement for such an overlay map in the model flood planning controls, councils should include a flood overlay map in their planning schemes. The map should identify the areas of a council region: • that are known not to be affected by flood	• Developed an approach to zoning and flood risk. • Commenced industry engagement on the flood code approach. • Adopted a new flood code into the planning scheme as part of Council's *New City Plan*. The *Brisbane City Plan 2014* offers an option to include a 'flood overlay' which details certain development restrictions for certain flood zones.

• that are affected by flood and on which councils impose planning controls (there may be subsets in each area to which different planning controls attach) • for which there is no flood information available to council.	

QFCI Recommendation	Council Action
5.5 If the Queensland Government does not include such a code in the model flood planning controls, councils should include in their planning schemes a flood overlay code that consolidates assessment criteria relating to flood.	• Adopted a new flood code into the planning scheme as part of Council's *New City Plan*. The *Brisbane City Plan 2014* offers an option to include a 'flood overlay' which details certain development restrictions for certain flood zones.

QFCI Recommendation	Council Action
5.7 If the Queensland Government does not include such a policy in the model flood planning controls, councils should include in their planning schemes a planning scheme policy that: • for development proposed on land susceptible to flooding, outlines what additional information • an applicant should provide to the assessment manager as part of the development application or: • for development proposed on land where potential for flooding is unknown requires an applicant to provide: - as part of the development application, information to enable an assessment of	• Adopted a new flood code into the planning scheme as part of Council's *New City Plan*. The *Brisbane City Plan 2014* offers an option to include a 'flood overlay' which details certain development restrictions for certain flood zones. The requirements for development applications are set out in company with the *Brisbane City Plan 2014.*

whether the subject land is susceptible to flooding, and - upon a determination the subject land is susceptible to flooding, more detailed information to allow an assessment of the flood risk	

QFCI Recommendation	Council Action
7.3 If the Queensland Government does not include such assessment criteria in model flood planning controls, councils should include assessment criteria in their planning schemes that require community infrastructure (including the types of community infrastructure which are identified in the Sustainable Planning Regulation 2009 and which the community needs to continue functioning, notwithstanding flood) to be located and designed to function effectively during and immediately after a flood of a specified level of risk.	• Identified specific flood planning levels for community infrastructure. • Commenced industry engagement on the flood code approach. • Adopted a new flood code into the planning scheme as part of Council's *New City Plan*. The *Brisbane City Plan 2014* offers an option to include a 'flood overlay' which details certain development restrictions for certain flood zones.

QFCI Recommendation	Council Action
7.5 If the Queensland Government does not include such assessment criteria in the model flood planning controls, councils should include assessment criteria in their planning schemes that require the impact of flood on commercial property to be minimised.	• Commenced industry engagement on the flood code approach. • Adopted a new flood code into the planning scheme as part of Council's *New City Plan*. The *Brisbane City Plan 2014* offers an option to include a 'flood overlay' which details certain development restrictions for certain flood zones. • The planning scheme provides for minimum requirements for commercial development in these zones.

QFCI Recommendation	Council Action
7.10 Council's should ensure that, when applications for environmentally relevant activities are approved by a council, the details of those activities, including their nature and location, are provided to the Department of Environment and Resource Management.	• Developed and implemented a process for Council to inform the Department of Environment and Heritage (previously the Department of Environment and Resource Management) about applications for Environmentally Relevant Activities. • Collated all existing applications for devolved Environmentally Relevant Activities and notify Department of Environment and Heritage on an ongoing basis.

QFCI Recommendation	Council Action
7.12 If the Queensland Government does not include such assessment criteria in the model flood planning controls, councils should include assessment criteria in their planning schemes that require that: a) the manufacture or storage of bulk hazardous materials (as defined in State Planning Policy 1/03) take place above a certain flood level, determined following an appropriate risk-based assessment, or b) structures on land susceptible to flooding and used for the manufacture or storage of bulk hazardous materials (as defined in State Planning Policy 1/03) be designed to prevent the intrusion of floodwaters.	• Identified an approach for land use provisions to deal with locational and design criteria for new potentially hazardous uses • Commenced industry engagement on the flood code approach. • Adopted a new flood code into the planning scheme as part of Council's *New City Plan*. The *Brisbane City Plan 2014* offers an option to include a 'flood overlay' which details certain development restrictions for certain flood zones.

QFCI Recommendation	Council Action
7.13 When approving applications for development which involve the manufacture or	• Reviewed and updated approval processes. • Implementing revised processes and continual training of staff on an

storage of hazardous materials, councils should not restrict the conditions imposed to ones which are solely reliant on human intervention to remove the materials in the event of flood.	ongoing basis.

QFCI Recommendation	Council Action
7.15 Councils (particularly Brisbane City Council) should consider including in their planning schemes more stringent standards for the design and construction of prescribed tidal work than those in the code for development applications for prescribed tidal work in the Coastal Protection and Management Regulation 2003.	• Approved the Prescribed Tidal Works planning scheme policy for public release. • The Queensland Government passed the Coastal Protection and Management Amendment Regulation that the Council implemented in order to ensure stringent standards for design and construction.

QFCI Recommendation	Council Action
7.17 If the Queensland Government does not include such assessment criteria in the model flood planning controls, councils should consider including assessment criteria in their planning schemes which require that works in a floodplain: • do not reduce on-site flood storage capacity • counteract any changes the works will cause to flood behaviour of all floods up to and including the acceptable defined flood event by measures taken within the subject site (for example, use of compensatory works, detention basins or other engineering mechanisms), and • do not change the flood characteristics outside the subject site in ways that result in: - loss of flood storage	• Identified a planning approach that balances filling and critical flood storage for incorporation into the flood code • Commenced industry engagement on the flood code approach. • Adopted a new flood code into the planning scheme as part of Council's New City Plan. The Brisbane City Plan 2014 offers an option to include a 'flood overlay' which details certain development restrictions for certain flood zones.

- loss of/changes to flow paths - acceleration or retardation of flows, or - any reduction in flood warning times elsewhere on the floodplain.	

QFCI Recommendation	Council Action
7.25 If the Queensland Government does not include such assessment criteria in the model flood planning controls, councils should consider including assessment criteria in their planning schemes that address: • the prospect of isolation or hindered evacuation • the impact of isolation or hindered evacuation.	• Identified a planning approach that balances filling and critical flood storage for incorporation into the flood code • Commenced industry engagement on the flood code approach. Adopted a new flood code into the planning scheme as part of Council's *New City Plan*. The *Brisbane City Plan 2014* offers an option to include a 'flood overlay' which details certain development restrictions for certain flood zones.

QFCI Recommendation	Council Action
8.1 Councils should, resources allowing, maintain flood maps and overland flow path maps for use in development assessment. For urban areas these maps should be based on hydraulic modelling; the model should be designed to allow it to be easily updated as new information (such as information about further development), becomes available.	• The high risk overland flow path areas were reviewed in order to determine areas in need of updating. Those areas were updated as required.

QFCI Recommendation	Council Action
8.2 Councils should make their flood and overland flow maps and models available to applicants for development approvals, and to consultants engaged by applicants.	• Flood and overland flow maps and models are available to applicants for development approvals, and to consultants engaged by applicants on Council's website. • Council's Open Data provides access to free flood modelling information from all available flood studies enabling access to raw data for engineers, planners, developers and insurance industry.

QFCI Recommendation	Council Action
8.4 If the Queensland Government does not include such a policy in the model flood planning controls, councils should include a planning scheme policy in their planning schemes that sets out the information to be provided in development applications in relation to stormwater and flooding. The policy should specify: • the type of models and maps to be provided • the substantive information required to be shown in the development application • how the assumptions and methodologies used in preparing the models and maps should be presented • the form in which the information on storm water and flooding is to be presented in the application.	• Information requirements for development applications are set out in a planning scheme policy and provided to the public. • Adopted a new flood code into the planning scheme as part of Council's *New City Plan.*

QFCI Recommendation	Council Action
8.5 Councils should review their assessment processes to ensure that: • the person with primary responsibility for the assessment of the development application considers what expert input is required • where a development application is subject to comment by a number of professionals, the responsibilities and accountability of each contributor are clear • where flood-related information is referred to an expert for advice, the expert is required to comment on the extent of compliance by	• Reviewed and updated assessment processes. • Implementing revised processes and continual training of staff on an ongoing basis.

reference to each relevant assessment criteria and identify and explain any inability to comment.	

QFCI Recommendation	Council Action
8.6 Councils should take care when imposing conditions to ensure that each condition has purpose; standardised conditions should not be included where they have no application to the development in question.	• Reviewed and updated assessment processes. • Implementing revised processes and continual training of staff on an ongoing basis.

QFCI Recommendation	Council Action
8.7 Councils should not rely on a condition requiring an evacuation plan as the sole basis for approving a development susceptible to flooding.	• Reviewed and updated existing processes to ensure Council does not rely on a condition requiring an evacuation plan as the sole basis for approving a development susceptible to flooding. • Implementing revised processes and continual training of staff on an ongoing basis.

QFCI Recommendation	Council Action
8.8 Councils should consider providing advice to development applicants during pre-lodgement meetings, and at the time of receiving a development application, about the way in which the development will be assessed for flood risk and what flood information council will be relying on to make this assessment.	• The processes are being reviewed and updated on an ongoing basis. • Amending pre-lodgement advice and information request templates to align with new processes when necessary.

QFCI Recommendation	Council Action
10.6 Queensland Urban Utilities, and other distributor-retailers and councils, that have identified a practice of stormwater drains being connected to sewerage infrastructure, should conduct a program of education to raise public awareness that this practice is illegal and impedes the operation of the sewerage infrastructure.	• Plumbing forum conducted to raise public awareness. • Developed a communication strategy to raise public awareness in relation to the illegality of connecting stormwater to sewerage infrastructure. • The communication strategy to ensure public awareness is being updated on an ongoing basis.

QFCI Recommendation	Council Action
10.7 Councils and distributor-retailers should agree to protocols for the exchange of information about suspected illegal connections, the steps being taken to investigate them or the basis for concluding that no investigation is required, and the results of any investigations or enforcement actions.	• Council liaises with Urban Utilities on an ongoing basis to understand their scheduled infrastructure maintenance programs. • The Plumbing Services Group (PSG) in Council's Development Services investigates non-compliant plumbing queries on a complaint driven basis. This includes stormwater to sanitary drainage complaints. • A copy of the Council's Compliance and Enforcement Guideline with respect to Defective and Illegal Stormwater connection is available on the Council website. • Continually develop and formalise processes for information sharing with Urban Utilities to identify non-compliant properties. • Implement enforcement processes that rectify illegal stormwater to sewerage connections. Ongoing quarterly reporting on this work. • Ongoing discussions between PSG and Urban Utilities regarding possible stormwater to sewer connections and any subsequent plumbing enforcement actions.

QFCI Recommendation	Council Action
10.9 All councils should, resources allowing, map the overland flow paths of their urban areas.	• Overland flow paths in Council's urban areas have been mapped and updated on an ongoing basis.

QFCI Recommendation	Council Action
10.10 Councils should consider amending their planning schemes to include provisions directed to consideration of the flood resilience of basements as a factor in determining the appropriateness of a material change of use.	• Included interim provisions in the new Temporary Local Planning Instrument that specify appropriate flood protections for basements • Commenced industry engagement on the flood code approach. • The Temporary Local Planning Instrument was adopted as a new flood code into the planning scheme as part of Council's *New City Plan.*

QFCI Recommendation	Council Action
10.11 In assessing and determining development applications for material change of use in areas susceptible to flood, councils should consider whether the new developments locate essential services infrastructure above basement level, or, alternatively, whether essential services infrastructure located at basement level can be constructed so that it can continue to function during a flood.	• Interim provisions in the Temporary Local Planning Instrument directed at flood resilience were implemented in the planning scheme. • Commenced industry engagement on the flood code approach. • The Temporary Local Planning Instrument was adopted as a flood code into the planning scheme as part of Council's *New City Plan*.

QFCI Recommendation	Council Action
10.14 All councils should periodically conduct risk assessments to identify areas at risk of backflow flooding. In respect of such areas, councils should consider how such risks can be lessened, including in that process consideration of the installation of BPDs. Backflow devices should not, however, be installed unless and until a full risk-based assessment has been undertaken.	• Council has conducted investigations into backflow reduction measures for priority areas following the January 2011 flood event. • Council has periodically undertaken comprehensive risk assessments into backflow flooding based on the following criteria; o severity of flooding; o number of affected residential properties; o frequency of flooding and inundations; o cost effectiveness; and o environmental, social and safety impacts. • Following Council's assessments, Council constructed 66 backflow devices at 16 priority localities, with detailed maps of the backflow device locations in Brisbane available for download from the Council website.

QFCI Recommendation	Council Action
10.15 Councils should conduct education campaigns directed to ensuring that all residents and property owners in areas identified as being at risk of backflow flooding are aware of the circumstances in which backflow flooding can occur, the hazard it presents and what should be done if it occurs.	• Ongoing education programs addressing flooding, including backflow flooding. • Providing information on the use of Backflow devices for stormwater drains and a map of their locations in the local government area. • Providing a FAQ section that explains the limitations of backflow devices and what residents can do in the event of a flood. • Ongoing contact with affected residents to ensure the latest information is being received. • Ongoing updates to Flood Information Online (FIO) systems to include targeted communications to affected properties to learn more about backflow flooding and potential impacts of referable dams

QFCI Recommendation	Council Action
10.17 If the Queensland Government does not include such assessment criteria in the model flood planning controls, councils should include assessment criteria in their planning schemes that require critical infrastructure in assessable substation developments is built to remain operational during and immediately after a flood of a particular magnitude. That magnitude should be determined by an appropriate risk assessment.	• Specified appropriate flood protection approaches for substations in relevant zones. • Commenced industry engagement on the flood code approach. • Adopted a new flood code into the planning scheme as part of Council's *New City Plan* with criteria directed at substations.

QFCI Recommendation	Council Action
10.22 Carriers, councils and the Australian Communications and Media Authority should take into account the risk of flooding when considering the placement of telecommunications facilities.	• Specified appropriate flood protection approaches for assessable telecommunications facilities in relevant zones. • Commenced industry engagement on the flood code approach. • Adopted a new flood code into the planning scheme as part of Council's *New City Plan* with criteria directed at substations.

QFCI Recommendation	Council Action
11.1 Councils should consider implementing a property buy-back program in areas that are particularly vulnerable to regular flooding, as part of a broader floodplain management strategy, where possible obtaining funding from the Natural Disaster Resilience Program for this purpose.	• The VHPS was instigated following the 2011 flood event and has now concluded. • Since 2006 Council has purchased 112 residential properties at risk of flooding at an approximate cost of $58 million. Properties purchased under the VHPS are used by Council for conservation, drainage easements and parklands, and it is Council's policy not to redevelop these flood prone areas for future residential use. • The FRHP offered by the Council provides eligible properties with unique reports and offers financial assistance to implement resilience works.

QFCI Recommendation	Council Action
15.1 Councils should support and encourage business owners to develop private flood evacuation plans by providing the following to business owners in areas known to be affected by flood: • information about the benefits of evacuation plans • contact details of relevant council and emergency service personnel for inclusion in evacuation plans.	• Information about evacuation plans included and continually updated on Council's website

QFCI Recommendation	Council Action
15.2 Councils should consider making available to business owners' locality specific information that would assist them to develop evacuation plans for commercial premises, for example, any evacuation sub-plan created under Emergency Management Queensland's disaster evacuation guidelines.	• Information continually provided to business owners to assist with developing an evacuation plan.

QFCI Recommendation	Council Action
15.11 Emergency Management Queensland should pursue the execution of the 'Local Arrangements' with councils where a Memorandum of Agreement is in place. The contents of the arrangements should be reviewed and updated regularly.	• Ongoing review of the MOU with Emergency Management Queensland and amending as required.

QFCI Recommendation	Council Action
17.1 The steering committees of the Wivenhoe Dam and Somerset Dam Optimisation Study and the North Pine Dam Optimisation Study should consider removing the water supply security investigation from each study.	• As a member of the Steering Committees, Council has agreed to remove water supply security investigations from the Wivenhoe Dam and Somerset Dam and North Pine Dam Optimisation Studies. • Ongoing support as a stakeholder of the steering committees.

QFCI Recommendation	Council Action
17.2 The Steering committee of the North Pine Dam Optimisation Study should consider whether it would be beneficial for the floodplain management investigation to be removed from the North Pine Dam Optimisation study.	• As a member of the Steering Committee, Council has agreed to remove floodplain management investigations from the North Pine Dam Optimisation Study. • Ongoing support as a stakeholder of the steering committees.

