

## ITEM 4

## POST EXHIBITION - DRAFT MULLET CREEK FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Wollongong is naturally prone to flooding due to our location between the mountains and the sea means flash flooding can often happen as water travels down the escarpment towards the ocean.

The draft Mullet Creek Floodplain Risk Management Study and Plan (FRMS) was prepared in accordance with the New South Wales (NSW) Flood Prone Land Policy and the principles of the Floodplain Development Manual (NSW Government, 2005). The Mullet Creek FRMS reviews options for managing the flood risk for the suburbs of Dapto, Horsley, Wongawilli, Dombarton, Huntley, Cleveland, Kembla Grange, Avondale, Brownsville and Kanahooka.

The draft Floodplain Risk Management Study and Plan was publicly exhibited from 4 October to 1 November in 2022. Council received 67 submissions which commented on various aspects of the draft Study and Plan. The comments have informed some refinements to the draft Floodplain Risk management Study and Plan. It is recommended that the Mullet Creek Floodplain Risk Management Study and Plan (as amended) be adopted.

### RECOMMENDATION

The Mullet Creek Floodplain Risk Management Study and Plan (as amended) be adopted.

### REPORT AUTHORISATIONS

Report of: Jeremy Morgan, Manager Infrastructure, Strategy + Planning  
Authorised by: Joanne Page, Director Infrastructure + Works

### ATTACHMENTS

- 1 Location plan – Mullet Creek Catchment
- 2 Minutes of the Southern Area Floodplain Risk Management Committee meeting held on 15 February 2023
- 3 Executive Summaries – Mullet Creek Floodplain Risk Management Study and Plan
- 4 Engagement Report – Managing Flood Risk in the Mullet Creek Catchment

### BACKGROUND

The NSW Government's Floodplain Development Manual provides a framework to ensure the sustainable development and activation of floodplain environments and incorporates the NSW Flood Prone Policy. Under the Policy, planning for flood liable land is led by Local Government, with State Government subsidising flood mitigation works and providing specialist technical advice to assist Councils in performing their floodplain management responsibilities. The Policy provides for technical and financial support by the State Government through five sequential stages -

- 1 Flood Study – Determines the nature and extent of flooding.
- 2 Floodplain Risk Management Study – Evaluates management options for the floodplain in respect of both existing and proposed development.
- 3 Floodplain Risk Management Plan – development of a plan of management for the floodplain based on the evaluation work in the Floodplain Risk Management Study.
- 4 Implementation of the Plan – taking action to implement the agreed flood modification measures, response modification measures, and property modification measures.
- 5 Review – reviews are recommended on average every 5-10 years and in response to significant changes or events.

The draft Mullet Creek Floodplain Risk Management Study and Plan was prepared in accordance with the NSW Government's Floodplain Development Manual and the Australian Rainfall and Runoff 2019 guidelines. It includes a review of the 2010 Mullet and Brooks Creek Floodplain Risk Management Study and Plan.

The preparation of this Study and Plan has been overseen by the Southern Floodplain Risk Management Committee, comprising membership of Councillors, community representatives and State Government agencies.

Public exhibition of the draft Mullet Creek Floodplain Risk Management Study and Plan occurred between 4 October to 1 November 2022.

On 15 February 2023, an overview of the draft Mullet Creek Floodplain Risk Management Study and Plan was presented to the Southern Floodplain Risk Management Committee, and the Committee recommended the report be adopted by Wollongong City Council (refer Attachment 2).

## PROPOSAL

It is proposed that Council adopt the Floodplain Risk Management Study and Plan for the Mullet Creek catchment. This will enable Council to implement identified priority actions and seek funding from the State Government. Implementation of identified actions in the Plan is estimated to cost in the order of \$4.4 million based on current cost estimates. Funding for specific actions will be considered in future budgeting cycles and prioritised as resources allow. Executive Summaries of the 'Draft Floodplain Risk Management Study and Plan' are included in Attachment 3.

After the adoption of the Floodplain Risk Management Study and Plan, the following actions will be undertaken –

- Incorporate the Flood Risk Precinct Mapping into Council's GIS system.
- Update the relevant Section 10.7 Planning Certificate codes relating to flooding.
- Update the flood planning levels.
- Update the relevant sections within the Wollongong DCP 2009.
- Prepare Grant submissions to State and Federal Government seeking assistance to implement actions within the implementation plan; and
- Commence the implementation of the plan (subject to funding).

## CONSULTATION AND COMMUNICATION

The draft Mullet Creek Floodplain Risk Management Study and Plan was developed through consultation with the local community, Technical Working Group and the Floodplain Risk Management Committee. The draft Mullet Creek Floodplain Risk Management Study and Plan was publicly exhibited from 4 October to 1 November 2022. Engagement with the Aboriginal stakeholders occurred between 7 September to 1 November 2022. A drop-in community information session at the Dapto Ribbonwood Centre took place on 13 October 2022 from 3:30pm to 6:30pm and was attended by 20 community members.

Consultation occurred via -

- Distribution of over 2,800 newsletters and questionnaires/feedback forms to all residents within the floodplain area at the commencement of the public consultation phase to give opportunity for them to provide feedback.
- Media release and notice in the Illawarra Mercury.
- Council's website.
- Public exhibition and community information session.
- Emails/letters to Neighbourhood Forums 7 and 8.
- Emails/letters to other stakeholders including State Government Agencies, schools, and business and industry bodies.
- Social media posts.
- Meetings of the Floodplain Risk Management Committee.
- Meetings of the Technical Working Group.

The exhibition project webpage was viewed 633 times and reports were downloaded 197 times.

Council received 67 submissions (5 letters/emails, 62 on-line/hardcopy surveys). The key themes from the submissions were stormwater infrastructure and maintenance; creek and vegetation maintenance; development and urban planning; roads and accessibility; community education and resilience; signage; and the voluntary purchase scheme.

The submissions are summarised in Council’s Engagement Report (Attachment 4).

The majority of residents were supportive of the actions within the draft Floodplain Risk Management Study and Plan.

### Drop-in Community Information Session

A drop-in community information session at the Dapto Ribbonwood Centre took place on 13 October 2022 from 3:30pm to 6:30pm and was attended by 20 community members. Attendees provided comments on post-it notes and attached them to large maps showing the location of the preliminary options for emergency management and flood modification, as well as flood extents. People raised concerns about road closures and access during floods. People also noted specific locations impacted by floods, and suggested ways to reduce flood impacts.

### Aboriginal Stakeholder Meeting

A meeting was held with Aboriginal stakeholders during the engagement period. They indicated there are sites and artefacts near the proposed locations of some of the recommended options. Aboriginal community requested further consultation as options are progressed further, to better understand the footprint of potential mitigation works and requested archaeological testing take place if Council was looking to expand the footprint of roads near creeks.

### BlueScope Lands Meeting

On 25 November 2022, a meeting was held with representatives from BlueScope Lands and their consultant, Department of Planning and Environment (DPE) staff and Council Staff. The purpose of the meeting was to discuss and seek clarity on key points raised in their submission. The points raised included clarity on hazard for development assessment, additional levee, survey data, flood warning system, flood function definition, flood planning level freeboard, assumptions in modelling future roads, reliable access to areas of West Dapto and Darkes Roads, and prioritisation of the eastern portion of Northcliffe Drive extension. The respective points were addressed in the meeting by Council staff.