QFCI Recommendation	Council Action
17.25 The Department of Transport and Main Roads, in conjunction with Brisbane City Council and Somerset Regional Council, should investigate options for the upgrade of Brisbane River crossings between Wivenhoe Dam and Colleges Crossing and undertake a cost-benefit analysis of these to determine the outcome which best serves the public interest.	• Council has investigated the construction of a green bridge (walking, cycling and bus) at Bellbowrie to improve cross-river connectivity. The proposed green bridge would have connected Bellbowrie and Moggill residents to cycling and walking options and public transport services on the eastern side of the river, including rail services at Wacol and Darra. The bridge also presented an opportunity to improve emergency access for Moggill and Bellbowrie during major flood events. Public consultation on the bridge was undertaken in late 2019 as part of Council's Green Bridges Program,

	however, following community feedback, Council did not progress the project.

QFCI Recommendation	Council Action
17.31 The Queensland Government should legislate to oblige each owner of a referable dam to have emergency action plans approved by the appropriate Queensland Government agency. Such plans should be reviewed periodically.	• The Emergency Action Plans (EAP) for Gordon Rd Detention basin, Bardon and Forest Lake Dam are being reviewed and updated every year as part of the Dam Safety guidelines for referrable dams. • EAPs are submitted annually to the Dam Safety Regulator and available to the public. • Council maintain contact with affected residents downstream of the dams as required to ensure awareness of the potential flood risk from the dams and provisions of EAPs to manage risks. • Options for a local warning system are being reviewed on an ongoing basis. • Ongoing review of options to improve the function of the Forest Lake Dam. • Council conducts periodic reviews of Emergency Action Plans.

Conclusion

As emerges from the above account, Council responded expeditiously and comprehensively to the recommendations of the QFCI report. Again, many involve a continuing commitment on the part of Council.

In light of the 2022 experience, **recommendations** in regard to backflow prevention and voluntary home purchase are included in **Chapter Three.**

Recommendations

2.1 Pullenvale Ward: that Council regularly review the Isolating Communities Sub-Plan of the Disaster Management Plan to ensure optimal deployment of relief assistance;

2.2 Tennyson Ward: that Council continue to review the provision of a flood proof Ward Office for the Tennyson Ward.

Chapter Three – Effectiveness of Inundation measures

This next Term of Reference (7b) invites consideration of the effectiveness of measures recommended in the reports to be taken by Council to improve protection for flood-prone properties, with particular attention to backflow devices and the Flood Resilient Homes Program (FRHP).

The 2011 report discussed the use of Backflow Prevention Devices (BPDs) (designed to help minimise water flowing back up stormwater pipes) and the construction of levees, among other aspects of the relevant infrastructure.

The 2011 Flood Response Review Board's report took a guarded approach to the possible installation of more BPDs and to levees (a possibility being the cold storage at the Brisbane Markets at Rocklea) suggesting more detailed engineering analysis was warranted in each case.

Backflow Prevention Devices

Following the 2011 flood, Council commissioned two expert engineering reports, one from MWA Environmental in September 2011, and a second from AECOM (May 2012).

The AECOM report identified 51 (although it speaks of 52) drainage systems for which installation of backflow devices was feasible. AECOM foresaw that in working out a priority for installation, Council would consider a cost benefit analysis, the number of properties impacted by floods, the cost of installation, operational issues and previously programmed drainage network upgrades of flood impacted infrastructure.

Having on that basis identified 12 high priority stormwater systems, Council installed devices in them, and three others. (In all, there are 66 backflow devices installed along the Brisbane River.)

Of the 15 devices installed post 2011, seven demonstrably mitigated the effect of flooding in 2022. The effect of the rest could not be gauged, either because the river levee overtopped rendering the device ineffectual (in five cases) or because, the devices being "passive" (meaning manual intervention was not needed for activation), there were no nearby monitoring gauges (in four cases). From the evidence currently available to Council, no properties were worse off during the 2022 event as a consequence of the installation of a backflow device.

Council has a detailed dedicated webpage relating to backflow devices which explains the concept of backflow flooding, lists locations where they are installed and provides information and responses to questions frequently asked about backflow. The locations are listed in **Appendix C** to this report.

Council estimates that of the backflow device locations referred to above, flood heights reduced between .09 and .99 metres and 1,275 properties benefitted which is obviously a very good result. The backflow devices installed since 2011 service 13,376 properties, at a cost of approximately $19,250,000.

It has been urged by respondents to this Review that Council should proceed to install devices at all of the determined locations identified as "feasible" by AECOM, that is, another 37. Council estimates that would cost in the order of $21,610,000 (at 2011/2012 costs) for an expected benefit to only 252 properties.

Council has not excluded further installations but contemplates a "City-wide priority". Council delivers stormwater infrastructure in accordance with a certain prioritisation methodology: cost effectiveness of the proposed project, severity of the flooding, number of affected properties, frequency of flooding events and associated inundations, severity factors (eg flooding to living areas rather than utility areas) and environmental social and safety impacts. Accordingly, at the moment further installations at those other 37 "feasible" locations is not considered a "high city-wide priority".

It is not for this reviewer to gainsay that assessment, recently informed as it is by the work of Council's City Projects Office (with engineering expertise). That work was carried out post this 2022 event, evaluating the performance and effectiveness of the devices in mitigating the height of river flooding at surrounding properties.

That this analysis took place, and promptly, indicates that Council is conscientiously alive to the critical importance of this tool in flood alleviation. **I am satisfied that assessment of the measures, and possible expansion, remain within Council's responsible radar.**

There will be however a **recommendation** that Council continue to assess and prioritise the installation of BPDs as part of its flood mitigation strategy.

Flood Resilient Homes Program

As well as referring specifically to backflow devices, the Term of Reference also refers to the Brisbane City Council FRHP.

Council introduced this program in 2018. It is delivered in partnership with Brisbane Sustainability Agency. Its object is to "retrofit" existing flood-prone dwellings to make them more flood resilient. The Queensland Reconstruction Authority has described the initiative as a "good practice example of leadership…in flood risk management in Queensland".

Participation is voluntary. So far, 286 properties have been assessed, and works completed in 144 homes (including one house raising). Council has invested $9,878,860 in the project.

Following the 2022 weather event, Council was able to make contact with 69% (100) homeowners involved (of a total of 144). 75 of those 100 said that floodwater impacted the area of the resilience work and of those 75, 62 (83%) said the resilience works were successful. Specific feedback was provided by the residents of Torwood Street in Paddington, about the failure of certain installations of the FRHP. This feedback should be investigated and responded to in any review and expansion of the program.

The scheme begun in 2018, a “pilot” scheme, targeted properties experiencing a 50% chance of flooding from overland flow every year. Those properties have been spread over 12 suburbs. There is prospect of expansion of the scheme. There is pressure that it be expanded, with more focus on raising houses, and that it embrace apartment buildings (which suffer largely through inundation of basements, and reduced accessibility because of flooding of adjacent streets).

There are calls that the program be offered to all residents and businesses impacted by regular and severe flooding. It has also been suggested that any town planning requirements for house raising be reviewed so this can occur as of right, and that any associated fees be waived as an extra incentive for residents to flood-proof their homes. No doubt consideration will be given to this in any possible extension of the program.

Following the 2022 flood the Lord Mayor approached the State and Federal Governments for financial assistance to further roll out the “pilot” program in Brisbane.

The Federal Government, in response, committed to providing a support package including $275 million for the “Resilient Household Rebuild Program” and $100 million for the “Resilient Household Raising Program”, to be provided to local Government areas affected by the floods.

This is plainly a worthwhile and effective initiative. Resources allowing, (and it is noted this federal commitment relates to <u>all</u> affected Local Government areas) it should be expanded. There will accordingly be a **recommendation** that the FRHP be continued, and expanded, by identifying other flood affected areas that will benefit from the program and inviting additional homeowners to participate.

<u>Voluntary Home Purchase Scheme (VHPS)</u>

On the separate matter of the VHPS, which featured in some submissions, the 2011 Flood Response Review Board considered that scheme to be a good one, with the caveat that any substantial broadening would probably require additional financial assistance from the State and Commonwealth Governments. (Council policy is not to redevelop those flood prone sites for residential use.) The scheme ran from 2006 to 2016.

At the moment, Council’s budget for voluntary buy-backs has been exhausted, and with limited take up under that scheme anyway (it is voluntary), more attention has been and is being given

to rendering flood prone properties more flood resistant. (There was a suggestion buy-backs should be compulsory in deeply flood prone areas.)
Post 2011, Council invested approx. $58.4 million in the purchase of 112 houses. To put this into perspective, in 2022, more than 20,000 properties suffered some degree of inundation. Council makes the point that this program cannot be revived without State and Commonwealth Government support, which to this point has not been forthcoming. Council has however resolved to re-instate this program if funding is forthcoming.

Other measures

Flood Studies
To equip itself to forecast optimally what properties may be affected by flooding, Council is engaged in a continuinng process of flood studies.

From 2011 to 2015, 17 flood studies were completed providing creek flood data covering more than 80% of urbanised areas across the City.

The Brisbane River Catchment Study, 2017, and the Strategic Floodplain Management Plan 2018, were released to the public.

Tidal, storm surge and coastal flooding within Moreton Bay were dealt with in 2015 in the Coastal Flood Study.

In 2017, Council completed a Citywide Creek and Overland Flow Path Mapping Study, building a city-wide hydraulics model of the City's overland flow paths and previously unmodelled creeks.

The development of these studies/plans has been part of the ongoing process which should now be informed by this 2022 event.

There should therefore be a **recommendation** that Council use new data obtained as a result of the 2022 weather event to update the existing flood studies knowledge base.

Floodplain Management
Council has utilised the information gained from those flood studies in its important catchment floodplain management planning.

By mid-2016, Council had completed 10 top priority Catchment Floodplain Management Plans (incorporating approx. 10 Creek Catchments), in 2018 there was the Strategic Floodplain Management Plan, and over the period 2019-2021, the local Floodplain Management Plan was developed.

The last is a consolidation of previous studies, and provides what Council describes as setting a roadmap for long-term flood management that considers the possible impacts of a changing climate.
There will be a **recommendation** that new data obtained as a result of the 2022 weather event be incorporated into the modelling within Council's existing flood studies to further enhance Council's floodplain management plan.

Drainage
Although not specifically included in the terms of this review, several respondents discussed the importance of the clearing and maintenance of drains and creeks (eg Cabbage Tree Creek, Little Cabbage Tree Creek and Bald Hills Creek), the upgrading of drainage systems (eg the Brighton drainage system), the installation of new drains or drainage basins and reserves. Some feedback has suggested that a more interventionalist approach to waterway management particularly of Enoggera Creek, Oxley Creek and Kedron Brook is warranted. Many respondents gave specific information about the location of where these drainage works would be beneficial.

These sorts of matters should best be processed in the ordinary way through the relevant Council Divisions. There is a host of them, such as, relevant to 2022, flood proofing the Centenary Highway, which is of course a State road, a review of the bridges over Oxley Creek, and many others.

Recommendations

3.1 Backflow Prevention Devices: that Council continue to assess and prioritise the installation of BPDs as part of its flood mitigation strategy;

3.2 Flood Resilient Homes Program: that the FRHP be continued, and if possible, extended into more flood affected areas, and that consideration be given to its extension to flood affected business premises and apartment buildings, with town planning incentives to participants;

3.3 Flood Resilient Homes Program: that the FRHP be reviewed in light of the 2022 weather event, taking into consideration the feedback from residents who had already participated in the program;

3.4 Voluntary Home Purchase Scheme: that subject to the availability of State and Federal funding, the VHPS be reinstated;

3.5 Updating Existing Flood Studies: that Council use new data obtained as a result of the 2022 weather event to update the existing flood studies knowledge base;

3.6 **Floodplain Management: that the new data obtained as a result of the 2022 weather event be incorporated into the modelling within Council's existing flood studies to further enhance Council's floodplain management;**

3.7 **Maintenance Issues: that where specific maintenance issues have been referred to this Review by Councillors or residents, for example of blocked drains and overgrown creek beds and banks impeding outflow, it fall to Councillors to raise those matters with the relevant Council Divisions.**

Chapter Four – Effectiveness of Disaster Management Framework

The Terms of Reference (7c) seek an assessment of the effectiveness of this framework in responding to the 2022 weather event.

7 (c) (i) Council's Disaster Management Organisational Structures and Policies

A high-level summary of the Disaster Management Framework is taken from Council's Submission. A full overview is provided in **Appendix C**.

Council's organisational structures and policies align with and support the disaster management framework prescribed by the Disaster Management Act 2003 (Disaster Management Act).
In accordance with the requirements under Part 2, Division 3 of the Disaster Management Act, Council has established the Brisbane City Council Local Disaster Management Group (LDMG). Council has a Local Disaster Management Plan (LDMP) which is updated annually and is required to be accepted by the District Disaster Coordinator and approved by the Chair of the LDMG.

Council has appointed the Lord Mayor as the chairperson of the LDMG, and representatives from a range of public, private, and not-for-profit sector entities as members. The group's membership reflects Council's understanding of the key stakeholders equipped with the knowledge and capability necessary to prepare for and respond to the disasters most likely in the City.

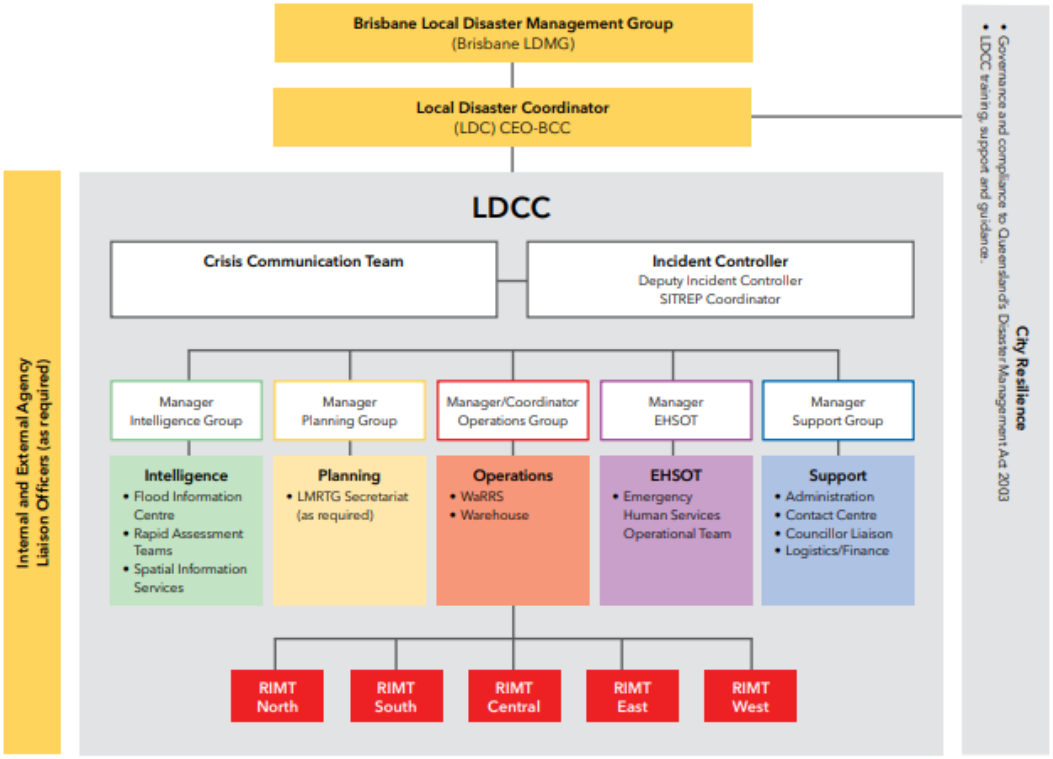
Council convenes a minimum of two LDMG meetings per year when there are no hazards present, and additional meetings during hazard years as are necessary to effectively prepare for and respond to hazards. In addition, at least once annually, the LDMG meets to share operational risks and opportunities in order to exercise and connect. The last LDMG exercise was conducted in September 2021 ("Exercise Tempest") with the ADF.

Council's City Resilience Branch (City Resilience) supports the LDMG to deliver its statutory functions. Through the City Resilience Branch, the LDMP is also supported by a suite of sub-plans and internal procedures which include response, hazard and site-specific, and relief and recovery procedures in accordance with the State disaster management policy and guidelines and stakeholder input.

Council's CEO is the Local Disaster Coordinator (LDC), having been appointed by the Lord Mayor. The LDMG provides for the establishment of a Local Disaster Coordination Centre (LDCC) to support the LDMG during an event. In accordance with the strategy and direction provided by the LDMG, the LDCC provides the central meeting and control point for information

flow and decisions by key stakeholders during an event. When the LDCC is operational, the LDMG adopts the Brisbane Incident Management System (BIMS) structure for its operations as follows:

Figure 1:



The structure facilitates a comprehensive City-wide approach to disaster management, based on the LDMP.

There is no need here for detailed further analysis of the role of these important bodies. Recourse may be had if desired to **Appendix D** which has been taken from Council's submission.

The relevant Term of Reference invites attention to how things worked out in 2022 "on the ground". It may reasonably be assumed that great care and consideration were given, pre and post 2011, to the appropriateness of the regulatory framework. For present purposes, the public utility rests in seeing how that "framework" aided/facilitated the last response and in identifying any areas for desirable enhancement.