### Southern Floodplain Risk Management Committee

On 15 February 2023, an overview of the draft Mullet Creek Floodplain Risk Management Study and Plan was presented to the Southern Floodplain Management Committee. The Committee recommended the report be adopted by Wollongong City Council (refer Attachment 2).

### Outcome of Community Consultation

Comments from the community and from State Government agencies have been reviewed and, where appropriate, incorporated into the final version of the Mullet Creek Floodplain Risk Management Study and Plan.

## PLANNING AND POLICY IMPACT

This report contributes to the delivery of Our Wollongong 2032 Goal 1 – **We value and protect our environment**. It specifically delivers on the following:

Community Strategic Plan 2032		Delivery Program 2022-2026
Strategy		Service
1.3	Increase our resilience to natural disasters and a changing climate to protect life, property and the environment.	(Stormwater Services) This service strategically plans for a coordinated approach to floodplain risk management and stormwater management including protection of waterways, beaches, lakes, lagoons and creeks.

The FRMS will be used by Council and developers to plan for new urban development at West Dapto.

### SUSTAINABILITY IMPLICATIONS

The recommended actions within the draft Mullet Creek Floodplain Risk Management Study and Plan have been assessed on the principles of sustainability in social, environmental, cultural and economic terms, using a triple bottom line approach (multi-criteria assessment).

### RISK MANAGEMENT

The draft Mullet Creek Floodplain Risk Management Study and Plan provides a better understanding of the flood behaviour and flood risk on the existing and future communities within the catchment and provides ways to manage flood risk efficiently and effectively into the future.

### FINANCIAL IMPLICATIONS

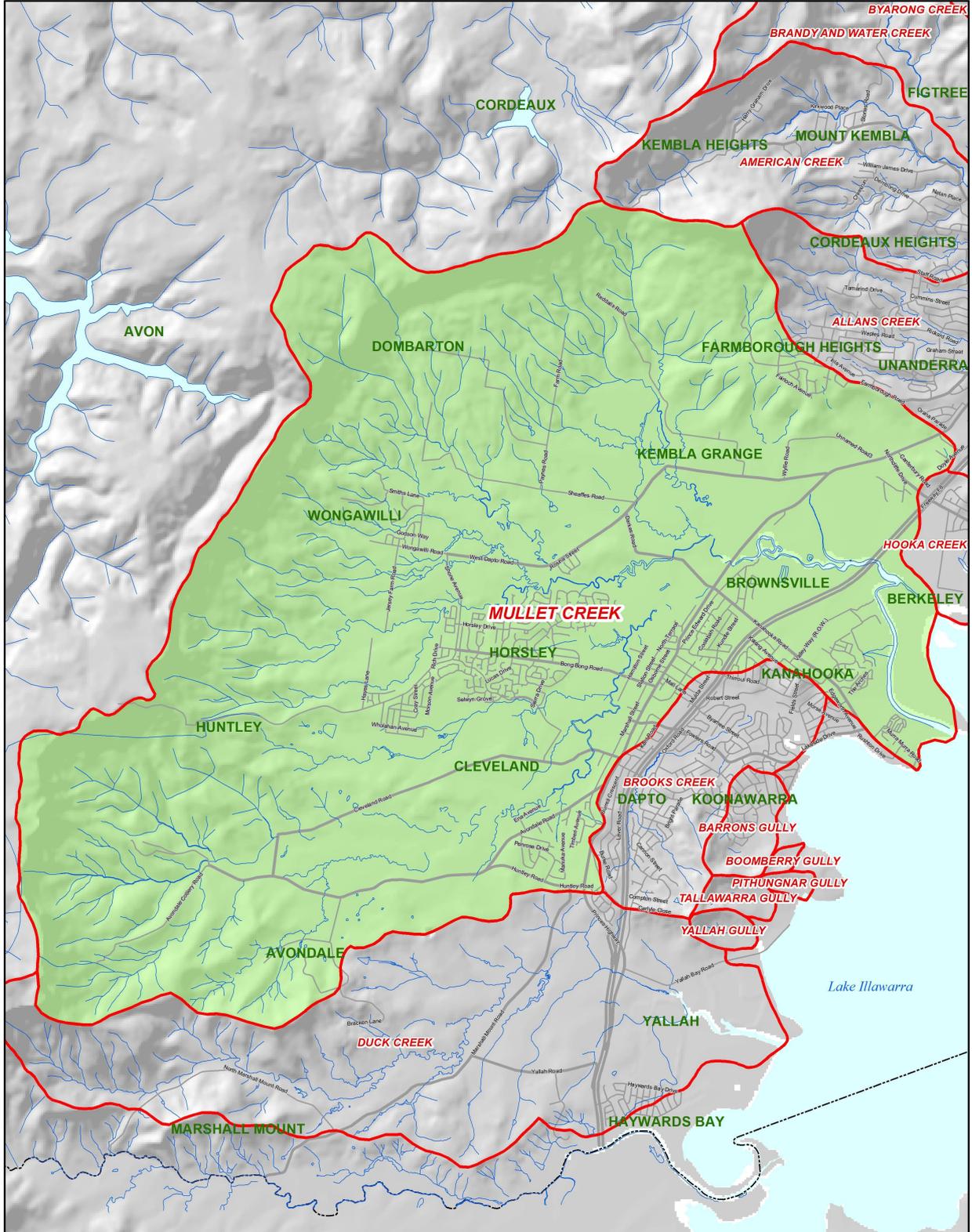
The preparation of this Floodplain Risk Management Study and Plan has cost \$205,645 (GST inclusive); approximately two thirds of which has been funded by State Government. Implementation of all actions within the Floodplain Risk Management Plan is estimated to cost in the order of \$4.4 million. Allocation of funds to priority actions will be considered in future budgeting cycles and delivered as resources allow.

Pending adoption of the Floodplain Risk Management Study and Plan, applications to State and Federal Governments will be made for financial assistance to implement actions within the Floodplain Risk Management Plan. Where successful, grants are usually provided in the ratio of 2:1 (two parts Government, one part Council).

### CONCLUSION

The draft Mullet Creek Floodplain Risk Management Study and Plan has been prepared with the cooperation, assistance, and support of many stakeholders, including community members and State Government representatives.

The draft Mullet Creek Floodplain Risk Management Study and Plan is an important milestone in the floodplain risk management process, that will allow the implementation of appropriate flood risk management strategies such as development controls, emergency response measures, education and infrastructure solutions to benefit the community and businesses within the catchment. The report and associated flood data will be put onto the NSW Flood Data Portal so it can be publicly accessed, with the aim to provide a better understanding of flood behaviour, flood risk and wiser decision making for the Mullet Creek catchment.



 <h2 style="margin: 0;">Mullet Creek Catchment</h2>		 	GIS ref.: gi11079_01
 Mullet Creek Catchment	 Other Catchment		Printed: 9/10/2017
 Catchment Boundary	 Watercourse	Scale 1:65,000	

While every effort has been made to ensure the highest possible quality of data, no liability will be accepted for any inaccuracy of the information shown. Copyright © Wollongong City Council, Mapping Services Section. This map may not be reproduced in any form whatever without the express written permission of Wollongong City Council.

MINUTES

FLOODPLAIN RISK MANAGEMENT COMMITTEE MEETING  
– SOUTHERN AREA



MINUTES

FLOODPLAIN RISK MANAGEMENT COMMITTEE  
(SOUTHERN AREA)

at 4.00 pm

Wednesday 15 February 2023

In Attendance

Councillor E Aitken – (Chair), Councillor A Martin, A Holmes - Transport for NSW, S Milling - Transport for NSW, N Pomfret – Department of Planning, Industry and Environment, S Raini – Department of Planning, Industry and Environment, R Whalan – SES, J Morgan – Manager Infrastructure Strategy & Planning, I Ghatti – Transport, Asset and Stormwater Manager, R Piatek - Senior Stormwater and Floodplain Design Engineer, A Sevenier – Floodplain Management Engineer, S Srbinovski - Senior Stormwater Development Engineer, P Milevski - Civil Engineer Urban Drainage, D Green – Land Use Planning Manager, C Robinson - Emergency Management Officer, R Smith – Community Representative, F Taaffe – GRC Hydro, Stephen Gray - GRC Hydro, M Faint – GRC Hydro, Luke Evans - Rhelm, L L Cheah – Administration Officer



**MINUTES**

**FLOODPLAIN RISK MANAGEMENT COMMITTEE MEETING  
– SOUTHERN AREA**



## INDEX

ITEM	PAGE NO.
1	STANDING AGENDA ITEMS.....3
1.1	Welcome .....3
1.2	Acknowledgement of Country .....3
1.3	Disclosures of Interest .....3
1.4	Apologies .....3
1.5	Confirmation of Minutes of Previous Meeting held on 16 September 2021 .....3
2	FLOOD MANAGEMENT UPDATE.....3
2.1	Mullet Creek Floodplain Risk Management Study & Plans.....3
2.2	Brooks Creek Floodplain Risk Management Study & Plan.....3
2.3	Duck Creek Floodplain Risk Management Study & Plan.....3
2.4	Kully Bay, Minnegang Creek and Hospital Creek Floodplain Risk Management Study & Plan.....3
2.5	Lake Illawarra Floodplain Risk Management Study & Plan .....4
2.6	Update on Implementation of Floodplain Risk Management Plans .....4
3	GENERAL BUSINESS .....4
3.1	Business Arising from Previous Minutes.....4
4	NEXT MEETING.....4
5	CLOSE MEETING .....4

MINUTES

FLOODPLAIN RISK MANAGEMENT COMMITTEE MEETING  
– SOUTHERN AREA



## 1 STANDING AGENDA ITEMS

### 1.1 Welcome

In line with NSW Health guidelines about Novel Coronavirus, we have made some changes to the way we are engaging the community, to keep our staff and people in our safe. Instead of having face-to-face conversations with people, meetings are currently being conducted via Teams.

### 1.2 Acknowledgement of Country

The traditional owners of the land were acknowledged.

### 1.3 Disclosures of Interest

Nil

### 1.4 Apologies

Apologies were received and accepted on behalf of Cr Linda Campbell, Andrew Monk, Jeremy Morgan (joined meeting at 4:20pm), John Wall and Andrew Heaven.

### 1.5 Confirmation of Minutes of Previous Meeting held on 16 September 2021

The Minutes of the Meeting held on 16 September 2021 were noted.

## 2 FLOOD MANAGEMENT UPDATE

### 2.1 Mullet Creek Floodplain Risk Management Study & Plans

The consultant (Rhelm) provided a summary of the findings, including key outcomes of the public exhibition period.

The committee recommended that Council adopt the Mullet Creek Floodplain Risk Management Study and Plan (2023).

### 2.2 Brooks Creek Floodplain Risk Management Study & Plan

The Consultant (GRC Hydro) provided an update on this project and presented preliminary flood modelling results.

### 2.3 Duck Creek Floodplain Risk Management Study & Plan

Council provided an update on the status of this project. It was acknowledged this study is conducted in partnership with NSW Department of Planning flood management experts who were thanked for their contributions.

## MINUTES

## FLOODPLAIN RISK MANAGEMENT COMMITTEE MEETING – SOUTHERN AREA



### 2.4 Kully Bay, Minnegang Creek and Hospital Creek Floodplain Risk Management Study & Plan

Council provided an update on the status of this project. It was acknowledged this study is funded by the NSW Floodplain Management Program and Council.

### 2.5 Lake Illawarra Floodplain Risk Management Study & Plan

Council has commenced the review and a technical brief is being prepared to engage a consultant. This study is conducted in conjunction with Shellharbour City Council (and NSW Department of Planning flood management experts).

### 2.6 Update on Implementation of Floodplain Risk Management Plans

*The committee noted the current works underway:*

- Kanahooka Rd, Dapto for proposed drainage extension (channel relining) and Non-Return Valve – Design in progress.
- Byamee Street, Dapto Proposed Debris Control Structure – Considered in future financial years.

## 3 GENERAL BUSINESS

### 3.1 Business Arising from Previous Minutes

Nil

## 4 NEXT MEETING

A date for the next meeting is yet to be determined.

## 5 CLOSE MEETING

The meeting closed at 5.20 PM.



## Executive Summary

The Mullet Creek Floodplain Risk Management Study has been prepared for Council and in accordance with the New South Wales (NSW) Flood Prone Land Policy and the principles of the Floodplain Development Manual (NSW Government, 2005). This will allow Council to better manage the existing, continuing and future flood risk to the community around the suburbs of Dapto, Horsley, Wongawilli, Dombarton, Huntley, Cleveland, Kembla Grange, Avondale, Brownsville and Kanahooka through identifying mitigation strategies in the Mullet Creek catchment, to ensure the safeguarding of residents, properties and other infrastructure.

### **Background**

This study has been based on the 2018 BMT WBM update to the Mullet Creek Flood Study. The 2018 updated models form the basis of the model updates for the catchment and floodplain documented in this report. The 2018 study focussed on the Mullet Creek catchment and excluded the Brooks Creek catchment from the study area.

### **Objectives**

A key objective for this project was to provide understanding of flood risk and management within the Mullet Creek catchment due to the increasing demand for development as a State Planning endorsed urban release area, as well as the risk for existing properties in the catchment.

This study is intended to be used to:

- Identify measures to reduce the risk of flooding impacts on the community
- Reduce the manageable impact and risk of flooding on the community
- Assist in informing the community of flood risks in the study area
- Inform Council planning guidelines for the study area.

The outcomes of this FRMS are presented in the Floodplain Risk Management Plan (FRMP) which documents and conveys the decisions on the management of flood risk into the future. The FRMP outlines a range of measures to manage existing, future and residual flood risk effectively and efficiently. This includes a prioritised implementation strategy; what measures are proposed and how they will be implemented.

### **Flood Model Update**

The flood study was updated through a revision to the hydrology and additional calibration of the catchment. An update of the hydrology to Australian Rainfall and Runoff 2019 (ARR2019) was also undertaken. The hydraulic model was updated to reflect current catchment condition and validated against historic events. The modelling approach was updated to reflect current best practice.

### **Property Flooding and Flood Damages**

A damages assessment has also been undertaken to quantify the existing flood damages based on design flood events within the study area. The results are summarised in **Table i**.