It may be observed here that the above structure facilitated a comprehensive City-wide approach to disaster management in 2022.

As the event emerged, City Resilience maintained a heightened level of awareness and reporting, issuing 13 reports.

In the week of 21-25 February 2022, City Resilience moved from “alert” to “lean forward” based on predicted heavy rainfall.

On Saturday 26 February 2022, the LDMG stood up and thereafter provided strategic direction to the LDCC, which also stood up that day. Over the weekend 26-27 February 2022, Council’s RIMT and Council’s Flood Information Centre were also stood up, providing strategic direction to the LDCC.

During the weather event the LDMG met daily. Priorities were provided as strategic direction to the LDCC via LDC, the DLDC and the LDCC incident controller.

The structure appears to have operated satisfactorily and no change to the structure is recommended.

There was a mixed response from respondents about the effectiveness of the Disaster Management Framework whilst in operation during the 2022 Flood. Many identified that the structure and management of the LDCC provided the support necessary during the event. Many gave praise for individual Council officers who worked tirelessly during the event. The dedicated Councillor Liaison Officers were appreciated, noting that it is important to have experienced staff in these roles. Some concerns were raised about the responsiveness to requests (eg for road closures, food waste bins), and a few instances reported of where phones were not answered.

What is evident from the responses, is that Ward Councillors have an important local role to play during such an event, with many residents preferring to contact the Ward Office rather than contact the Council’s contact centre or emergency services directly. There has been a suggestion Councillors be allowed more “discretionary power during a declared disaster to effect outcomes” including recourse to a small fund to assist residents. **I think that could be problematic and I am not persuaded of a need for it.**

The Councillors also play an important role in communicating details and emergency services advice about the event to their constituents. Many Councillors have large followings on their social media channels. Councillors also provide a role in reporting local issues and hazards into the LDCC, which adds to the intelligence about the event. There is a call for timely and up to date information via the SITREPs so this information can be passed on confidently to constituents.

Notwithstanding the above, as previously mentioned, this event was rapidly changing, with near city-wide impacts. The SITREPs reflected BoM advice which was rapidly changing (see Chapter Five) and based on the river flooding. Meanwhile, Creek systems were flooding which led to a view that the SITREPs were out of date and not reflecting what Councillors were experiencing within their wards.

Many Councillor respondents also talked of a desire for additional training – to better understand their role and the processes and resources available in a time of disaster. It is therefore **recommended** that the role of the local Councillors is formally understood and documented in the various guides and SOP's within the disaster management framework; that mandatory training occur for newly elected Councillors in the disaster management framework and operations; and that regular refresher training is given at defined intervals, including the opportunity for Councillors to participate in desktop and simulated emergency exercises.

7 (c) (ii) Effectiveness of the establishment of Evacuation Centres

Council established two evacuation centres, at the Sleeman Sports Centre on the South-side (Chandler) from 6am Sunday 27 February 2022 (it operated for 12 days), and at the Kedron-Wavell Services Club on the North-side (Chermside) from 2pm Sunday 27 February 2022 (open 6 days). Sleeman received 257 evacuees and Kedron-Wavell 581.

Council staffed these centres, aided by Australian Red Cross, Salvation Army, St John Ambulance, Tzu-Chi Foundation, Save the Children and the Animal Welfare League.

From the Council, 140 trained staff (from a range of departments) worked a total of 1986 hours across 51 eight-hour shifts. They are to be commended for their willingness to undertake this different and in ways arduous and challenging role.

The two locations were selected for a variety of reasons, including availability, the number of evacuees who could be accommodated and their hazard suitability, and that the venues would not be affected by flooding. The establishment of the centres was publicised by a Council Social Media campaign on the Saturday night.

The conduct of the centres was complicated by the need to isolate COVID-19 infected persons (and that was successfully achieved).

For the first three days of operation, the Australian Red Cross was not (because of wide demands in South-east Queensland and Northern New South Wales) able to deploy a trained Red Cross workforce to operate and manage the centres (including registering evacuees) as per the existing MOU between Council and the Red Cross. Hence this commendable involvement of Council staff and other community partners.

There will be a **recommendation** that Council work with the Australian Red Cross to review the current MOU and consider alternative procedures for the registration of evacuees and management of the centres during periods of unavailability of Red Cross officers.

A more decentralised site selection for evacuation centres was advocated following 2011, ensuring the centres were used only by bona fide evacuees, vetting volunteers and

accommodating those with special or distinct (eg by ethnicity) needs. Considerable concern has been expressed that those two centres – Sleeman and Kedron Wavell were too remote from many flooded residents. Respondents have advocated for multiple evacuation centres to be established across the city servicing each region.

There is a challenge to provide conveniently located evacuation centres, but in areas that are safe, have the required sleeping, cooking and personal amenities available and have the required multi-agency support to deal with the multitude of issues that may arise from members of the community who are sheltering there. The scale of support required cannot be reasonably resourced in multiple centres across the city.

Mention is now made of a number of non-Council community support centres or "support hubs" which early in the event spontaneously opened eg Riverlife Church flood refuge centre. Some provided overnight accommodation, others supported residents' access to food, water, power via a generator, cleaning supplies, refrigeration and first aid. These were very good examples of community mutual support. These hubs delivered capacity to charge electronic devices (amid widespread power failures), people being reliant on technology for communication, information and alerts.

The community-based support centres are mentioned in the context of desirably broadening access to evacuation centres. Obviously, few would be appropriate for overnight accommodation, but it may be they could be utilised as temporary staging posts for those on the way to a major centre.

Other possibilities are State owned assets, such as schools, and the clubhouses of community groups, such as churches, sporting groups, Scout huts etc. Involvement with the latter would of course depend on the organisation's agreement.

There is need to further develop a model that integrates the function of community hubs and evacuation centres such that impacted residents can effectively access the support needed during a disaster event.

The **recommendations** which follow are premised on the need to broaden the range of facilities in which displaced residents may seek refuge, localising them, perhaps with a staged progress to a major evacuation centre, and also query the adequacy of having but two major centres for a City the size of Brisbane.

7 (c) (iii) Adequacy of Public Information Provided on Flood Risk to Individual Properties

This Term of Reference covers the provision by Council of flood information about individual properties.

The categories of public information Council made available prior to, and during, the weather event broadly fall in the following categories:

Flood Information Online Products, designed to enable individuals to obtain flood maps or property reports regarding individual suburbs or properties, and their respective flood risk exposure. These tools include the Flood Awareness Maps and FloodWise Property Reports (FWPR);
A Creek Monitoring Service, available to the public online, which provides near "real time" information, taken from Council gauges, regarding creek heights for a number of flood-prone locations;
A Brisbane River Flood Forecast Service (BRFF) available to the public online, which provides flood forecast information about potential Brisbane River flooding based on information provided by BoM; and
Warning services, including Council's Early Warning Alert Service. (EWAS)

In addition, Council:

- has available a range of general online flood education and preparedness products; and
- annually undertakes targeted flood risk awareness campaigns.

Following the 2011 flood, the report of the Flood Response Review Board provided a positive affirmation in relation to the information provided by Council to residents during the flood event and stated:

"*The Board commends Council's approach, during the flood event, in providing public information, advice and alerts using a multi-channel broadcast approach, for print and electronic media, the internet including websites, email and social media, telecommunications including Call Centre, mobile SMS and the Early Warning Alert Service and off-line including the "Living in Brisbane" newsletter, facts sheets, other community letters, posters, and outdoor advertising.*"
During 2021, Council's various online flood information tools and services were visited over 2.3 million times, by over 460,000 unique visitors.

Pivots are the Flood Awareness Maps and FloodWise Property Reports. These are comprehensive sources of information, readily accessible for residents and intending purchasers (or renters). They are updated regularly.

It is **recommended** that Council update the Flood Awareness Maps to include the historical flooding levels from the 2022 weather event and that Council review and if appropriate update the Flood Awareness Maps and FloodWise Property Reports using data gathered during and after the 2022 event including adding the 2022 weather event flood levels.

In assessing the "adequacy" of Council's provision of this information, reference should be added to the following publicly available material: the Creek Monitoring Service; the BRFF and the EWAS (opt-in).

Creek Monitoring Service
Telemetry gauges are installed and maintained by Council throughout 11 creeks in Brisbane. These produce live data which indicate water levels and then trigger alerts for road flooding, collect data for flood models and collect and measure rainfall. Council shares this information with BoM and makes it available to the community on its website.

Brisbane River Flood Forecast (BRFF)
BRFF provides forecast of Brisbane River flooding for individual properties, based on BoM forecast levels. Users can search by address to find out if their property is forecast to flood.

Early Warning Alert Service (EWAS)
Council provides a free opt-in service of early warning alerts. Residents can access the EWAS by downloading Weatherzone mobile app. The EWAS offers two services; a severe weather warning alert; and a creek flooding alert. Creek flooding alerts are available for properties that may be affected by creek flooding in the suburbs of Albion, Archerfield, Bardon, Boondall, Brookfield, Coorparoo, Corinda, Deagon, Doolandella, East Brisbane, Forest Lake, Greenslopes, Hemmant, Herston, Kenmore, Moorooka, Northgate, Nundah, Oxley, Rocklea, Salisbury, Windsor, Woolloongabba, Wynnum, Wynnum West, and Zillmere.

Currently, not all of Brisbane's 38 creek catchments are covered by the creek flooding EWAS. It is **recommended** that Council explore further expanding Council's creek flood alert program to allow additional residents and business to register and receive alerts when rain or flow levels in nearby creeks indicate that properties may be at risk of flooding.

Further, more generally, there have, since 2011, been multiple community awareness campaigns – including multi-lingual advertising, rates insert notices, "street meets," billboard and shopping centre advertising, Council advertising, digital advertising, Brisbane radio advertising and social media publications.

There is a plethora of information available to Brisbane residents and businesses about the flooding impact to their properties. (**Chapter Five** will address the information available to residents during a flood event.) One respondent identified that the FloodWise Property Reports provided by Council for all sources of flooding appeared to be relatively accurate, showing areas that could be inundated by the river, creek or overland flow. Despite annual education campaigns by Council and direct mail to impacted residents, it appears that many residents were caught unaware. Perhaps people's expectations for this event were based on their lived experience of the 2011 event, which of course did not include the same impacts from creek flooding and overland flow.

Council is concerned to promote awareness they are available, which seems unfortunately to be limited. I am sure Council does its best to publicise these offerings.

But it may assist to have a **recommendation** that Council continue actively to invite access to the full range of Flood Awareness tools and alerts to ensure knowledge they are available; they are accurate and that they are utilised. Council and Councillors should continue to promote the availability of these tools to the Brisbane community.

7 (c) (iv) The Effectiveness of Coordination with Other Government Agencies, Communications and Utility Providers.

There was, during and after the 2022 weather event an outstanding level of cooperation between Council and other agencies.

Council anticipated the desirability of this by involving those agencies in training sessions and exercises, for example a joint training exercise with the ADF in September 2021 called “Exercise Tempest”. That concerned a projected severe weather event, and the exchanges better equipped Council officers to deal with what transpired only a few months later.

Throughout the February 2022 event, the Flood Information Centre acted as a conduit to external agencies – BoM, Seqwater and flood management experts in bordering local authority areas, for intelligence gathering situational awareness and forecasting.

These following agencies regularly attended the meeting of the LDMG daily during the weather event: Queensland Police Service (QPS), Queensland Fire and Emergency Services (QFES), Australian Defence Force (ADF), Urban Utilities (UU), Energex, Maritime Safety Queensland and Queensland Reconstruction Authority (QRA).

Also, QPS, QFES and ADF provided liaison officers.

Importantly, there was an open line of communication between Council and QPS.

The contribution of the ADF was extremely valuable. From Tuesday 1 March 2022, the ADF provided clean-up support throughout Brisbane with up to 400 personnel each day until 24 March 2022.

Council is to be commended for its preparatory planning, ensuring that when the need arose, the cooperation of those agencies could be counted on.

Without exception, the Councillor respondents were complimentary of the Australian Defence Force, noting that their service was essential and exemplary. In the main, communication and

assistance from QPS met expectations, with some notable examples of individual officers going above and beyond to serve their community. Some suggested a greater police presence to assist with evacuation advice, road closures and looters was needed.

Whilst many did not have direct communication with BoM, the respondents relied heavily on their information. Some commented that the rainfall predictions were not specific enough to their area, and lack of available information about creek flooding meant BoM advice was incongruent with the local experience.

Feedback regarding SES was mixed, some noting their efforts exceeded even their highest expectations and others thought the response was limited and advice only general in nature. There was feedback that it seemed there were not enough SES volunteers to assist during the event, with reports of neighbours and local heroes who used recreational craft to ferry people to safety.

Interactions with UU were mainly positive, noting that they were good with sending crews, however some locations felt that they were not quick enough.

Due to widespread power loss, many thought that Energex did not meet their expectations. Advice about the period of outages was wanting. Some suggested that additional information about the cause of outages would have been helpful as some residents who were not flooded did not understand why they lost power. Some suggested that Energex should review the location of their infrastructure, as much of it was inundated resulting in greater damage and longer restoration times. The time taken to restore power was reported to cost individual businesses thousands of dollars in production, stock and sales. Particularly noted were cold storage businesses. Analysis of the Energex response is not within the purview of this review.

Two respondents noted that the QRA and Queensland Government need to ensure that when a Local Government Area (LGA) is declared a disaster area, all suburbs in that LGA are eligible for emergency financial assistance. Some suburbs that were flood affected were not included on the initial list of declared disaster areas.

While it has been suggested there needs to be a more coordinated system in place with other levels of government and agencies, it does seem to me that the system worked well. The only **recommendation** arising from the 2022 experience is for Council to continue to share learnings about the 2022 event and continue to work together to improve the coordination of emergency responses. Additionally, Council has also suggested that alternative contacts should be provided from all agencies, to ensure that representatives are available to assist the LDCC and LDMG at all times, acknowledging that some nominated representatives may not for a variety of reasons be able to attend.

7 (c) (v) Effectiveness of the Community Response, Including the Organisation and Management of Volunteers

Those who carried out voluntary work as part of Mud Army 2.0 are to be warmly thanked and commended for what they contributed, as indeed are all who registered. It is a pity that more of those who registered could not have been deployed into action, but the reasons for that, beyond the control of Council, are set out below.

There were issues in 2011 arising from the disposal of items without the householder's consent and as to the security of dwellings during the cleanup.

Eleven years on, there is a question whether volunteers were optimally deployed.16,747 volunteers registered through Volunteering Queensland for so called Mud Army 2.0 and 1569 residents/owners made requests for assistance. 2250 volunteers accepted and confirmed a shift for Saturday 5th March, but only 1795 were put into action. That deployment was coordinated by the LDCC on data and information provided by the City Analytics Office.

It should be noted that the 2022 Volunteer effort was not confined to the Mud Army – there was mutual support among neighbours, Council workers and contractors, community organisations, Churches, Sporting Clubs, Schools and the Australian Defence Force (together engagingly styled as the "Mud Militia").

In 2022, there is criticism that the (official) Mud Army was deployed for only one day, Saturday 5 March 2022. Access to properties was initially limited by road flooding and bad weather, then the Premier urged people to stay at home for 48 hours due to ongoing severe weather alerts. As it turned out, by the time the Mud Army was "reactivated", a lot of the cleaning-up had already been accomplished by neighborhood volunteers: neighbours helping neighbours. There are many reports of volunteers commencing the clean up within communities from Monday 28th February. Mud Army 2.0 volunteers attended 21 flood-affected suburbs conducting clean-up efforts in 1,039 homes over 180 streets.

The organic community response using Facebook community pages and community networks was swift and effective. The delay with initiating the official mud army (due to the Premier's stay

at home requirement), saw volunteers abandon their registrations and not turn to up at volunteer centres as anticipated.

Also, in light of the 2011 experience of some residents, with volunteers (no doubt well intentioned) entering homes in the absence of the residents and throwing out items of value to them, some residents in affected areas preferred not to have Mud Army involvement. In 2022, volunteers were directed only to enter flood affected properties with the permission of the resident and to work under the resident's supervision.

There has been a suggestion that the 15,000 or so database of volunteers could be used to match any expertise to task – for example, an engineer to a drainage problem, a doctor to a medical issue. **This in an interesting and helpful suggestion, but the listing is not specific in that way, and refining it in that way, and then following up as suggested, would be unduly demanding on Council resources in emergent circumstances.**

As previously mentioned, many suburbs benefitted from the standing up of community hubs – places where residents could gather, charge their devices, get food and drink, get support, seek volunteer assistance and feel the embrace of community during a challenging time. These hubs were largely run by community groups, local businesses, and Councillors and Ward Office staff. The people who coordinated these centres and volunteered at them should be highly commended for their efforts.

There is a clear need for such a facility that is organic, and community based and can respond quickly without the rigour and planning that Council needs to invest on a city wide basis. The role of these community hubs and their volunteers should be recognised and formalised as an integral part of the community response to such a disaster.

<u>Waste Disposal, Road Closures, Sandbags</u>

Although not particularly mentioned in the Terms of Reference, these matters arose as part of Council's operational response during the 2022 flood event and featured in many submissions.

Council advises that it is undertaking a full operational review following the 2022 Flood event. The following matters should be taken into account as part of that review.

Waste Management
An enormous kerbside collection operation ("Operation Collect") was undertaken, including food waste bins. Issues have been raised about whether sufficient food bins were provided, sufficiently early and in the right locations. Issues were also raised as to the temporary unloading of waste in parks in residential areas before the movement of the waste to Council's four resource recovery centres. Also, some illegal dumping in parks and community centres occurred. There was particular criticism of the expeditiousness of the provision and removal of food disposal bins.

Road Closures
Challenges were experienced during the 2022 flood event due to road closure information not being readily accessible, time taken to close roads with adequate signage, and motorists driving into flood waters despite warnings and barriers. It was reported that residents resorted to using their cars and bins to block flooded roads from oncoming traffic and undertaking traffic control during the night.

Solutions offered to these issues included installation of more road flood markers; additional cameras for frequently flooded roads; flooded road information potentially integrated with Google Maps; flood gates in specific locations; changing signage to 'road closed' instead of 'road flooded'; additional QPS resources to monitor road closures; an SOP for road closures; and additional road closure signage being locally available. Also, QPS requests should be processed, as one example, flood gates at Illaweena Street, Stretton at both ends to ensure public safety.

Sandbags
Mention may also be made here of sandbags. Council has always provided pre-filled sandbags (182,770 sandbags were distributed in response to this 2022 event). There is an issue as to the location of distribution depots; whether there were enough sandbag filling machines; insufficient stockpiles; queuing and wait times; access to sandbags for the elderly and people with disability; and as to delay in provision (while properties flooded).

The issue about location concerns accessibility to distribution depots and whether there were enough of them, and inaccessibility due to flooded surrounding roads.

There must be a balance between keeping stockpiles for such an extreme event and reasonable expectations for timely supply and distribution.

But plainly, having residents waiting for hours for sandbags, as their properties flooded, is not acceptable, and there must be a solution to this, hence the following **recommendation**.

Recommendations

4.1 **Role of Councillors: that the role of local Councillors is formally understood and documented in the various guides and SOPs within the disaster management frameworks;**

4.2 **Councillor Training: that mandatory training occur for newly elected Councillors in the disaster management frameworks and operations;**

4.3 **Councillor Refresher Training: that regular refresher training is given at defined intervals, including the opportunity for Councillors to participate in desktop and simulated emergency exercises;**

4.4 **Red Cross MOU: that Council work with the Australian Red Cross to review the current MOU and consider alternate procedures for the registration of evacuees and management of the centres during periods of unavailability of Red Cross Officers;**

4.5 **Community Hubs: that Council work with local Councillors to develop a model that integrates the function of community hubs and evacuation centres such that impacted residents can effectively access the support needed during a disaster event;**

4.6 **Evacuation Centres: that Council assess the adequacy of having only two major evacuation centres for a city the size of Brisbane;**

4.7 **Update Maps and Reports: that Council review and, if appropriate, update the Flood Awareness Maps and FloodWise Property Reports using data gathered during and after the weather event, including to add the 2022 weather event flood levels;**

4.8 **Creek Flood Alert Program: that Council explore further expanding Council's creek flood alert program to allow additional residents and businesses to register and receive alerts when rain or flow levels in nearby creeks indicate that properties may be at risk of flooding;**

4.9 **Flood Awareness Tools: that Council continue actively to invite access to the full range of flood awareness tools to ensure knowledge they were available, they are accurate and that they are utilised;**

4.10 **Other Agencies: that Council share learnings and feedback with other agencies about the 2022 weather event and continue to work together with them to improve the coordination of emergency responses;**

4.11 **Other Agencies: that Council require other agencies to provide alternative contacts to ensure that a representative is available to assist the LDCC and LDMG at all times;**

4.12 **Community Hubs: that Council recognise and formalise the role of community hubs and their volunteers as an integral part of the community response to disaster events;**

4.13 **Mud Army: that Council review the implementation of a Mud Army in response to such an event, possibly on the basis that a Mud Army fill a supplementary role to ordinary spontaneous community volunteering;**

4.14 **Operational Review: that Council take on board feedback regarding waste disposal, road closures and sandbags in its operational review of the 2022 weather event.**

Chapter Five – Adequacy of Council's public warnings and advice

This Term of Reference (7d) concerns the adequacy of the Council public warnings and advice.

Information in these events comes from the State to QFES, the BoM and Council.

The Emergency Alert (EA) is an emergency warning system capable of sending warning messages to landlines and mobile phones based on the registered service address of geographic locations within a particular area defined in the EA system. It is a Commonwealth funded system administered by the State through QFES. Council may request the State to issue an EA, which the State does through the QFES, in situations of imminent threat or hazard. Text and/or voice messages are delivered to all telecommunication devices in a specified location to potentially affected people.

Council's EWAS is provided by a company called Weatherzone which has a contract with Council. This service provides alerts via SMS, email, push notifications or voicemail for early warning issued by the BoM of severe weather events, as well as higher than normal high tides and creek flooding.

Unlike the EA system, the benefit of the EWAS is that it is automatically generated on the basis of Severe Weather Alerts from BoM, or near real-time data from Council's telemetry gauges and FloodWise information system (in the case of creek flooding).

Whereas EAs go to all phone users in the particular location (in batches), the EWAS is an opt-in service, and notwithstanding regular advertising and promotion, there is only approximately a 14% take up among residents in the Brisbane City Council area.

Reference has already been made to Flood Awareness Maps and FloodWise Property reports in **Chapter Four**. Council also issues CSAs and utilises social and public media.

What occurred in the case of the 2022 Weather Event may be summarised as follows:

a) at 8.19am on Saturday 26 February, the Lord Mayor issued two CSAs advising that Council was seeing dangerous conditions with localised flooding in low-lying areas;
b) at 9.26am that same day, Council uploaded a video to its Facebook page advising residents how to prepare for severe weather, including how to access the EWAS;
c) at 12.22pm that day, Council issued a flood safety CSA on its Facebook page;
d) at 12.30pm, Council sent a tweet referring residents to key Council webpage links, including Flood Awareness Maps, sandbag information, flooding in Brisbane information and the EWAS;

e) at 3.00pm, an LDCC SITREP reported that regular Early Warning Alerts were being issued for Thunderstorms and Heavy Rainfall, as well as for Creek flooding in catchment areas. It was also reported that the following flood information was being issued by Council to residents:

    - Residents are reminded to stay home where possible and not walk or drive through flood water. If it's flooded, forget it;
    - Residents should always stay out of flood water and keep children close and protected;
    - As rain continues across the city today and over the weekend, residents must remain vigilant as water levels continue to rise.

f) at 6.00pm, the Lord Mayor tweeted an indicative 2.7m AHD (Brisbane City Gauge) flood inundation map based on BoM's forecast river height at that time;

g) at 7.59pm, a CSA was sent by Council advising that overnight flows on the Brisbane River could result in water entering properties in certain specified suburbs and that residents in low-lying areas should make sure they were prepared;

h) at 8.13pm, Council sent a tweet warning that overnight flows of the Brisbane River combined with possible Wivenhoe Dam releases would coincide with the morning's high tide;

i) at 9.26pm, Council uploaded a Flood Forecast Map to its website displaying the potential impacts of a flood height of 2.7m AHD at the Brisbane City Gauge. (This was subsequently re-issued with further information at 9.59am the following day);

j) At 9:57pm, the Lord Mayor published a tweet which included a link to the 2.7m AHD Flood Forecast Map;

k) At 7.00am on Sunday 27 February, an LDCC SITREP reported that regular EWAs were being sent for Thunderstorms and Heavy Rainfall, as well as for Creek flooding in catchment areas. The flood information that Council was issuing to residents was:

    - Residents should always stay out of flood water and keep children close and protected;
    - As rain continues across the city today and over the weekend, residents must remain vigilant as water levels continue to rise;
    - An evacuation centre has been established at the Sleeman Sports Complex, located at Old Cleveland & Tilley Roads, Chandler, in the Chandler area. Residents can bring their pets. It is preferable that residents who are required to evacuate stay with friends or family in the first instance.
    - A flood inundation map of the forecasted impact is available on Council's corporate website.

l) at 11.53am on Sunday 27 February, Council uploaded a Flood Forecast Map to its website displaying the potential impacts of a flood height of 3.05m AHD at the Brisbane City Gauge;

m) at 1.16pm, the Lord Mayor sent a tweet including the 3.05m AHD Flood Forecast Map;

n) At 4:29pm, the BRFF webpage was live allowing residents to search their property to obtain an indication of whether it was predicted to flood based on BoM river height forecasts. At that time, the BRFF tool assumed a flood height of 3.50m AHD.

o) at 7.07pm, Council sent an EA request to the SDCC for immediate action. Following discussion with the SDCC, the EA was approved for issue by the QFES and the campaign began at 7.51pm;
p) at 7.33pm, the Lord Mayor retweeted a BoM Alert advising that the then predicted 3.7m AHD flood level would be the highest flood level since the 2011 flood;
q) at 7.45pm, Council updated the BRFF tool to assume a flood height of 3.70m AHD at the Brisbane City Gauge;
r) at 10.00pm, a Severe Weather Warning EWAS alert was sent to residents warning that a Flood Watch and multiple Flood Warnings were current;
s) at 12.30am on Monday 28 February, Council updated the BRFF tool to assume a flood height of 4.00m AHD at the Brisbane City Gauge; and
t) at 1.11am on Monday, Council uploaded a Flood Forecast Map to its website displaying the potential impacts of a flood height of 4.0m AHD at the Brisbane City Gauge. It was approved and published at 11.13am.

The key agency from which Council received information was the BoM, and also, Seqwater. As to BoM, the river flood warnings on 27 February increased in severity over a short period of time: there were 5 changes over 11 hours to the estimated river height at the City Gauge. That made it difficult to model data and distribute information to the community.

As to Seqwater, between 22 February and 7 March, Council received 132 communications – flood operations centre updates, SITREPS (30), dam predictions, dam release updates.

That intelligence informed what Council published for the information of residents.

The Chair of Brisbane LDMG, the Lord Mayor of Brisbane, was the chief media spokesperson during the weather event and communicated public messages through regular press conferences and social media. Weather Event related public information was regularly issued through the LDCC Crisis Communication Team who delivered a range of targeted, considered communications.

The importance and influence of social media in events like the weather event cannot be underestimated. Relevantly, all Councillors have social media platforms that are used for distributing messages to the community. This is evidenced by the following table which demonstrates the volume of messages sent by the Lord Mayor alone (as distinct from Council) to thousands of followers on these various platforms.

DATE	FACEBOOK	INSTAGRAM	TWITTER	LINKEDIN	TIKTOK	TOTAL
Friday, 25.02.2022	**3**	**3**	**2**	**0**	**0**	**8**
Saturday, 26.02.2022	**14**	**16**	**13**	**10**	**2**	**55**
Sunday, 27.02.2022	**9**	**12**	**18**	**8**	**0**	**47**
Monday, 28.02.2022	**9**	**10**	**13**	**9**	**3**	**44**
	35	**41**	**46**	**27**	**5**	**154**

Over the course of the event, Council issued 75 severe weather warning alerts containing BoM advice, 285 creek floods EWAS alerts, and 288 social media communications (including CSAs).

Also, in addition to the above warnings and advice, between 25 February to 17 March 2022:

a) 1,445,104 online visitors utilised the Council website (the most monthly users ever recorded by Council);
b) Council's social media accounts reached an audience of 3,175,251 members on Facebook, and 558,676 members on Twitter;
c) 4,299,339 unique webpage views of Council's website were recorded;
d) 145 existing webpages were updated, 33 new webpages created, and 288 social media posts made.

Council's assessment of the alert and monitoring systems available to the public from Council (being the EWAS and Creek Monitoring Service) is that they functioned accurately and efficiently in accordance with their design. Despite best urgings, there has been limited take up of the EWAS (as mentioned above, only a 14% take up for the residents of Brisbane City).

There will therefore be three **recommendations**, taking account also of some clerical issues with QFES:

i) First, that Council advocate that the QFES undertake a review of the system that distributes the EAs to determine whether there is a more efficient method by which EAs can be distributed, particularly in circumstances where the EA must be distributed to a large number of people;
ii) Second, that Council review the 'request for EA process' with QFES as there seemed to be some delay in the review and approval by QFES of the wording of the EA and timing of the issue of the EA. This process and QFES expectations for the EA scripting could, for example, be agreed to prior to the event such that the fact-specific EA during an event might be the refinement of pre-agreed templates;
iii) Third, that Council seek to raise the number of subscribers to the EWAS through ongoing public campaigns to identify and promote the benefits of the service to residents.

These recommendations are made in recognition of considerable community concern about the adequacy of warnings. More should be recorded of this.

The experience within the community, reflected by respondents, suggests that warnings to evacuate came too late, with houses already flooding up to a day and a half before that warning was issued. Many channels were being used to broadcast warning information, including Facebook and other social media, mainstream media, LDCC issued SITREPs in addition to the mentioned early alert systems.

Some of these communication channels were not accessible by all, and loss of power and digital illiteracy meant some residents found it difficult to stay informed. Some commented that the multiple channels (and likely the speed at which each one could be deployed) meant that sometimes the messages were inconsistent and confusing. A suggestion was made that a greater and more diverse communication process should be considered for reporting live updates on weather patterns and warnings such as radio, television and social media (as occurs eg with Amber Alerts for child abduction).

An additional issue raised is that flood maps were not sufficiently localised, and broadcast flood alerts were not timely or readily comprehensible (through overuse of technical terms etc). Particular reference has been made to the description of a “1 in 100 year flood”; as if this major flood having now occurred, there will not be another of similar magnitude for 100 years. **Following 2011, Council’s material now refers to the percentage chance of a flood occurring in any year, as it should continue to do.**

Respondents additionally referenced the lack of community comprehension of what is meant by a particular height measurement at the City Gauge. The community needs information that interprets this measure into an impact at their property. Some simpler reference would be preferable, for example, ‘1.5m above normal high tide’.

One commentator queried not only the “1 in 100” reference, but also the arguably odd concept of a dam safely reaching, say, 200% capacity (odd, that is, to a citizen rather than perhaps an engineer or hydrologist). The respondent went on to assert a BoM tendency to translate localised storm conditions to the whole of Brisbane. The Bureau does good work, but as that commentator pointed out, in the interests of greater consistency in public reporting it may be a good idea to have the same officer speaking publicly throughout the event. Whilst these comments are not within the terms of this review, nor the jurisdiction of Council, public confidence in the advice of the BoM is plainly very important.

A limitation of the existing systems is that the BoM flooding predications are based on river flooding only. The Brisbane 2022 Flood event saw creek systems already overwhelmed before the river flooding warnings were issued. The existing system which gives warning about creek flooding is Weatherzone which is controlled by Council. It uses real time telemetry within the

creek network (meaning there was no warning of forecasted flooding). It was reported to work without issue during the 2022 event, but is subscriber based with low take up.

The Brisbane 2022 Flood event was rapidly changing, with BoM advice changing many times over the course of Saturday 26th February – Sunday 27th February. There is evidence that Council acted promptly on this advice each time, issuing updated weather warnings and updating the flood maps. Once the advice came from BoM at 6pm on Saturday 26th February that a major flood was likely the following day, Council immediately put in the steps to issue the evacuation warning via the State's EA system. Due to the limitation of the EA system (as discussed above) that warning was not received by some until Sunday evening.

The 2011 report noted concerns that alerts from the Early Warning Network used by Council (Weatherzone) were too generic and not delivered in a timely way. Also, the take-up rate for registered residents was low, and the warnings were not sufficiently local. Similar issues are raised in 2022, with, as said, only 14% of Brisbane Residents registering for the opt-in subscription based Early Warning Network (Weatherzone) used by Council. It is additionally suggested that practical advice should be included in these events such as "move your car to higher ground" or "charge your devices and prepare for power failure".

It should be noted, as previously discussed, that Council has provided, and provides, Flood Awareness Maps and FloodWise Property Reports, among a number of initiatives helpfully summarised in Brisbane's Floodsmart Future Update 2021. There was a question whether the maps accounted, as well as for Brisbane River heights, for added run-off from tributaries and local catchments. These maps and reports are continually updated. They are available for every property in the City. Purchasers and developers may be very well informed.