Eleven (11) buildings have overfloor flooding in the 20% AEP event which increases to 72 in the 1% AEP event. This relatively low number of properties impacted reflects the developing nature of the catchment.

The average annual damage (AAD) for the Mullet Creek study area under existing conditions is **\$2,412,000**. Over a 50-year assessment period and under a seven per cent discount rate, this is equivalent to a Net Present Value (NPV) of **\$33.3 million**. These damages were calculated based on the tangible damages only.



**Table i Existing Damages Assessment Results**

<b>AEP</b>	<b>Properties with Over-Floor Flooding</b>	<b>Max Over-Floor Depth (m)</b>	<b>Avg Over-Floor Depth across all flood affected properties (m)</b>	<b>Total Damages</b>
<b>PMF</b>	296	3.29	0.56	\$95,119,612
<b>1% AEP</b>	72	2.05	0.36	\$10,107,351
<b>5% AEP</b>	26	1.18	0.20	\$3,661,449
<b>20% AEP</b>	11	0.18	0.07	\$1,024,179
<b>AAD</b>				\$1,673,293

***Flood Risk Management***

Flood risk is a combination of the likelihood of occurrence of a flood event and the consequences of that event when it occurs. It is the human interaction with a flood that results in a flood risk to the community. This risk will vary with the frequency of exposure to this hazard, the severity of the hazard, and the vulnerability of the community and its supporting infrastructure to the hazard. Understanding this interaction can inform decisions on which treatments to use in managing flood risk.

Measures available for the management of flood risk can be categorised according to the way in which the risk is managed. There are three broad categories of management:

- Flood modification measures – options aimed at preventing/avoiding or reducing the likelihood of flood risks through modification of flood behaviour in the catchment.
- Property modification measures – options focused on preventing/avoiding or reducing the consequences of flood risks. Rather than necessarily modify flood behaviour, these options aim to modify existing properties (e.g. by house raising) and/or impose controls on property and infrastructure development to modify future properties. Property modification measures, such as effective land use planning and development controls for future properties, are essential for ensuring that future flood damages are appropriately contained, while at the same time allowing ongoing development and use of the floodplain.
- Emergency response modification measures – options focused on reducing the consequences of flood risks, by generally aiming to modify the behaviour of people during a flood event.

A range of measures to manage existing, future and residual flood risk effectively and efficiently have been assessed. This includes a prioritised implementation strategy; what measures are proposed and how they will be implemented. Preliminary costs have been developed for feasible options to allow for planning, implementation and integration with Council’s existing long-term financial planning and asset planning processes. All options have been assessed utilising a triple bottom line approach in the form of a multi-criteria assessment.

There was a total of 26 options assessed using the MCA. The emergency and property modification options generally ranked higher than the flood modification options. This was due to the emergency and property options being able to deliver reasonable reductions in flood risk without the capital outlay required for the flood modification options. The highest ranked flood modification option was ranked 15 (Princes Highway and



Unara Road Blockage Control Device), with the first 14 options being emergency, property and future development modification options.

The top three ranked options overall were:

- Data handover to the SES
- Update of emergency response documentation
- Data collection following flood events

The top three ranked structural options were:

- Princes Highway and Unara Road blockage control
- Taywood Park Basin and Blockage Control
- Essex Street Levee - Short

Details of the implementation strategy are included in the Floodplain Risk Management Plan component of this study.

### ***Outcomes and Recommendations***

This report presents the findings of the Floodplain Risk Management Study stage of the Flood Risk Management Process for Mullet Creek, in accordance with the Floodplain Development Manual (NSW Government, 2005). The investigations undertaken as part of this process identified a number of issues within the floodplain. Based on these issues, a series of floodplain management options were developed and recommended.

The outcomes of the multi-criteria assessment provide a sound basis upon which Council can make decisions about undertaking works, making planning decisions and developing response arrangement to reduce the impact of flooding on property and life.

The implementation strategy associated with the outcomes of this study may not necessarily approach the options from “highest ranking to lowest ranking” but will also need to incorporate various other considerations such as existing works programs, availability of funding and other opportunities to combine floodplain works with other activities.

The options identified as having significant flood risk reductions that also do not have adverse social or environmental impacts are incorporated into the Floodplain Risk Management Plan (FRMP) as proposed management actions. The FRMP provides a realistic strategy to manage flood risk and will outline the process of implementation for recommended management actions within the floodplain.



## Executive Summary

### Study Overview and Purpose

The Mullet Creek Floodplain Risk Management Plan (FRMP) has been prepared for Wollongong City Council (hereafter referred to as Council) in accordance with the New South Wales (NSW) Flood Prone Land Policy and the principles of the Floodplain Development Manual (NSW Government, 2005).

This FRMP is to be considered in conjunction with the Mullet Creek Floodplain Risk Management Study (FRMS), prepared as a separate document to this FRMP. The FRMS (Rhelm, 2022), examined options for managing flood risk in the suburbs of Dapto, Horsley, Wongawilli, Dombarton, Huntley, Cleveland, Kembla Grange, Avondale, Brownsville and Kanahooka. This FRMP outlines the floodplain management measures recommended as an outcome of the assessment undertaken in the FRMS along with the implementation strategy associated with those measures.

The overall objective of this FRMP is to document and convey the decisions on the management of flood risk into the future. Drawing on the investigations undertaken as part of the FRMS, this plan outlines a range of measures to manage existing, future and residual risk effectively and efficiently. This document also presents a prioritised implementation strategy, to guide the implementation of the proposed measures.

This document is a draft version of the plan, for public exhibition and stakeholder engagement. It is anticipated that this Plan will be updated to reflect the input from the community and stakeholders.

### Study Area

The Mullet Creek catchment is located approximately nine kilometres south-west from the Wollongong CBD and encompasses the suburbs of Dapto, Horsley, Wongawilli, Dombarton, Huntley, Cleveland, Kembla Grange, Avondale, Brownsville and Kanahooka.

The catchment borders the Duck Creek catchment to the south, the Allans Creek catchment to the north, the Illawarra Escarpment to the west and Lake Illawarra to the east.

### Consultation

Community and stakeholder consultation is an important element of understanding and managing flood risk. The engagement approach undertaken as part of this study was in accordance with the IAP2 framework and the requirements of the NSW Government's Floodplain Development Manual (2005).

The community and stakeholders will be engaged to provide input on flooding issues experienced in Mullet Creek and how they could be addressed. This report will be updated following the public exhibition and feedback from the community.

A more detailed description of the community consultation strategy adopted in this FRMSP is provided in **Section 3** of this document.

### Floodplain Risk Management Study

The Mullet Creek Floodplain Risk Management Study (Rhelm, 2022) provided a comprehensive evaluation of the flood risks in Mullet Creek and identified potential options to mitigate these risks.

The key outcomes of the FRMS include:

# R h e l m

## Mullet Creek Floodplain Risk Management Plan

- Evaluation of flood risk to the community based on the flood behaviour of the catchment. This analysis included Flood hazard and emergency response mapping, and economic damages assessments.
- Review of flood planning policy, including flood-related controls covered by the Local Environment Plan (LEP), relevant Development Control Plans (DCPs), Council policies and plans. The recommendations proposed as an outcome of this review are presented in this FRMP.
- Identification of a range of flood mitigation measures to address existing and future flood risk and evaluation of these measures with the use of a Multi-Criteria Assessment (MCA) approach. The MCA enabled the comparative assessment of all options based on their economic, social, and environmental aspects, as well as on their effectiveness in mitigating flood risk.