Recommendations

5.1 EA System Review: that Council advocate that the QFES undertake a review of the system that distributes the EAs to determine whether there is a more efficient method by which EAs can be distributed, particularly in circumstances where the EA must be distributed to a large number of people;

5.2 EA Process Review: that Council review the 'request for EA process' with QFES as there seemed to be some delay in the review and approval by QFES of the wording of the EA and timing of the issue of the EA. This process and QFES' expectations for the EA scripting could, for example, be agreed to prior to the event such that the fact-specific EA during an event might be the refinement of pre-agreed templates;

5.3 EWAS Uptake: that Council rigorously promote community uptake of the Weatherzone severe weather and creek alerts system;

5.4 **Public Warnings and Advice: that consistent and widely publicised channels be used to relay emergency information. These channels should be accessible by everyone. Non-digital channels, eg radio, should continue to be used. Residents should continue to be encouraged to have a battery powered radio in case of power failure;**

5.5 **Terminology: that continuing consideration be given to the terminology of public warnings and advice – continuing to avoid reference to, say, a '1 in 100-year flood', but also developing a way of referring to flood heights in Brisbane River other than by height at the 'City Gauge' – which few citizens would understand;**

5.6 **Provision of Information: that Council continue to refine its capacity to publish timely warnings and alerts and provide practical advice to residents such as 'move your car to higher ground', 'charge your devices and prepare for power outages', and provide emergency contact numbers and details.**

Chapter Six – Effectiveness of changes made to the *Planning Regulation 2017*

This Term of Reference (7e) concerns the effectiveness of changes made to the *Planning Regulations 2017* in mitigating loss and damage in respect of flood prone areas post 2011.

With Brisbane resting in a floodplain, a persistent issue is control over further construction in flood prone areas.

This 2017 Regulation was made pursuant to the *Planning Act 2016*. That Act and the Regulation commenced on 3 July 2017.

Whilst the Regulation has since remained unchanged, there have been changes to Council's planning scheme and the State Planning Policy.

Most significantly, a new hazard-based *Flood Overlay Code* has been introduced to ensure development adequately addresses the issue of flooding. Flood planning areas are defined for the Brisbane River, creek flooding and overland flow to guide future development in flood prone areas.

There have been good subsequent outcomes including the raising of properties to achieve acceptable flood immunity, designed to allow for the conveyance of flood water through a site, and locating essential electrical services above flood level.

A theory is that enormous urbanisation of catchment areas contributed to this flooding event. Many respondents commented that the changes to *City Plan 2014* and relevant Neighbourhood Plans have taken into account flooding impacts which seem to have been successful in the 2022 event.

Basement flooding, however, continues to be an issue. The TLPI 01/11 and subsequent City Plan amendments required that basements be built with a higher level of immunity, however pre-existing buildings are prone to significant impacts to essential services. Building owners and body corporates should be encouraged to retrofit electrical and other essential services to be protected from inundation.

In some areas, rather than surrender their houses (as by the previous voluntary buy back program), some residents have preferred to raise their homes beyond flood levels. Respondents reported that some locals who had lifted their homes after 2011 were protected from flooding. Some, however, despite raising their homes still suffered inundation of the upper levels or were inundated for the first time during the 2022 event. There are suggestions that

Council should conduct a review of the existing planning laws to provide a streamlined process for planning applications to mitigate flooding. This might include relaxations to existing building height where required, flexibility to allow rebuilding or demolition of houses or businesses, and land use designations should be reviewed to properly consider housing choices that are flood resilient.

It is not within the practicable scope of this review to embark on any comprehensive analysis of the planning legislation basing the 2017 regulation.

There is however, one particular aspect of concern emerging from the 2022 event which should be mentioned.

Private pontoons

Some private pontoons floated free and become a hazard causing pollution to the water ways and the City as they broke up. As in 2011, one of the challenges experienced during the 2022 event was the amount of debris in the river from these detached pontoons, causing damage to infrastructure, but also environmental impact due to the foam-based materials used that disintegrated and polluted waterways - as far as K'gari (formerly Fraser Island). A review with the relevant bodies of the materials used for pontoon construction and tethering to the embankment should be considered.

Apparently, a question is the ability of Council to regulate private pontoons, said not to be entirely clear. Especially in light of the 2022 experience, Council should have that capacity, clearly spelt out.

It is **recommended** that Council review the legislative framework governing private pontoons and make representations to the relevant authorities or make permitted changes where appropriate to the City Plan, to make clear the ability of Council to regulate private pontoons.

Village Yeronga – Regis Aged Care Home

Finally, there is the particular issue of the Village Yeronga (a retirement village) and the Regis aged care home, where residents (reportedly about 400 with an average age of 80 years), had to be evacuated as waters rose.

The question asked now, as it was before the QFIC, is how this development, and its extension, could responsibly have been approved – with the site prone to flooding.

Supplementary advice provided by Council advises Stage 3 (Building 5a and 5b) buildings as shown highlighted in **Figure 2** below are the only buildings subject to new development approval after the 2011 floods. A Flood Risk Management Plan certified by a Registered Professional Engineer of Queensland (RPEQ) forms part of the approved documents and includes an evacuation procedure and disaster management plan. There is also evidence that

previous development approvals were modified in response to the 2011 flood, to raise the height of the building 3 and 4 to remove the basement and provide carparking at podium level at stage 2. **Council reports, and I accept, that this was prepared in accordance with the *City Plan 2000 requirements*.**

Figure 2

Recommendations

6.1 <u>Basements</u>: that building owners and body corporates be encouraged to retrofit electrical and other essential services located in basements in flood prone areas to ensure protection from inundation;

6.2 <u>Planning Laws</u>: that Council review, with the State Government where relevant, the existing planning laws in light of the 2022 weather event to further mitigate impacts from flooding;

6.3 <u>Private Pontoon Regulation</u>: that Council review the legislative framework concerning approval and control of private pontoons and make representations to the relevant authorities or make permitted changes, where appropriate, to the *City Plan*;

6.4 <u>Private Pontoon Construction</u>: that Council review with relevant bodies the materials used for pontoon construction and the tethering of pontoons to embankments.

Chapter Seven - Resilience of Riverine and Waterways Infrastructure

This Term of Reference (7f) concerns the resilience of riverine and waterways infrastructure developed post 2011.

Council's approach following the 2011 flood event has been, where practicable, to upgrade this infrastructure to reduce the prospect of its being damaged by future flooding such as occurred in 2022.

The Term of Reference involves an assessment of the effectiveness in terms of flooding of that upgraded construction post 2011 (including for example flood resistant ferry terminals).

In short, how resilient has that post-2011 construction proved to be? Obviously, it was seriously tested by the 2022 event, and that provides a reasonable basis for the assessment of its resilience.

The ferry terminals suffered a lot of damage in 2011, which prompted a range of measures to improve resilience. Also, the floating Riverwalk structure was then destroyed, with a new Riverwalk designed to resist significant flood events and return to service after a short period following inundation. (Which it did).

In 2022, of the 19 council owned ferry terminals, constructed or upgraded after 2011, six required major repairs, six moderate and seven minor. 16 of those terminals were effective and withstood substantial structural damage despite inundation and striking from debris. Council is reviewing the performance of all 19 terminals.

The ferries themselves suffered varying degrees of damage – one sank. There is an issue of why they were not moved earlier in the piece to a safe haven, rather than remaining moored in the river. It must be recalled here that the 2011 event was vastly different from 2022. In 2011, there were three days' warning that a flood was coming, with sunny, calm conditions giving ample time to plan and safely execute the relocation of the ferries.

In addition to the ferries and the terminals, Council owns 307 items of riverine or waterways infrastructure constructed, or upgraded, since 2011. The store includes boat ramps, bridges, canoe ramps, culverts, jetties, pontoons, retaining walls, river walks, and sea walls. Council is assessing the status of each, but indications at this stage are that 256 elements escaped unscathed, whereas 51 experienced damage requiring further consideration. (There are also five items requiring further assessment.)

As mentioned above, there was a query raised with this Review why early on the ferry fleet was not moved, as in 2011, to a safe haven such as Manly. It is beyond my scope to enquire into that, but I should nevertheless **recommend**, to keep the issue on the table, that further consideration be given to ensuring the security of the ferry fleet in such an event; only if time and conditions allow this to be done safely, remove if warranted by moving the ferries expeditiously to a secure location where they will not be subject to damage from debris etc.

Respondents to the review commented that many community and sporting club facilities, park equipment and facilities, storage facilities etc were inundated during the 2022 event, some suffering significant damage. The call from these respondents is that consideration should be given to rebuilding these community facilities "better and smarter," including raising of clubhouses and reconstruction with more resilient building materials to ensure protection against future flood events, possibly with Queensland Reconstruction Authority funding.

There will be a **recommendation** that Council consider whether improvements can be made to design, location and material selection in order to improve future flood resilience of Council's riverine and waterways infrastructure.

A number of submitters made comment about the prioritisation of cleaning and making operable the active transport routes, bikeways and main pedestrian routes. Whilst it is not within the remit of this review, Council should consider this issue in its operational review of the 2022 weather event.

Recommendations

7.1 Infrastructure: that Council consider whether improvements can be made to design, location and material selection in order to further improve future flood resilience of Council's riverine and waterway infrastructure;

7.2 Build Back Better: that where Council infrastructure has been damaged, a prime consideration – possibly aided by Queensland Reconstruction Authority funding, should be to 'build back better' to maximise protection against future flood events;

7.3 Ferries: that further consideration be given to ensuring the safety of the ferry fleet in such an event, by moving them expeditiously to a secure location (assuming time and conditions allow this to be done safely), where they will not be damaged by debris, etc;

7.4 Active Transport: that Council review the prioritisation of cleaning active transport routes in its operational review of the 2022 flood event.

Report Recommendations

2.1 **Pullenvale Ward: that Council regularly review the Isolating Communities Sub-Plan of the Disaster Management Plan to ensure optimal deployment of relief assistance for the Pullenvale Ward;**

2.2 **Tennyson Ward: that Council continue to review the provision of a flood proof Ward Office for the Tennyson Ward;**

3.1 **Backflow Prevention Devices: that Council continue to assess and prioritise the installation of BPDs as part of its flood mitigation strategy;**

3.2 **Flood Resilient Homes Program: that the FRHP be continued, and if possible, extended into more flood affected areas, and that consideration be given to its extension to flood affected business premises and apartment buildings, with town planning incentives to participants;**

3.3 **Flood Resilient Homes Program: that the FRHP be reviewed in light of the 2022 weather event, taking into consideration the feedback from residents who had already participated in the program;**

3.4 **Voluntary Home Purchase Scheme: that subject to the availability of State and Federal funding, the VHPS be reinstated;**

3.5 **Updating Existing Flood Studies: that Council use new data obtained as a result of the 2022 weather event to update the existing flood studies knowledge base;**

3.6 **Floodplain Management: that the new data obtained as a result of the 2022 weather event be incorporated into the modelling within Council's existing flood studies to further enhance Council's floodplain management;**

3.7 **Maintenance Issues: that where specific maintenance issues have been referred to this review by Councillors or residents, for example of blocked drains and overgrown creek beds and banks impeding outflow, it fall to Councillors to raise those matters with the relevant Council Divisions;**

4.1 **Role of Councillors: that the role of local Councillors is formally understood and documented in the various guides and SOPs within the disaster management frameworks;**

4.2 **Councillor Training: that mandatory training occur for newly elected Councillors in the disaster management frameworks and operations;**

4.3 **Councillor Refresher Training: that regular refresher training is given at defined intervals, including the opportunity for Councillors to participate in desktop and simulated emergency exercises;**

4.4 **Red Cross MOU: that Council work with the Australian Red Cross to review the current MOU and consider alternate procedures for the registration of evacuees and management of the centres during periods of unavailability of Red Cross Officers;**

4.5 **Community Hubs: that Council work with local Councillors to develop a model that integrates the function of community hubs and evacuation centres such that impacted residents can effectively access the support needed during a disaster event;**

4.6 **Evacuation Centres: that Council assess the adequacy of having only two major evacuation centres for a city the size of Brisbane;**

4.7 **Update Maps and Reports: that Council review and, if appropriate, update the Flood Awareness Maps and FloodWise Property Reports using data gathered during and after the weather event, including to add the 2022 weather event flood levels;**

4.8 **Creek Flood Alert Program: that Council explore further expanding Council's creek flood alert program to allow additional residents and businesses to register and receive alerts when rain or flow levels in nearby creeks indicate that properties may be at risk of flooding;**

4.9 **Flood Awareness Tools: that Council continue actively to invite access to the full range of flood awareness tools to ensure knowledge they were available, they are accurate and that they are utilised;**

4.10 **Other Agencies: that Council share learnings and feedback with other agencies about the 2022 weather event and continue to work together with them to improve the coordination of emergency responses;**

4.11 **Other Agencies: that Council require other agencies to provide alternative contacts to ensure that a representative is available to assist the LDCC and LDMG at all times;**

4.12 **Community Hubs: that Council recognise and formalise the role of community hubs and their volunteers as an integral part of the community response to disaster events;**

4.13 **Mud Army: that Council review the implementation of a Mud Army in response to such an event, possibly on the basis that a Mud Army fill a supplementary role to ordinary spontaneous community volunteering;**

4.14 **Operational Review: that Council take on board feedback regarding waste disposal, road closures and sandbags in its operational review of the 2022 weather event;**

5.1 **EA System Review: that Council advocate that the QFES undertake a review of the system that distributes the EAs to determine whether there is a more efficient method by which EAs can be distributed, particularly in circumstances where the EA must be distributed to a large number of people;**

5.2 **EA Process Review: that Council review the 'request for EA process' with QFES as there seemed to be some delay in the review and approval by QFES of the wording of the EA and timing of the issue of the EA. This process and QFES' expectations for the EA scripting could, for example, be agreed to prior to the event such that the fact-specific EA during an event might be the refinement of pre-agreed templates;**

5.3 **EWAS Uptake: that Council rigorously promote community uptake of the Weatherzone severe weather and creek alerts system;**

5.4 **Public Warnings and Advice: that consistent and widely publicised channels be used to relay emergency information. These channels should be accessible by everyone. Non-digital channels, eg radio, should continue to be used. Residents should continue to be encouraged to have a battery powered radio in case of power failure;**

5.5 **Terminology: that continuing consideration be given to the terminology of public warnings and advice – continuing to avoid reference to, say, a '1 in 100-year flood', but also developing a way of referring to flood heights in Brisbane River other than by height at the 'City Gauge' – which few citizens would understand;**

5.6 **Provision of Information: that Council continue to refine its capacity to publish timely public warnings and alerts, and provide practical advice to residents such as 'move your car to higher ground', 'charge your devices and prepare for power outages', and provide emergency contact numbers and details;**

6.1 **Basements: that building owners and body corporates be encouraged to retrofit electrical and other essential services located in basements in flood prone areas to ensure protection from inundation;**

6.2 **Planning Laws: that Council review, with the State Government where relevant, the existing planning laws in light of the 2022 weather event to further mitigate impacts from flooding;**

6.3 **Private Pontoon Regulation: that Council review the legislative framework concerning approval and control of private pontoons and make representations to the relevant authorities or make permitted changes, where appropriate, to the *City Plan*;**

6.4 **Private Pontoon Construction: that Council review with relevant bodies the materials used for pontoon construction and the tethering of pontoons to embankments;**

7.1 **Infrastructure: that Council consider whether improvements can be made to design, location and material selection in order to further improve future flood resilience of Council's riverine and waterway infrastructure;**

7.2 **Build Back Better: that where Council infrastructure has been damaged, a prime consideration – possibly aided by Queensland Reconstruction Authority funding, should be to 'build back better' to maximise resilience against future flood events;**

7.3 **Ferries: that further consideration be given to ensuring the safety of the ferry fleet in such an event, by moving them expeditiously to a secure location (assuming time and conditions allow this to be done safely), where they will not be damaged by debris, etc;**

7.4 **Active Transport: that Council review the prioritisation of cleaning active transport routes in its operational review of the 2022 flood event.**

Appendices

Appendix A – Terms of Reference

Review into the February 2022 Brisbane Floods - Terms of reference
18 March 2022

Context

1. The City of Brisbane has throughout its history been the subject of intense seasonal weather events. It is not uncommon for Brisbane to receive several weather warnings from the Bureau of Meteorology (**BoM**) throughout summer months. Of relevance, was the flooding event of 2011 which resulted in the findings of the Queensland Floods Commission of Inquiry being released in March 2012 (**QFCI Report**).

2. As a result of the 2011 flooding event Brisbane City Council (**Council**) established a board in late January 2011 and requested a report be produced by the middle of May 2011 (**Brisbane Flood Report**).

3. In response to the recent weather event described below, Council seeks to have an independent review undertaken to ensure that Council continues to improve its ability to protect lives and property from similar natural disasters in Brisbane in the future.

The Weather Event

4. Between 24 and 28 February 2022, South-East Queensland and northern New South Wales experienced an unprecedented weather event (**Weather Event**).

5. The Weather Event was the largest rainfall event (for that period) to have occurred over the Brisbane catchment with 792.8mm falling 24 February 2022 to 9.00am 28 February 2022. To put this in perspective, this exceeded the 1974 rainfall record of 655.8 and represents about 80 per cent of Brisbane's yearly average rainfall falling in this five-day period.