This floodplain risk management plan draws from the conclusions of the analysis undertaken in the FRMS and present the recommended measures for managing flood risk within the Mullet Creek catchment, as well as the strategy to implement these measures.

### Recommended Floodplain Risk Management Measures and Implementation Program

The outcomes of the options analysis undertaken in the FRMS form the basis of this FRMP. A detailed description of the recommended floodplain risk management measures is provided in **Section 4.2**.

**Table E-1** summarises the measures recommended as part of this FRMP.

In order to achieve the implementation of relevant management actions, a program of implementation has been developed. The proposed implementation strategy is presented in **Section 5**. The proposed program provides information on the estimated costs of each measure, the agency/ organisation responsible for the action, as well as the priority and timeline for implementation.

It is recommended yearly monitoring of the plan be undertaken for progress against the recommended actions, and to ensure that the findings of the plan continue to be referenced as development is undertaken in the Mullet Creek catchment

### Conclusions and Recommendations

This FRMP provides a practical framework and implementation plan for managing existing, future and continuing flood risk within the study area.

Overall, it is considered that existing risks to the Mullet Creek floodplain can be managed appropriately through the implementation of development controls, emergency response measures and selected ground works. The effective implementation of development controls will be of key importance in reducing the damages and risk to life associated with flooding into the future through the construction of flood compatible buildings and assets. Improving emergency response through flood free access, and improved community awareness of flooding, is critical to reducing the risks associated with flooding in the study area.

This FRMP fulfils its objectives in accordance with the New South Wales (NSW) Flood Prone Land Policy (NSW Government, 2001) and the principles of the Floodplain Development Manual (NSW Government, 2005).



**Table E-1 Summary of Recommended Floodplain Risk Management Measures**

<b>Management Scenario</b>	<b>ID</b>	<b>Name</b>
Catchment Flood Management Measures	FM1	Princes Hwy and Unara Road Blockage Control
	FM4	Taywood Park Basin and Blockage Control
	FM8b	Essex Street Levee - Short
Future Development Management Measures	FD1	Community Detention Basin Strategy
	FD2	Enhanced Storage Area (ESA) Strategy
	FD3	Riparian Corridor Setbacks and Policy
Emergency Response Management Measures	EM1	Data Handover to the NSW SES
	EM2	Update of Emergency Response Documentation
	EM4	Emergency Plans for Flood Affected Businesses
	EM5	Flood Warning Signs and Information
	EM6	Community Education and Awareness
	EM7	Data Collection Following Flood Events
	EM12	Predictive Flash Flood Warning
	EM13	Installation of Additional Gauges
	EM14	Post-Flood Inspection Checklist
Property Management Measures	PM1	Land use planning and building control updates
	PM2	Floodproofing and Flood Resilient Building Guidelines
	PM3	Voluntary House Purchase scheme



OUR WOLLONGONG JOIN THE CONVERSATION



# Managing Flood Risk in the Mullet Creek Catchment

Draft Floodplain Risk Management Study & Plan

Engagement Report

November 2022

## Table of Contents

Executive Summary .....	3
Background .....	6
Stakeholders .....	7
Methods.....	8
Results .....	9
Next Steps.....	24

The information in this report is based on data collected from community members who chose to be involved in engagement activities and therefore should not be considered representative.

This report is intended to provide a high-level analysis of the most prominent themes and issues. While it's not possible to include all the details of feedback we received, feedback that was relevant to the project has been provided to technical experts for review and consideration.

## Executive Summary

As part of our commitment to managing flood and stormwater risks in our region, we're working on a review of the Mullet Creek Floodplain Risk Management Study and Plan (FRMSP). We shared the preliminary options recommended for flood mitigation and draft reports with the community and key stakeholders and sought their input.

### Engagement details

Engagement with Aboriginal stakeholders ran from 7 September to 1 November 2022. Broader community engagement ran from 4 October to 1 November. We sent letters, Frequently Asked Questions (FAQ), a map and a survey to more than 2,800 residents and owners of properties identified as flood affected. They were invited to learn more and join the conversation. We sent the information to Neighbourhood Forums 7 and 8, participants in previous Mullet Creek catchment flood engagements and other stakeholders including State Government agencies, schools and business and industry bodies. We published a project webpage on [our.wollongong.nsw.gov.au](https://our.wollongong.nsw.gov.au), which included the draft FRMSP reports, a map showing the location of the preliminary options, FAQ, an online survey and Q&A forum. We issued a media release and published a notice in the Illawarra Mercury Community Update. We held a meeting with Aboriginal stakeholders and a drop-in community information session at Dapto Ribbonwood Centre. People could also access the information from Council's Customer Service Centre, and Wollongong and Dapto Libraries. A Ward 3 Councillor and community member both promoted the engagement in Dapto Facebook groups and the Illawarra Mercury published an article promoting the exhibition.

### Engagement participation

We invited feedback on the draft FRMSP and received 67 submissions, including 15 via the online survey, four emails, one letter and 47 hard copy surveys. We had conversations with 20 attendees at the community information session and two representatives of an Aboriginal Traditional Custodian group. Two people submitted questions to the online Q&A and the project webpage had 633 unique views.

### What we heard

#### Survey

Most of the feedback was provided via the survey (61 submissions). Nearly half of the respondents have lived, worked or visited in the catchment for more than 21 years. The most common response people said they would have to a major flood in the area, is to remain at their house. During a flood event, they would most commonly seek information via radio, social media and TV about road closures, predicted flood levels and evacuation notices. Respondents were asked to indicate their level of support for the options for managing flood risk in the Mullet Creek Catchment. Most were either strongly supportive or somewhat supportive of each option.

Respondents were also asked if they had other suggestions for managing flood risk in the catchment. Several made suggestions for stormwater infrastructure they believe would help, like bigger pipes, debris control structures, retention basins, levees and weirs. Some acknowledged the effectiveness of existing infrastructure and had observed improvements since mitigation measures were put in place.

There was a call for improvements to the maintenance of stormwater infrastructure and to increase the frequency of maintenance. There is a perception some drains are never cleared out and there is risk from blocked drains increasing flood impacts. Respondents identified specific areas of concern and made suggestions for maintaining stormwater infrastructure.

Some respondents called for improvements to creek and vegetation maintenance and identified areas of concern. People want maintenance to occur more frequently to remove rubbish and weeds, including lantana. Some believe dredging Mullet Creek will help.

Some respondents believe not allowing or limiting development on flood-affected land is needed, whereas others feel the current development controls are suitable. There is a perception new development contributes to worsening flood impacts. We heard more care needs to be taken when granting building permits, to ensure there is adequate drainage for all future development in flood-affected areas. Some believe there should be higher flood-mitigation requirements on developers.

Road raising was spoken about as a potential mitigation option. People made suggestions for roads they think should be raised and expressed concerns about roads being cut off in floods.

We received other suggestions, including:

- Educating the community about evacuation and driving through floodwaters
- Using Dapto High School as an emergency evacuation centre
- Installing flood warning signs and depth indicators on roads that are known flooding hotspots
- Purchasing flood-affected properties at real estate value, not market value.