6. The Brisbane River peaked Monday, 28 February at 3.85m (AHD city gauge) at 9.00am. whilst this is less than the 4.46m AHD recorded in 2011, the widespread intense rainfall also caused significant creek and overland flow flooding.

Appointment and Scope

7. On 1 March 2022 the Lord Mayor of Brisbane, Councillor Adrian Schrinner announced that former Governor and former Chief Justice of Queensland the Honourable Paul de Jersey AC CVO QC would undertake an independent and comprehensive review with respect to the following matters:

    (a) the extent to which Council has implemented the relevant recommendations from the QFCI Report and the Brisbane Flood Report, as they related to the City of Brisbane, prior to the Weather Event;

(b) the effectiveness of measures recommended by the QFCI Report, and the Brisbane Flood Report taken by Council to improve the protection for flood prone properties from inundation with a particular focus on backflow devices and the Flood Resilient Homes Program;

(c) the effectiveness of Council's disaster management framework in responding to the Weather Event having regard to the combined means of other relevant entities, with a focus on:

i. Council's disaster management organisational structures and policies;

ii. the establishment of Council's evacuation centres;

iii. the adequacy of public information provided by Council on flood risk for individual properties;

iv. the coordination with other government agencies, communications and utility providers; and

v. community response, including the organisation and management of community volunteers.

(d) the adequacy of the Council's public warnings and advice, having regard to:

i. the requirements and responsibilities of the other relevant entities, such as the State Government, Commonwealth Government and BoM;

ii. the reliability and timeliness of the information provided to Council by other relevant entities;

iii. the capability of external systems relied upon by Council;

(e) the effectiveness of changes made to the *Planning Regulations 2017* in mitigating loss and damage in respect of flood prone areas post 2011;

(f) the resilience of riverine and waterways infrastructure which has been upgraded or constructed following the 2011 flood event (a list of relevant infrastructure is provided in ***Attachment 'A'***).

Submissions

8. Mr de Jersey will be calling for submissions from all Councillors, Council, and all others at Mr de Jersey discretion, in respect of the matters subject of the review, with submissions to be provided to Mr de Jersey by close of business 8 April 2022

Report

9. Mr de Jersey is required to produce a report addressing the above matters including any recommendations arising from the terms of reference which he considers as reasonable to improve the City's preparation and planning for any such future weather event.

10. The report is to be provided to the Lord Mayor on or before 1 July 2022. However, should Mr de Jersey require any further information on a particular matter that cannot be addressed in the above timeframe, this request should be made through the report and be addressed after the provision of the material. This timing will enable any recommendations to be addressed prior to the next summer's wet season.

11. The report will be made public following its delivery to the Lord Mayor.

Appendix B - Chronology of Key Events

This Chronology is taken from Council's Submission to the review.

Date	Key Events	Council Notification
Pre-Event Phase		
Thurs 24.02.2022	**Brisbane Disaster District Management Group on 'Alert'** **City Resilience Branch on 'Alert'** **Key statistics:** • Rainfall: 30mm (day average), 9-60mm (min-max) • Brisbane River Flood/Tide Peak (*at Brisbane City River Gauge*) (Morning): 1.01m AHD **Brisbane River Flood/Tide Peak (*at Brisbane City River Gauge*) (Evening): 0.71m AHD**	**Early warning alerts (*BoM severe weather warnings)*: 5** **Early warning alerts (creek flooding): 5**
Emerging Event Phase		
Fri 25.02.2022	**Brisbane Disaster District Management Group on 'Alert'** **City Resilience Branch moved to 'Lean Forward' Status** **4.35pm: Predicted Flood/Tide Peak: Likely to reach minor flood level of 1.7m over the weekend. BoM advises "minor flooding likely at Brisbane City over the weekend** **7.00pm: Predicted Flood/Tide Peak: Likely to reach minor flood level of 1.7m over the weekend - further rises likely depending on rain forecast.** **Key statistics:** • Rainfall: 216mm (day average), 163-279mm (min-max) • Brisbane River Flood/Tide Peak (Morning): 1.09m AHD **Brisbane River Flood/Tide Peak (Evening): 0.73m AHD**	**Early warning alerts: 10** **Early warning alerts (creek flooding): 78** **Social media posts (*includes content made by Council and the sharing of messaging from other agencies via Council's channels*): 14**
Sat 26.02.2022	**3.04am: Predicted Flood/Tide Peak: Likely to reach minor flood level of 1.7m over the weekend – further rises likely depending on forecast rain.**	**8.19am: Lord Mayor issues two CSAs advising that Council was seeing**

	5.35am: Predicted Flood/Tide Peak: Likely to reach minor flood level of 1.7m over the weekend – further rises likely depending on forecast rain. **8.04am: River City Ferries enact Business Continuity Plan and cease operating public transport services on the Brisbane River.** **3.08pm: BoM advises: "Moderate flood levels at Brisbane on the high tide during Sunday morning. Higher flood levels possible Sunday and Monday depending on further rainfall and dam releases." All Queensland Rail services suspended.** **Key statistics:** • Rainfall: 195mm (day average), 141-275mm (min-max) • Brisbane River Flood/Tide Peak (Morning): 1.81m AHD • Brisbane River Flood/Tide Peak (Evening): 1.87m AHD **Disaster Management:** • **Local Disaster Management Group moves to 'Stand Up' status** • **Local Disaster Coordination Group moves to 'Stand Up' status** (initially two shifts, extended to three shifts same day) • **City Resilience Branch moves to 'Stand Up' status** **BDDMG remains on 'Alert'**	**dangerous conditions with localised flooding in low-lying areas.** **9.26am: Council uploads a video to its Facebook page advising residents how to prepare for severe weather, including how to access the EWAS.** **12.22pm: Council issues a flood safety CSA on its Facebook page.** **12.30pm: Council sends a tweet referring residents to key Council webpage links, including Flood Awareness Maps, sandbag information, flooding in Brisbane information and the EWAS.** **6.00pm: Lord Mayor publishes a Tweet providing residents with the Brisbane Flood Inundation Map with a flood level of 2.7 AHD.** **7.59pm: CSA sent by Council advising that overnight flows on the Brisbane River could result in water entering properties in certain specified suburbs and that residents in low-lying areas should make sure they were prepared.** **8.13pm: Council sends tweet warning that overnight flows of the Brisbane River combined with possible Wivenhoe**

		Dam releases would coincide with the morning's high tide. **8.20pm: Council sends a tweet referring residents to key Council webpage links, including Flood Awareness Maps, sandbag information, flooding in Brisbane information and the EWAS.** **9.27pm: Council publishes Brisbane Flood Inundation Map on its website with a flood level of 2.7 AHD.** **9:54pm: Council releases post advising of the opening of an evacuation centre at Sleeman Sports Complex at Chandler.** **9.57pm: Lord Mayor publishes a tweet which includes a link to the 2.7m AHD Flood Forecast Map.** **Early warning alerts: 20** **Early warning alerts (creek flooding): 76** **Social media posts: 29**
Response Phase		
Sun 27.02.2022	**6.00am: Sleeman evacuation centre opens.** **10.02am: Predicted Flood/Tide Peak: Likely to reach around 3.00 to 3.20 metres with the high tide during Monday morning.** **12.00pm: First LDMG meeting.** **12.15pm: QLD Premier declares disaster in Brisbane.**	**7.00am: LDCC SITREP reports that regular EWAs were being sent for Thunderstorms and Heavy Rainfall, as well as for Creek flooding in catchment areas.**

	1.41pm: The Brisbane Model Report identified that the Brisbane City River height was at 2.63m and was forecast for 3.21m (for 28 February at 07:45am). **1.53pm: (approx.): QLD Premier urges SEQ residents to stay at home.** **2.00pm: Kedron Wavell evacuation centre opens** **2.02pm: Predicted Flood/Tide Peak: BoM advise "Moderate flood levels of 2.8-3.0 metres are possible at Brisbane City with the Sunday evening high tide. Levels of 3.2 - 3.4 metres are possible at Brisbane City with the high tide during Monday morning."** **4.01pm: Council buses suspended.** **6.00pm: Telephone call from BoM to FIC advising of predicted major flood levels of 3.7m.** **6.14pm: Predicted Flood/Tide Peak: BoM advises "Major flood levels to 3.7 metres are possible at Brisbane City with the Monday morning high tide. Levels are approaching 3.2 metres with high tide Sunday evening."** **Prior to 9:00pm: BoM again telephoned the FIC to revise the forecast of the flood height to 4.0m.** **11.00pm: Predicted Flood/Tide Peak: Major flood levels are expected with the high tide during Monday morning and river levels may reach 4.0 m** **Lord Mayor calls for volunteers for Mud Army 2.0.** **Key statistics:** • Rainfall: **350mm (day average), 229-608mm (min-max)** • Brisbane River Flood/Tide Peak (Morning): 3.01m AHD	**11.53am: Council uploads a Flood Forecast Map to its website displaying the potential impacts of a flood height of 3.05m AHD at the Brisbane City Gauge.** **1.16pm: Lord Mayor publishes a Tweet providing residents with the Brisbane Flood Inundation Map with a flood level of 3.05 AHD.** **4.29pm: Brisbane River Flood Forecast Service updated to provide results at a flood level of 3.50m AHD.** **7.00pm: Request for Emergency Alert 1 prepared in the LDCC and signed off by the LDCC on-duty Incident Controller.** **7.07pm: Request for Emergency Alert 1 sent to SDCC.** **7.22pm: SDCC advises of changes to the EA wording recommended by the Authorising Officer.** **7.33pm: Lord Mayor publishes a Tweet informing residents that a flood level of 3.7 AHD was predicted.** **7.44pm: Council emails updated scripting for Emergency Alert to SDCC.**

	• Brisbane River Flood/Tide Peak (Evening): 3.41m AHD **Disaster Management:** • **LDCC at 'Stand Up' status** • **City Resilience Branch moves to 'Stand Up' status (included in LDCC)** • QFES LO (remains until 11 March) • QPS LO (remains until 6 March) • **Brisbane Disaster District Management Group moves to 'Lean Forward' status** **BDDCC moves to 'Lean Forward' status**	**7.45pm: Brisbane River Flood Forecast Service updated to provide results at a flood level of 3.70m AHD.** **7.51pm to 9.50am 28.02.2022: Emergency Alert 1 sent by SDCC:** ***Brisbane City Council advises: Major flooding likely on the Brisbane River. Evacuate if required. Stay out of flood water. Check roads and plan your journey if evacuating. Refer to link below for Councils evacuation centre information. Visit www.brisbane.qld.gov.au*** **10.00pm: Severe Weather Warning EWAS alert sent to residents warning that a Flood Watch and multiple Flood Warnings were current.** **Early warning alerts: 23** **Early warning alerts (creek flooding): 67** **Social media posts: 32**
Mon 28.02.2022	**8.00am: Jack-up barge (part of Kangaroo Point Green Bridge project) risks overturning.** **9.00am: Brisbane River peaks at 3.85m AHD at City Gauge.** **12.00pm: LDMG meeting.**	**12.30am: Brisbane River Flood Forecast Service updated to provide results at a flood level of 4.00m AHD.** **1.11am: Council uploaded a Flood Forecast Map to its website displaying the potential impacts of a flood height**

	1.30pm: QPS evacuates along city reach and Howard Smith Wharves. **5.37pm: BoM modelling report indicates current river height (at City Gauge)** **3.07m (17:14), forecast (highest model in forecast period) 3.46m (1 March at 08:45)** **8.55pm: Barge levelled and made safe, with further monitoring in place over night.** **Mud Army 2.0 leadership team formally commences work to stand up Mud Army 2.0.** **Key statistics:** • Rainfall: 9mm (day average), 0-32mm (min-max) • Brisbane River Flood/Tide Peak (Morning): 3.85m AHD • Brisbane River Flood/Tide Peak (Evening): 3.41m AHD **Brisbane Disaster District Coordination Centre moves to 'Stand Up' status**	**of 4.0m AHD at the Brisbane City Gauge. It was approved and published at 11.13am.** **Early warning alerts: 0** **Early warning alerts (creek flooding): 21** **Social media posts: 49**
Response/Recovery Phase		
Tues 01.03.2022	**6.30am: Brisbane City Gauge records 2.91m at 06:27.** **11.46am: Request for Assistance submitted to SDCC and DDC for Australian Defence Force assistance in clean up.** **12.00pm: LDMG meeting.** **3.53pm: Moderate flood warning for Brisbane River, predicted moderate flood peak of 2.8 m with Tuesday evening high tide at Brisbane City.** **Temporary food waste bins commenced roll out across Brisbane.**	**7:55am: Request for Emergency Alert 2 sent by Council.** **9.04am to 3.40pm: Emergency Alert 2 sent by SDCC:** ***Brisbane City Council advises: Brisbane River remains flooded. The river will continue to peak over the coming days. Stay out of flood water. Check roads***

	A number of major roads in Brisbane remain cut on morning high tide, making movement of vehicles difficult. **Buses recommence on a 'Saturday' timetable.** **Key statistics:** • Rainfall: 1mm (day average), 0-4mm (min-max) • Brisbane River Flood/Tide Peak (Morning): 3.35m AHD • Brisbane River Flood/Tide Peak (Evening): 2.49m AHD • Energex reports 31,000 properties without power in SEQ. **ADF Liaison Officer (remains until 24 March)**	***and plan your journey if evacuating. Refer to link below for Councils evacuation centre information. Visit www.brisbane.qld.gov.au*** **Early warning alerts: 0** **Early warning alerts (creek flooding): 12** **Social media posts: 27**
Wed 02.03.2022	**12.31am: Moderate Flood Warning for Brisbane River. Moderate flood peak of 2.6 m possible with Wednesday morning high tide at Brisbane City** **12.00am: LDMG meeting. Minutes record ADF request for assistance processed, with ADF available from 0600 tomorrow.** **ADF support operations commence.** **Day 1 of Recovery and Kerbside collection - "Operation Collect" commences.** • 50 sites for temporary food waste bins installed across the City (200 bins) - two sites remain inaccessible. • Four collection trucks now operating collecting food waste temporary bins. • Registration for 'Mud Army 2.0' commences. **Key statistics:** • Rainfall: 0mm (day average), 0-1mm (min-max) • Brisbane River Flood/Tide Peak (Morning): 2.45m AHD	**Early warning alerts: 1** **Early warning alerts (creek flooding): 9** **Social media posts: 37**

	Brisbane River Flood/Tide Peak (Evening): 1.91m AHD	
Thurs 03.03.2022	**6.59am: Severe Thunderstorm Warning - Southeast Queensland for intense rainfall, damaging winds and large hailstones. Very dangerous thunderstorms are forecast to affect Brisbane CBD, Aspley and Albany Creek by 7:25am.** **8.12am: Cancellation of severe thunderstorm warning.** **9.28am: Moderate Flood Warning for the Brisbane River. Minor flood peaks with the high tide at Brisbane city on Thursday rising to moderate flood peaks during Friday.** **10.38am: Brisbane City River Gauge records current level of 2.09m and forecast of 2.68m (05/03/2022 at 11:15am).** **11.00am: QLD Premier makes media announcement for people to consider staying at home for the next 24-48 hours due to unstable weather conditions.** **11.04am: Severe thunderstorm warning for Wide Bay, Burnett and Southeast Coast forecast districts.** **1.00pm: LDMG meeting. Deputy Local Disaster Coordinator advises that based on weather forecast, high tides may cause re-flooding. Advice from SDCC is:** ***stay off roads due to potential severe weather. School children will be staying at home tomorrow. QPS LO will remain in LDCC during weekend. Maintaining patrols in affected areas - anti-looting.*** **2.00pm: Briefing provided to BCC Councillors on scale of event and update on recovery efforts.** **82 sites now live for temporary food waste disposal across the City today (336 bins).**	**12.00pm: Request for Emergency Alert 3 sent by Council.** **4.35pm to 12.40am 04.02.2022: Emergency Alert 3 sent by SDCC:** ***Brisbane City Council advises: Brisbane Local Government Area could see isolated severe thunderstorms continue into the weekend. Creek catchments remain saturated and could respond quickly to further rainfall resulting in flash flooding. Residents are urged to secure loose objects where possible to reduce the risk of damage to properties. Take care in the wet weather, stay off flooded roads. Be alert to all future warnings. Visit www.brisbane.qld.gov.au for up-to-date information.*** **Early warning alerts: 16** **Early warning alerts (creek flooding): 17** **Social media posts: 27**