#### **Meeting with Aboriginal stakeholders**

The Aboriginal Traditional Custodians we spoke to indicated there are sites and artefacts near the proposed locations of some of the recommended options. They requested to have a site officer present to monitor when the Enhanced Storage Areas go in. They would like to better understand the footprint of potential roadworks and requested archaeological testing take place if Council is looking to expand the footprint of roads near creeks.

#### **Open submissions**

We received open written submissions from:

- An operator of an electrical distribution network
- An engineering consultancy firm on behalf of an industrial landowner
- A development investment group on behalf of an industrial landowner.

Lengthy and/or technical submissions were provided in full to the team working on the FRMSP. The main points raised in these submissions included requests to:

- Clarify or add technical details
- Prioritise the Northcliffe Drive extension (EM9)
- Add other mitigation options to the Plan, including debris control structures and a levee

The representative of the electrical distribution network operator provided advice regarding their flood response plan and impacts of floods on the network.

#### **Information session**

Twenty people attended the information session at Dapto Ribbonwood Centre on 13 October 2022. Attendees provided comments on post-it notes and attached them to large maps showing the location of the preliminary options for emergency management and flood modification, as well as flood extents. People raised concerns about road closures and access during floods. People noted specific locations impacted by floods, in particular around Ena Avenue, and suggested ways to

reduce flood impacts. They also noted their observations of flooding and flood impacts in these areas.

### **Social media**

Commentary centred around people's perceptions as to what causes flooding; allowing development and built-up areas on floodplains – and how it could be mitigated. Suggestions included raising a section of Bong Bong Rd and the bridge, raising the level of Darkes Rd and dredging the silt build-up at the mouth of the creeks.

### **Next steps**

We will use this feedback to inform any required revisions to the draft Floodplain Risk Management Study and Plan. These are preliminary discussions about the recommended options. They will each require further investigation, consultation and approvals before going ahead. We will continue sharing information with the community and key stakeholders and seek input as we progress.

## Background

As part of our commitment to managing flood and stormwater risks in our region, we're working on a review of the Mullet Creek Floodplain Risk Management Study and Plan (FRMSP). These reports identify flooding "hotspots". They explain what the risks and damages from floods in these areas might be. The risks and damages can be to people, property and the environment. The reports present potential options for ways we could reduce those risks. Examples of these measures include:

- Emergency response plans
- Building new or improving existing structures that collect and carry stormwater into drains or creeks, e.g. detention basins or culverts.
- Land zoning and development controls that guide what can and can't be built on flood-prone land.
- Voluntary purchase of houses built in areas of high flood-risk
- Flood education programs.

We consider changes to flood risk as a result of these strategies and under future conditions, e.g. climate change and future development. The report includes recommendations for strategies to reduce flood risk.

## NSW FLOODPLAIN RISK MANAGEMENT PROCESS



### Flood study reviews and previous engagement

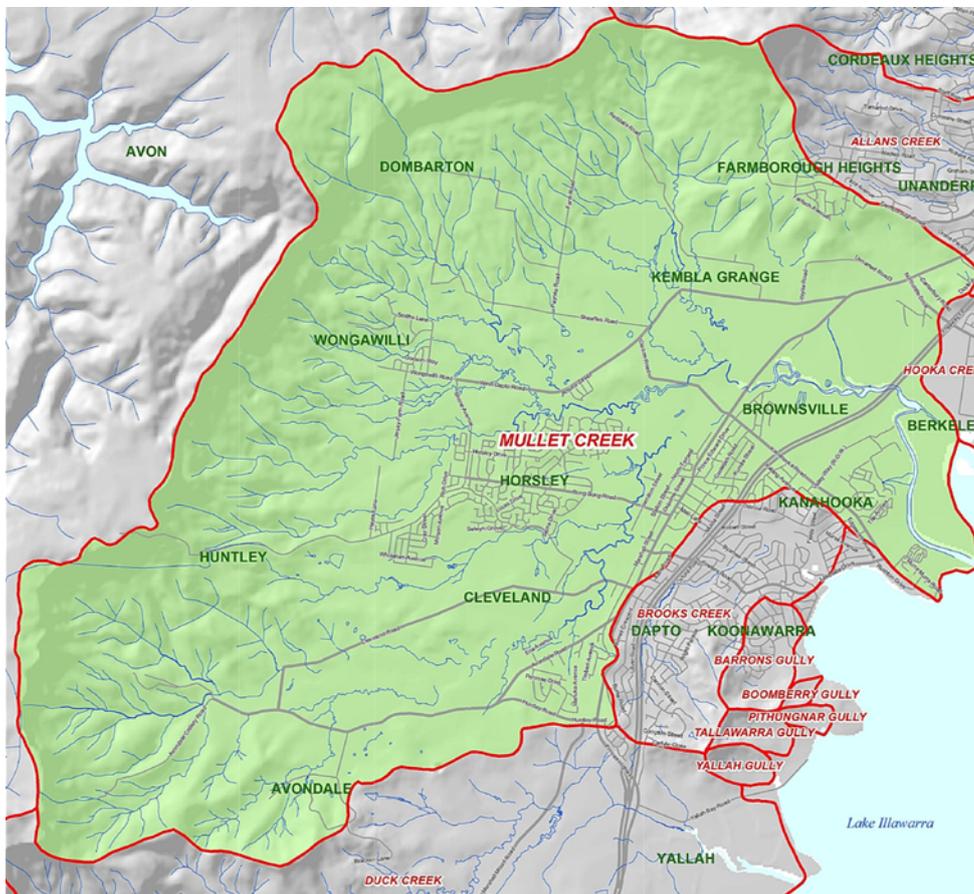
Flood studies describe floodwater behaviour and identify areas that are flood prone. We use computer flood models to estimate where it might flood, and by how much. These studies are used to inform land use planning, planning certificates and for the development of the floodplain risk management studies. The community has provided valuable input to previous flood investigations within the Mullet Creek catchment, with the most recent inputs provided in 2017 as part of the flood study review. The community provided accounts of their observations of flooding and feedback on

the flood mapping through online surveys and at community drop-in sessions. The flood models were updated as a result. The Mullet Creek Flood Study (2018) was updated and finalised following the public exhibition. The report was adopted by Council at its meeting on 25 June 2018.

As part of our review of the 2010 FRMSP for the catchment, we are building on the outcomes of the revised flood modelling (2018).

The Mullet Creek Catchment includes parts of Farmborough Heights, Dapto, and the wider West Dapto area.

The Southern Area Floodplain Risk Management Committee assists Council in developing and implementing FRMSP for southern-area catchments. Members of this advisory group include Councillors, specialist Council staff, various state agency representatives and members of the local community.



## Stakeholders

Stakeholders identified prior to the start of the engagement period included:

- Participants in previous engagements
- Southern Floodplain Committee
- NSW Department of Planning and Environment
- Lord Mayor & Councillors

- NSW SES Southeastern Zone
- Transport for NSW
- Emergency Services
- Sydney Water
- Endeavour Energy
- Development industry
- Flood-affected residents, ratepayers and businesses
- Register of Interest - Flood
- Neighbourhood Forum 8
- Aboriginal stakeholders
- Schools
- General community

## Methods

Methods	Details of Methods
<b>Communication Methods</b>	
Email to key stakeholders	An email with the map, FAQ and link to the project webpage was sent to key stakeholders identified through an analysis process. This included an email to 1,292 registered participants on Our Wollongong; the Register of Interest (Flood) and those in the catchment area.
Letter	A letter about the public exhibition and how to submit feedback (via phone, email, online or in person) was delivered to more than 2,800 residents, businesses and property owners identified as either living on, working on, or owning flood-affected land. It included a copy of the FAQ, map and survey.
Frequently Asked Questions (FAQ)	Responses to common questions about the draft FRMSP were distributed with the letter and emails, and published on the project webpage.
Draft FRMSP reports	The draft FRMSP reports, which included information about the recommended options, we published on the website and hardcopies were available to view at the information session.
Draft map	A map was produced showing the FRMSP study area and location of the recommended options for managing flood risk in the catchment.
Aboriginal stakeholder meeting	Aboriginal stakeholders were emailed the information. All were invited to attend a meeting with a flood engineer working on the project to learn more and have their questions answered.
Our Wollongong website	The project webpage hosted background information and supporting documents: <ul style="list-style-type: none"> <li>• Frequently Asked Questions</li> <li>• Draft FRMSP reports</li> <li>• Map of the catchment study area and location of the recommended options</li> <li>• Q&amp;A forum</li> <li>• Online survey</li> </ul>
Wollongong City Council website	Event listings promoting the information session were published on Council's website and corporate calendar.
Information session	A drop-in information session was held at Dapto Ribbonwood Centre on Thursday 13 October 3:30pm – 6:30pm, where we displayed: <ul style="list-style-type: none"> <li>• Draft FRMSP reports</li> <li>• Multi-criteria analysis and scoring sheet used for assessing the feasibility of each option.</li> <li>• Labelled maps showing the location of recommended options for flood risk management.</li> </ul>

	<ul style="list-style-type: none"> <li>• 10% and 1% Probable Maximum Flood maps.</li> </ul>
Illawarra Mercury Community Update	A notice appeared on the Council page in the 12 October edition of The Illawarra Mercury to promote the engagement.
Media release	A <a href="#">media release</a> about the exhibition was distributed on 17 October 2022.
<b>Engagement Methods</b>	
Our Wollongong website	<ul style="list-style-type: none"> <li>• An online survey was used to capture participants' comments</li> <li>• An online Q&amp;A forum was provided for participants to ask questions about the draft FRMSP.</li> </ul>
Aboriginal stakeholder meeting	Stakeholders shared feedback with the Council flood engineer at the meeting.
Information session	The flood engineers working on this project and a representative of NSW Department Planning and Environment attended to answer people's questions. A summary of open feedback and actions was noted.
Email	People emailed in open written submissions and completed hard copy surveys.
Post	People posted in open written submissions and completed hard copy surveys.

## Results

All stakeholders and the wider community were invited to provide feedback on the draft Mullet Creek Floodplain Risk Management Study and Plan.

On 5 October 2022, a Ward 3 Councillor promoted the engagement via a Dapto Facebook group with 12K members. There were 18 reactions to the post and 41 comments. The commentary centred around people's perceptions as to what causes flooding (allowing development and built-up areas on floodplains) and how it could be mitigated. Suggestions included raising a section of Bong Bong Rd and the bridge, raising the level of Darkes Rd and dredging the silt build-up at the mouth of the creeks.



A community member posted a link to the engagement webpage in another Dapto Facebook group with 17.5K members, on 1 November as a last call for feedback. It received 3 likes, 2 shares and no comments.

The Illawarra Mercury published an article promoting the exhibition on 24 October 2022 (print version).

### Engagement Participation

This section provides details on the participation in engagement activities and feedback received during the exhibition period. Details of the number of participants for each engagement activity are presented in Table 2.

**Table 2: Participation in Engagement**

Engagement Activities	Participation
Emails (some respondents submitted both an email and hardcopy survey)	4

Letters (this respondent also submitted a hardcopy survey)	1
Aboriginal stakeholder meeting	2
Information Session	20
Hard copy surveys	47
<b>Online Participation</b>	
Aware – Total number of unique visitors who viewed the project webpage.	633
Informed – Total number of people who clicked a hyperlink, e.g., to download the maps or draft reports.	197
Engaged – Total number of people who actively contributed to the project, e.g., by submitting comments via the survey or asking a question in the Q&A	16

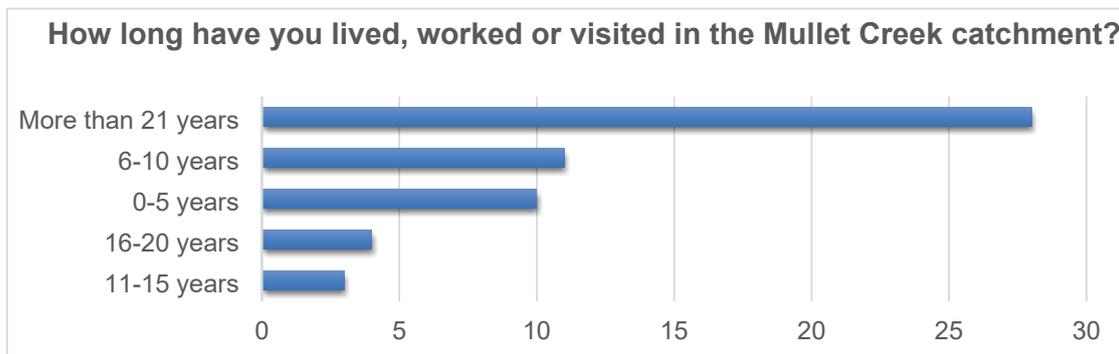
### Submission results

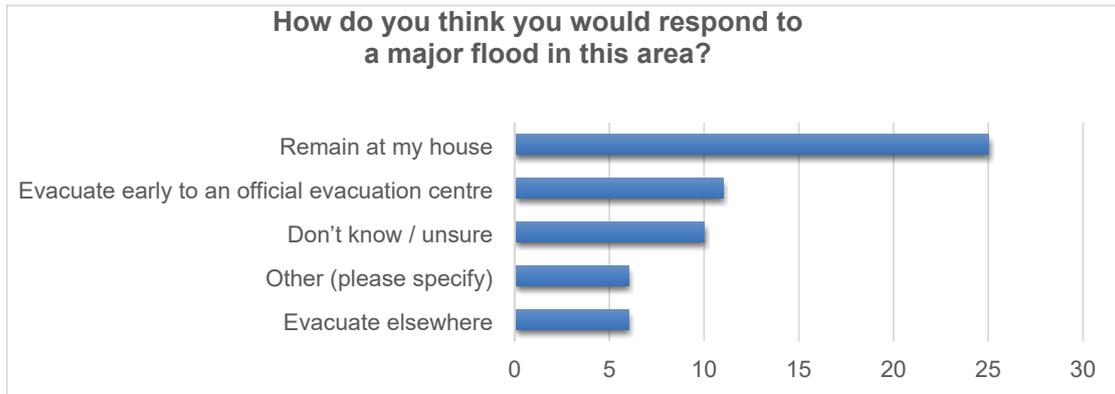
We received 67 submissions and had conversations with 22 people. Representatives from the following organisations made either an open submission or submitted responses via the survey:

- An Aboriginal Traditional Custodian group
- A government body responsible for the management of NSW’s Crown land
- A government emergency and rescue service
- An operator of an electrical distribution network
- An engineering consultancy firm on behalf of a landowner
- A development investment group on behalf of a landowner
- A legal firm on behalf of a landowner.