	Initial roll-out of 100 Mud Army 2.0 volunteers cancelled due to severe storm activity. **Queensland Rail commences limited services.** **Key statistics:** • Rainfall: 38mm (day average), 0-62mm (min-max) • Brisbane River Flood/Tide Peak[1] (Morning): 2.25m AHD **Brisbane River Flood/Tide Peak (Evening): 1.91m AHD**	
Fri 04.03.2022	**12.00pm: LDMG meeting.** **2.00pm: Kedron Wavell evacuation centre closes. Remaining 22 guests transported to Sleeman evacuation centre.** **120 temporary locations for food waste bins across the city operational now (516 bins).** **Planned deployment of Mud Army 2.0 on 4 and 5 March 2020 postponed due to severe storm activity.** **Brisbane Disaster District Management Group moves to 'Stand Up' status**	**Social media posts: 23**
Sat 05.03.2022	**8.00am: Mud Army 2.0 deployed to suburbs across Brisbane, cleaning 1039 properties in one day.** **12.00pm: LDMG meeting.** **A decision was made to cease the Mud Army at the conclusion of the day, for several reasons including that:** • By Saturday afternoon, the majority of clean up was for large amounts of kerbside household waste that needed to be collected and taken to	**Social media posts: 20**

	landfill sites. Volunteers were not trained to lift heavy items above head height; • It was deemed unsafe for volunteers to be in the same streets as waste removal crews which included the use of bobcats. As such, the ADF and Council officers would continue to provide clean-up support throughout Brisbane. **QLD and Federal governments announce financial support package for small businesses, farmers, not for profits and sports/community clubs in SEQ.**	
Sun 06.03.2022	**12.00pm: LDMG meeting** **ADF continue residual clean up works (continued until 24 March).** **Council sends text message to 1174 customers who had requested assistance via Council's Mud Army web page:** ***Residents please be assured that the floods clean-up will continue. Council officers and the Australian Defence Force will continue the work done by the Mud Army 2.0 yesterday. We want to assure the people of Brisbane that no one will be left behind. If you still require clean-up assistance, email mudarmy.macc@brisbane.qld.gov.au or phone Council on 3403 8888. Also visit Council's website for more information.***	**Social media posts: 14**
Mon 07.03.2022	**12.00pm: LDMG meeting** **Council's Contact Centre commences outbound calls to the 1174 customers to confirm whether they require further assistance.**	**Social media posts: 3**
Tues 08.03.2022	**12.00pm: LDMG meeting.** **Council's Contact Centre concludes outbound calls to the 1174 customers to confirm whether they require further assistance.** **Buses return to normal timetable.**	**Social media posts: 2**
Wed 09.03.2022	**12.00pm: LDMG meeting.**	**Social media posts: 1**

	Council announces $5000 payment to not-for-profit community organisations operating from or located within a Council leased or licensed community facility impacted by the severe weather event.	
Thurs 10.03.2022	**12.00pm: LDMG meeting.** **12:00pm: Sleeman evacuation centre closes. Arrangements made for transport and alternative accommodation via QLD Department of Housing for remaining 15 guests.** **Council announces flood rates relief for residents affected by Weather Event.**	**Social media posts: 3**
Fri 11.03.2022	**12.00pm: LDMG meeting.**	
Sat 12.03.2022	**12.00pm: LDMG meeting.** **LDCC reduced to two shifts per day.**	**Social media posts: 5**
Sun 13.03.2022	**1200pm: LDMG meeting.** **3.12pm: Disaster Declaration ceased.**	
Mon 14.03.2022	**12.00pm: LDMG meeting.** **Regional Councils start providing assistance to Council's flood recovery (Redlands City Council, Central Highlands Regional Council, Gladstone Regional Council)** **Disaster management:** • BDDMG moves to 'Alert' status **BDDCC moves to 'Alert' status**	
Tues 15.03.2022	**12.00pm: LDMG meeting.** **Mackay Regional Council starts providing assistance to Council's flood recovery.**	
Wed 16.03.2022	**12.00pm: LDMG meeting.**	
Thurs 17.03.2022	**12.00pm: LDMG meeting.**	
Fri 18.03.2022	**12.00pm: LDMG meeting.** **Disaster management:**	

	• LDMG reduced to 'Lean forward' status • LDCC at 'Stand Up' status - reduced to one shift. **City Resilience Branch activated to 'Stand Up' status**	
Sat 19.03.2022	**Council's Contact Centre conducts outbound calls to approximately 50 customers who have open requests for assistance.** **ADF LO operations from ROC**	
Wed 23.03.2022	**Council's Contact Centre makes an additional 7 outbound calls to customers who had submitted requests outside of the Mud Army 2.0's remit (to remove damaged doors etc).**	
Thurs 24.03.2022	**"Operation Collect" concludes, with a total of 3,357 streets cleared and 75,535 tonnes of waste collected.**	

Appendix C – Backflow Device Locations

Since 2011, Council has installed backflow devices at 15 locations along the Brisbane River to help protect areas from backflow flooding. In total, 66 backflow devices are situated at the following 16 locations along the Brisbane River.

No.	Location	Device Type	Year Built	Cost $(k)	Properties served
	Harrison Street, Bulimba	Passive	2012/13	550	98
	Jamieson Street, Bulimba	Passive	2015/16 - 2017/18	6,098	1,262
	Sydney Street, New Farm	Passive & Active	2012/13 - 2013/14	1,990	4052
	Oxlade Drive, New Farm	Passive	2011/12 - 2013/14	457	92
	Margaret Street, CBD	Passive & Active	2012/13 - 2013/14	1,128	3,097
	Castlemaine Street, Milton	Passive & Active	2012/13 - 2013/14	960	518
	Cribb Street, Milton	Passive	2011/12	261	211
	Lang Parade, Rosalie	Active	2013/14	3,080	2,255
	Coronation Drive, Auchenflower	Active	2013/14	1,077	656
	Gailey Road, Toowong	Active	2013/14	916	601
	Ryan Street, West End	Passive	2012/13	605	53
	Brisbane Corso, Fairfield	Passive	Pre-2011	-	-
	Vivian Street, Tennyson	Passive	2012/13	52	61
	Leybourne Street, Chelmer	Passive & Active	2012/13 - 2013/14	1,366	214
	Queenscroft Street, Chelmer	Passive	2012/13 - 2013/14	535	206
	Kenny Street, Fig Tree Pocket	Passive	2013/14	175	60
	TOTAL			19,250	13,376

Appendix D – Overview of Disaster Management Framework

The following overview has been taken from part six of Council's submission.

The Disaster Management Framework

6.1 Council's obligations in respect of disasters like the Weather Event are prescribed under the Disaster Management Act. These obligations are concurrent with and, in some cases contingent on, the obligations of other State and Commonwealth entities. Therefore, Council has organisational structures and policies which align with and support the disaster management framework prescribed by the Disaster Management Act.

Structure of the disaster management framework in Queensland

6.2 The objects of the Disaster Management Act are to assist communities in mitigating, preparing for and responding effectively to disasters and emergency situations and provide for effective disaster management for the State.

6.3 Pursuant to section 4 of the Disaster Management Act, these objects are sought to be achieved by:

- **a)** establishing disaster management groups for the State, disaster districts and local government areas;
- **b)** preparing disaster management plans and guidelines;
- **c)** ensuring communities receive appropriate information about preparing for, responding to and recovering from a disaster;
- **d)** declaring a disaster situation; and
- **e)** establishing the Office of the Inspector-General of Emergency Management (under Part 1A of the Disaster Management Act).

6.4 That is, the Disaster Management Act establishes the framework for how the various levels of government (and key stakeholders) will work together in response to disasters, by establishing a hierarchy of disaster management groups supported by disaster management plans, and by affording powers and functions to those groups and appointed position-holders.

Chief Executive – QFES

6.5 The framework (and the Disaster Management Act) is administered by the Chief Executive of Queensland Fire and Emergency Services (the QFES Commissioner), who, under s.16A of the Act, has the following functions:

- **a)** to establish and maintain arrangements between the State and the Commonwealth about matters relating to effective disaster management;

b) to ensure that disaster management and disaster operations in the State are consistent with the following—
   - **I.** the State group's strategic policy framework for disaster management for the State;
   - **II.** the State disaster management plan;
   - **III.** the disaster management standards;
   - **IV.** the disaster management guidelines;

c) to ensure that persons performing functions under this Act in relation to disaster operations are appropriately trained; and

d) to provide advice and support to the State group and local and district groups in relation to disaster management and disaster operations.

Disaster management groups and plans

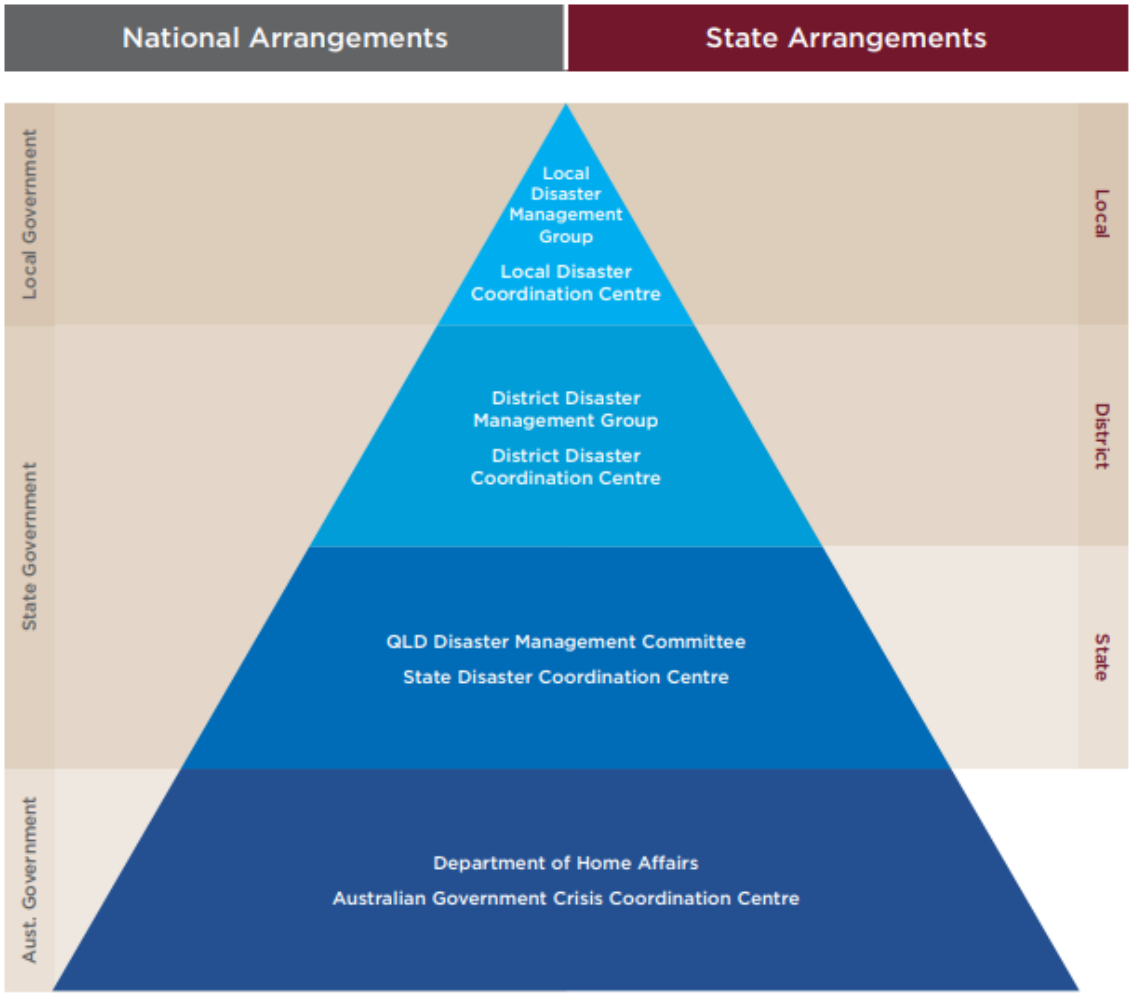
6.6 Disaster management arrangements are coordinated by partnerships between the community and groups at local, district, State and Commonwealth levels. Each of these levels is enabled by a 'disaster management group'.

6.7 The State is divided into 22 disaster districts under the Disaster Management Regulation 2014 (Disaster Management Regulation). Each district comprises one or more local government areas. The State, each district and each local government relevantly hold specific obligations round the creation of disaster management groups, the preparation of documentation and responses to emergency situations.

6.8 The functions of the disaster management groups at State, district and local level are set out below. Some of the primary functions relate to the concepts of 'disaster management' and 'disaster operations'.

6.9 A high level diagram (as extracted from the State Disaster Management Plan 2018) identifying the disaster management structure in Queensland is below.

FIGURE 2.1
QLD DISASTER MANAGEMENT STRUCTURE



State Group and State Disaster Management Plan

6.10 The State Group - the Queensland Disaster Management Committee (QDMC) - is established under s 17 of the Disaster Management Act.

6.11 The functions of the QDMC are outlined in s 18 of the Disaster Management Act and include, most relevantly, to develop a strategic policy framework for disaster management for the State and to ensure effective disaster management is developed and implemented for the State.

6.12 In accordance with the Disaster Management Act requirements, the State has prepared the Queensland State Disaster Management Plan 2018. The State Plan sets the framework for the arrangements and practices enabling disaster management in Queensland and includes

guidance for disaster management stakeholders through the provision of commentary and directions along with supporting documents such as plans, strategies or guidelines.

6.13 Council is not a member of the State group. Rather, the membership includes the Premier, various ministers and assisting officials from Departments and State agencies with an interest in disaster coordination, response and recovery. The State Disaster Coordinator (SDC) and State Recovery Coordinator also participate as members, by invitation.

6.14 The QDMC is supported by the SDC who is responsible for coordinating the disaster response operations for the QDMC, reporting regularly to the QDMC about disaster response operations, ensuring, as far as reasonably practicable, that any strategic decisions of the QDMC about disaster response operations are implemented and providing strategic advice on disaster response operations to district disaster coordinators.

6.15 The SDC is supported by the State Disaster Coordination Group **(SDCG).** That group is responsible for providing advice to the SDC about available resources and options for disaster response operations, ensuring the coordinated and efficient deployment of state government resources, and liaising with invitees and other organisations, including local governments, to ensure the coordinated and efficient deployment of resources in disaster response operations.

6.16 Having regard to the critical operational functions of the SDCG, the group's membership is broad, and includes representatives from a range of State agencies (including QFES and the QPS (who acts as chair) and standing invitees from key stakeholders including BOM and Seqwater.

BOM

6.17 In addition to prescribing BoM as a "standing invitee" on the SDCG, the State Disaster Management Plan prescribes a specific role and set of responsibilities for the BoM. These roles and responsibilities are consistent with the functions of the BOM set out in the Meteorology Act 1955 (Cth).

6.18 Most significantly, the State Disaster Management Plan provides that:

a) BoM's role is to provide forecasts, weather warnings and long term outlooks on environmental phenomena that affect the safety, prosperity and resilience of Australians;
b) BoM is responsible for collecting, coordinating and distributing environmental observation data in support of advices, warnings and briefings, and providing weather alerts, updates and warnings;
c) a BoM officer is embedded within the SDCC, year round, to undertake analysis and reporting of weather forecasts from the BOM and to provide briefings to key stakeholders as well as direct liaison with BoM.

6.19 In respect of the scope and conduct of the BoM's role in the disaster management framework, the State Disaster Management Plan also refers to particular agreements, specifications and plans that support and regulate the BoM's activities. Those plans include:

a) Inter-Governmental Agreement for Hazard Services: This Inter-Government Agreement was established following a 2011 review of the BOM's capacity to respond to future extreme weather and natural disaster events and to provide seasonal forecasting services. The agreement formalises the services provided to State and Territory Emergency Services Agencies, and agrees on a clear allocation of responsibilities of the Australian Government, the States, Territories and local governments for flood management, fire weather management and management of extreme weather and hazard impact events;
b) Service Level Specification for Flood Forecasting and Warning Services for Queensland: The current version of this document (Version 3.3) was prepared by the BOM in consultation with the Queensland Flood Warning Consultative Committee and finalised on 11 August 2021. It sets out, in detail, the flood forecasting and warning services provided by BOM in Queensland, adopting the Total Flood Warning System.

6.20 Separate to the State Disaster Management Plan (but consistent with the principles of that plan, and the BOM's provision of services under the Inter-Governmental Agreement for Hazard Services), BOM has agreed the "Communications Protocol for Flooding in the Lower Brisbane River" with Seqwater, Brisbane City Council, Ipswich City Council, Somerset Regional Council and Lockyer Valley Regional Council. That document sets out the communications arrangements during flood operations in the Lower Brisbane River, particularly in the event of releases of water from Wivenhoe Dam. The protocol contemplates the occurrence of stakeholder agency meetings to coordinate communication and information sharing during flood operations.

Seqwater

6.21 Seqwater is also a "standing invitee" on the SDCG and is assigned a range of roles and responsibilities under the State Disaster Management Plan. Most relevantly, Seqwater:

a) is identified as the "key liaison" for the State, local government and emergency services for all water related emergencies and incidents in South-East Queensland;
b) provides notifications and warnings to population at risk immediately downstream of their referable dams in accordance with their approved Emergency Action Plans;
c) provides a free dam release notification services and associated app to provide the community with up-to-date information on dam releases, water supply and recreation during emergencies or incidents; and
d) works with and provides timely and accurate information to State, District and Local disaster management groups where required to manage the consequences of a water supply or dam safety incident.

ADF

6.22 The ADF is also a "standing invitee" on the SDCG. The State Disaster Management Plan provides that the ADF may provide assistance in response to a disaster event, following a request for Defence Assistance to the Civil Community **(DACC).** Requests for assistance must be made via the SDCC's process.

District Group and District Disaster Management Plan

6.23 Part 2, Division 2 of the Disaster Management Act establishes a District Disaster Management Group (DDMG) for each disaster district prescribed in Schedule 1 of the Disaster Management Regulation. For Council, its relevant disaster district consists of the Brisbane and Redland local government areas.

6.24 Section 23 of the Disaster Management Act describes a DDMG's functions as being:

a) to ensure that disaster management and disaster operations in the district are consistent with the State group's strategic policy framework for disaster management for the State;
b) to develop effective disaster management for the district, including a district disaster management plan, and regularly review and assess that disaster management;
c) to provide reports and make recommendations to the State group about matters relating to disaster management and disaster operations in the district;
d) to regularly review and assess:
    I. the disaster management of local groups in the district; and
    II. local disaster management plans prepared by local governments whose areas are in the district;
e) to ensure that any relevant decisions and policies made by the State group are incorporated in its disaster management, and the disaster management of local groups in the district;
f) to ensure the community is aware of ways of mitigating the adverse effects of an event, and preparing for, responding to and recovering from a disaster;
g) to coordinate the provision of State resources and services provided to support local groups in the district;
h) to identify resources that may be used for disaster operations in the district;
i) to make plans for the allocation, and coordination of the use, of resources mentioned in paragraph (h);
j) to establish and review communications systems in the group, and with and between local groups in the district, for use when a disaster happens;
k) to ensure information about an event or a disaster in the district is promptly given to the State group and each local group in the district;
l) to prepare a district disaster management plan;
m) to perform other functions given to the group under the Act; and
n) to perform a function incidental to a function mentioned in paragraphs (a) to (m).

6.25 In accordance with the Disaster Management Act requirements, the commissioner of the police service has appointed the Queensland Police Service, Assistant Commissioner,

Brisbane Region as chairperson. That person is also appointed as the District Disaster Coordinator (DDC).

6.26 Council is identified as a "core member" of the Brisbane district group. At the district level, the key responsibilities of Council are identified in the Brisbane District Disaster Management Plan – 2021-2022 as:

a) Provision of advice and reports to the DDMG;
b) Resource allocations relevant to parent organisational functions;
c) To ensure it has a disaster response capability;
d) Undertake training in accordance with the QDMTF (Queensland Disaster Management Training Framework);
e) To ensure information about an event or a disaster in its area is promptly given to the DDC.

6.27 The DDC may, under s 47 of the Act, give a local group in the district a written direction about the performance of the group's functions if satisfied it is necessary.

6.28 Other core members include the QAS and Queensland Government Departments. The District Disaster Management Plan also prescribes that representative from agencies including BOM, Seqwater and the ADF may be invited to the DDMG meeting and assist in disaster operations in an "advisory and cooperative" disaster capacity.

Local Disaster Management Group and Local Disaster Management Plan

6.29 In accordance with the requirements under Part 2, Division 3 of the Disaster Management Act, Council has established the LDMG.

6.30 The functions of an LDMG are outlined in section 30 of the Disaster Management Act as follows:

a) to ensure that disaster management and disaster operations in the area are consistent with the State group's strategic policy framework for disaster management for the State;
b) to develop effective disaster management, and regularly review and assess the disaster management;
c) to help the local government for its area to prepare a local disaster management plan;
d) to identify, and provide advice to the relevant district group about, support services required by the local group to facilitate disaster management and disaster operations in the area;
e) to ensure the community is aware of ways of mitigating the adverse effects of an event, and preparing for, responding to and recovering from a disaster;
f) to manage disaster operations in the area under policies and procedures decided by the State group;

g) to provide reports and make recommendations to the relevant district group about matters relating to disaster operations;
h) to identify, and coordinate the use of, resources that may be used for disaster operations in the area;
i) to establish and review communications systems in the group, and with the relevant district group and other local groups in the disaster district of the relevant district group, for use when a disaster happens;
j) to ensure information about a disaster in the area is promptly given to the relevant district group;
k) to perform other functions given to the group under the Disaster Management Act; and
l) to perform a function incidental to a function mentioned in paragraphs (a) to (k).

6.31 Council has appointed its Lord Mayor as the chairperson of the LDMG, and representatives from a range of public and private sector entities (including BOM, the DDMG, QUU, Seqwater, QFES, Queensland Health and Telstra) as members. The group's membership reflects Council's understanding of the key stakeholders equipped with the knowledge and capability necessary to prepare for and respond to the disasters most likely in the Brisbane local government area.

6.32 Council convenes a minimum of two LDMG meetings per year when there are no hazards present, and additional meetings during hazard years as are necessary to effectively prepare for and respond to hazards. At least once annually, the LDMG meets to share operational risks and opportunities in order to exercise and connect. In September 2021, the LDMG completed a training exercise with the ADF ("Exercise Tempest") to explore concepts of operation for a large storm or severe weather event, where ADF would assist Council in the recovery activities.

City Resilience Branch, internal procedures and sub-plans

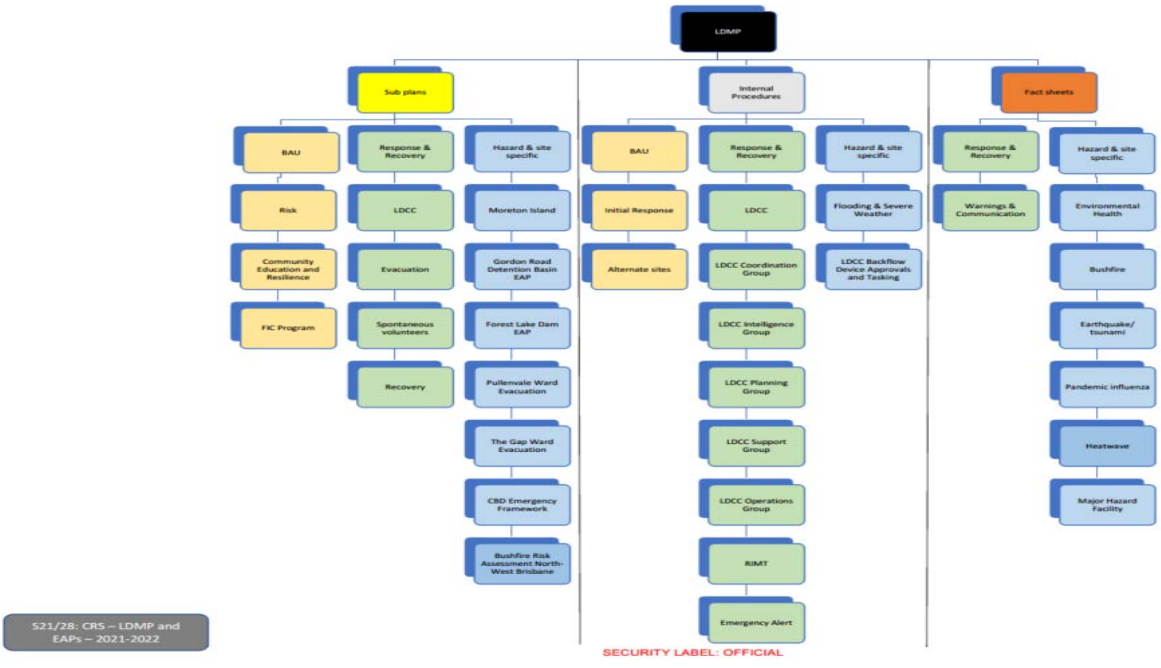
6.33 Council's City Resilience Branch supports the LDMG to deliver its statutory functions. Most significantly, the City Resilience Branch:

a) separate to the LDMG meetings, leverages and builds on its relationships with the LDMG members and adjoining and near local governments to support and develop Council's disaster management and planning capability;
b) develops policies and delivers strategies and programs in response to and in anticipation of disaster events that may impact the City;
c) raises awareness and provide tools and education to Brisbane residents to Prevent, Prepare, Respond and Recover (PPRR) from disasters through various communication and awareness projects and initiatives;
d) identifies the differing needs and vulnerabilities of communities during, post and prior to disaster events and to create tools to assist in empowering residents and creating resilient communities;

e) designs, implements and continually improves emergency and disaster management planning and preparation;
f) maintains and enhances relationships with external emergency service agencies to ensure a collaborative approach to disaster management preparation, response, recovery and community education;
g) ensures all resources are identified and allocated to facilitate optimal response and recovery in case of a disaster/emergency event with the objective of minimising impact on people, property, environment and infrastructure;
h) manages and maintain the LDCC and provides operational coordination for response and recovery during and after an event;
i) ensures compliance with legislative requirements of the Disaster Management Act and underpinning policy, guidelines, plans and procedures.
j) implements, coordinates and manage Brisbane Incident Management System (BIMS) during an event – this is a system used to allocate and track activity and information in the LDCC; and
k) coordinates the LDMG which is chaired by the Lord Mayor and is a requirement of the Disaster Management Act.

6.34 Through the City Resilience Branch, the LDMP is also supported by a suite of sub-plans and internal procedures which include response, hazard and site-specific, and relief and recovery procedures in accordance with the State policy and guidelines and stakeholder input.

6.35 The internal procedures and sub-plans document the policies and procedures undertaken by Council in detail, and the response procedures provide specific instructions and checklists for individual groups and roles. This is shown in the diagram below:



Local Disaster Coordinator and Local Disaster Coordination Centre

6.36 Section 35 of the Disaster Management Act requires the chairperson of a local group to appoint the CEO or an employee of the relevant local government as a LDC of the group. The chairperson must be satisfied that the person appointed to this role has the necessary expertise or experience to be a LDC.

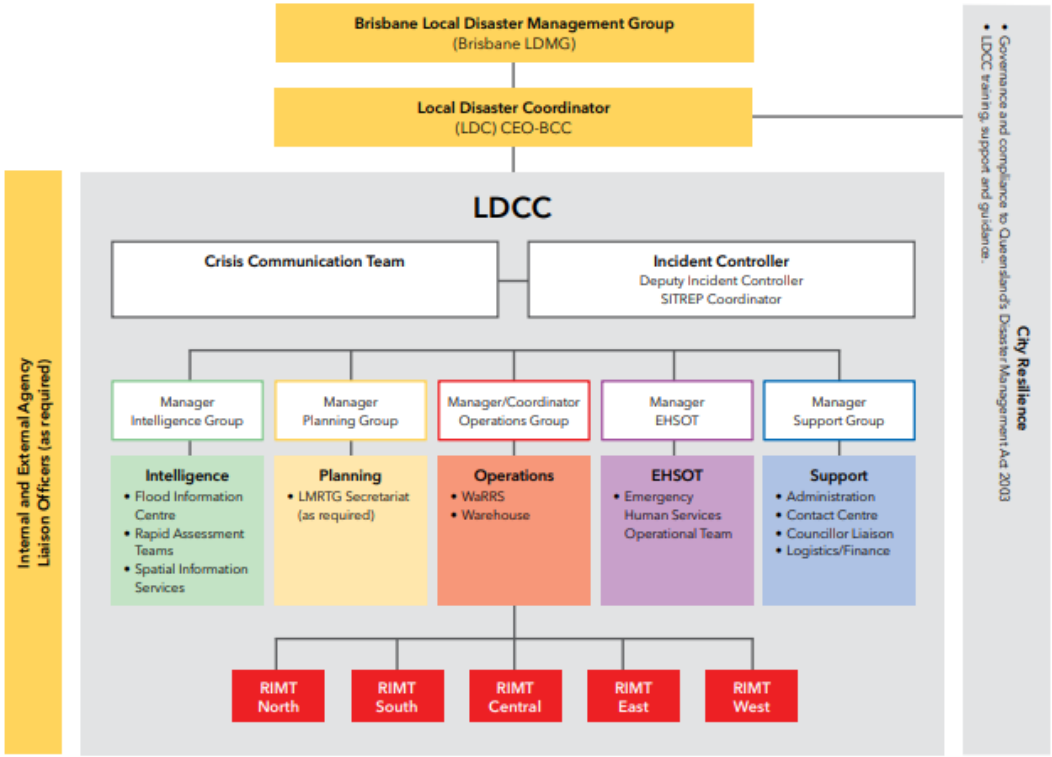
6.37 For Council, the Lord Mayor appointed Council's CEO as the LDC. The functions of that legislative role are 36 of the Disaster Management Act as:

a) to coordinate disaster operations for the local group;
b) to report regularly to the local group about disaster operations; and
c) to ensure, as far as practicable, that any strategic decisions of the local group about disaster operations are implemented.

6.38 The LDMG provides for the establishment of a Local Disaster Coordination Centre (LDCC) to support the LDMG during an event.

6.39 The LDMG operated from the LDCC situated at Level 1 of Brisbane Square, 266 George Street, Brisbane. The LDCC provided the central meeting and control point for information flow and decisions by key stakeholders during the event.

6.40 When the LDCC is operational, the LDMG adopts the following BIMS structure for its operations:



6.41 The structure ensures a comprehensive City-wide approach to disaster management, based on the Local Disaster Management Plan.

Declaration of disaster situation

6.42 In the event of a disaster, the disaster groups hold primary responsibility for undertaking disaster operations in accordance with the disaster management plans and guidelines.

6.43 Under Part 4 of the Disaster Management Act, disaster declarations for a disaster district can be made by the district disaster coordinator with the approval of the Minister for Fire and Emergency Services. The Minister and Premier may make a declaration for the State.

6.44 Declarations of disaster situations under sections 64(1) or 69 of the Act can be made by a DDC or the Minister if a 'disaster' has happened, is happening or is likely to happen and it is necessary for the DDC or a declared disaster officer to exercise declared disaster powers to prevent or minimise any of the following:

a) loss of human life
b) illness or injury to humans
c) property loss or damage; or
d) damage to the environment.

Activation of Council's response arrangements

6.45 The LDMP requires the timely "activation" of Council's response arrangements, including activation of the LDMG and LDCC, in response to any event that has caused significant impact to the community, infrastructure and environment. There are four levels of activation:

a) Alert – an "Alert" level of activation is triggered when there is *an awareness* of a hazard that has the potential to affect the City. In accordance with the LDMP, an Alert status triggers a requirement for the City Resilience team to monitor events and maintain situational awareness, for the City Resilience Duty Officer to monitor events and brief the LDC and for the Manager City Resilience to activate a response through core business functions.

Council's "Disaster Management Workforce – Internal Procedures – City Resilience – Initial Response" further details the roles and responsibility of the City Resilience staff during this period prior to transitioning to standing up the LDCC. The internal procedure sets out specific requirements in the event of thunderstorms and severe weather, including direct engagement with BOM and engagement with the FIC Duty Officer to obtain details about rainfall, river/creek/dam water levels and tidal levels from the FloodWise Information System.

In addition, various other sub-plans and internal procedures including Council's "Flooding and Severe Weather", "Intelligence Group" and "Disaster Preparation Education and Awareness"

documents apply to trigger specific action by Council staff prior to LDCC activation. Those actions include CSAs through the Crisis Communication Team, identification of intelligence needs and priorities for the incident, including through stakeholder engagement with the Rapid Response Group, the SES, City Standards and the FIC, and the issue of early warning alerts.

In respect of the Weather Event:

I. The Seqwater Flood Operatons Centre moved to “Stand Up” Activation Level on 23 February 2022.
II. City Resilience received information from Seqwater and BoM throughout 23 an 24 February 2022 and determined to move to “Alert” activation status on 24 February 2022, and
III. The move to Alert activation triggered Council’s Internal Procedures and Sub-plans.

b) Lean Forward - a **“Lean Forward”** level of activation is triggered when there is a likelihood the threat may affect the City. In accordance with the LDMG, a Lean Forward status triggers a requirement for City Resilience to issue updates and reports, provide advice to the LDC and prepare the LDCC for operations, for the City Resilience Officer to issue updates and reports and/or situation reports and for the Manager City Resilience to activate a response managed by the key Council business unit. In addition, the LDC may elect to activate the LDCC.

In respect of the Weather Event, City Resilience continued to receive information from Seqwater and BOM throughout 25 February 2020 and determined to move to “Lean Forward” activation status on 25 February 2022.

c) Stand Up - a “Stand Up” level of activation is triggered when the threat is *imminent*, the community will be or has been impacted, and the response requires coordination. In accordance with the LDMG, a Stand Up status triggers a requirement for City Resilience to continue to issue updates and reports, to provide advice to the LDC and prepare the LDCC for operations. In addition, the LDC may elect to activate the LDCC for an event that requires a complex response from a range of stakeholders and the LDMG may meet.

In respect of the Weather Event, on 26 February 2022, the LDMG and LDCC moved to "Stand Up" status.

d) Stand Down - a **“Stand Down”** level of activation involves the transition from responding to the event to a recovery phase. At this phase, the community will have returned to normal operation and there will no longer be a requirement to respond to an event.