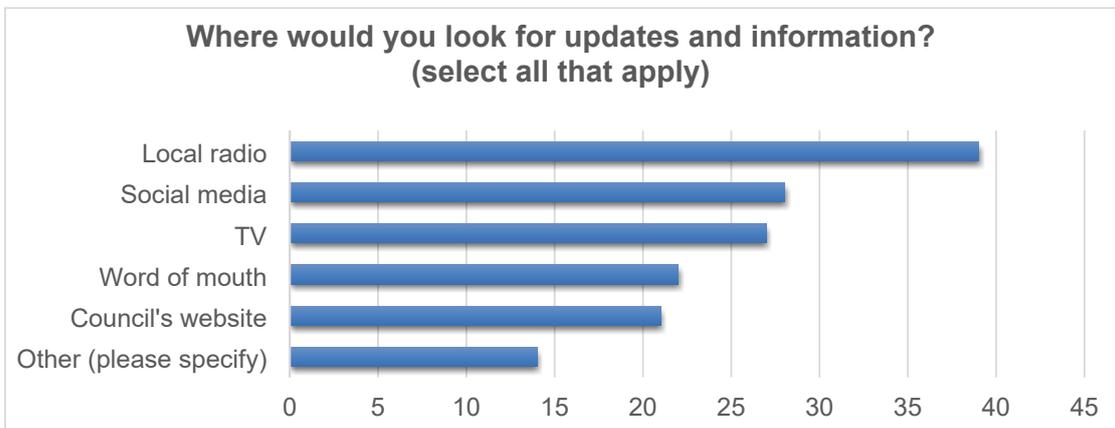
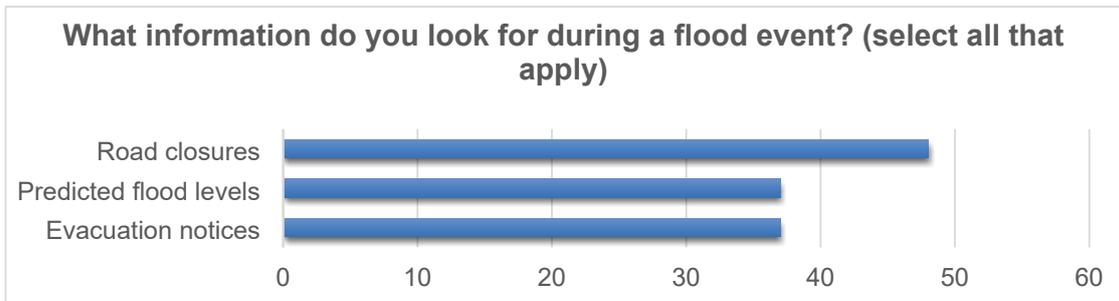
### Online and Hardcopy Survey Feedback

We received 62 online and hardcopy surveys. Some were only partially completed, with either some of the questions skipped or only partially completed. Following is a summary of the feedback we received via the survey.





One respondent said they would respond by staying in their home if they knew it wasn't going to be affected. Another said they would try to save their home.

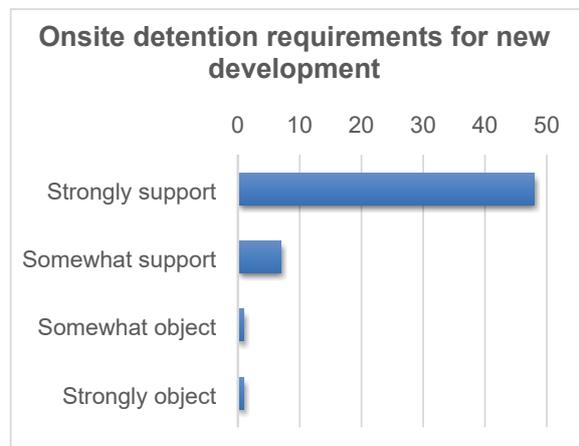
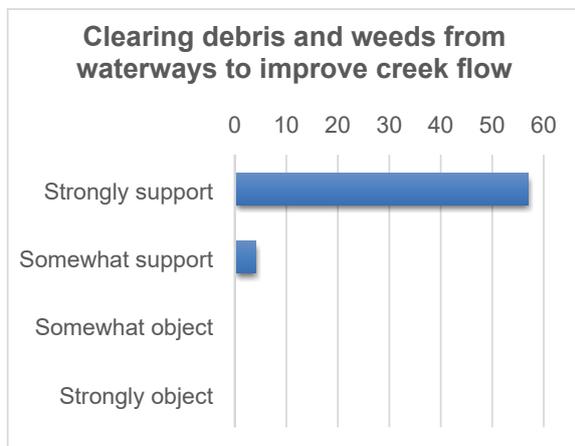
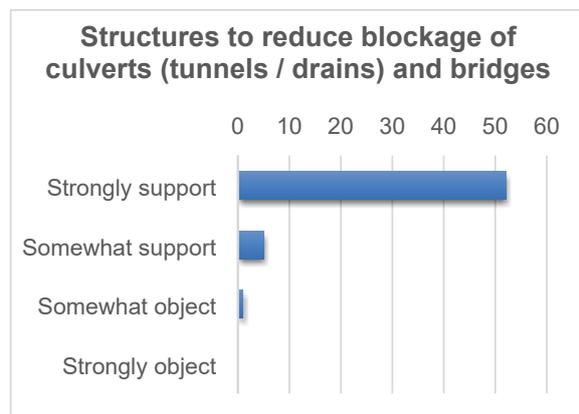
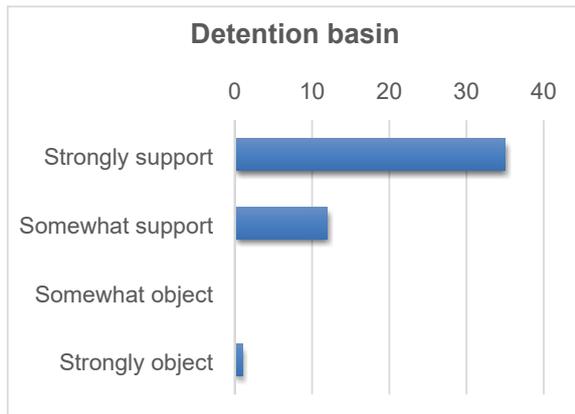
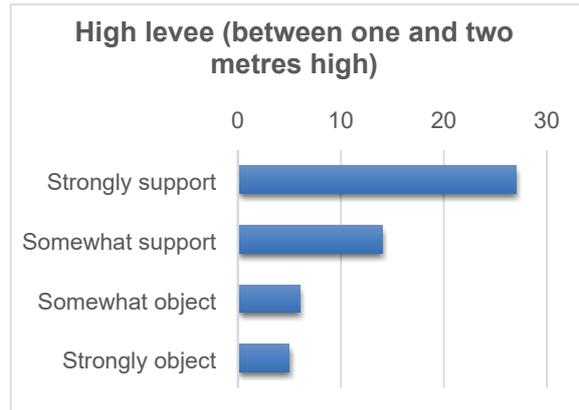
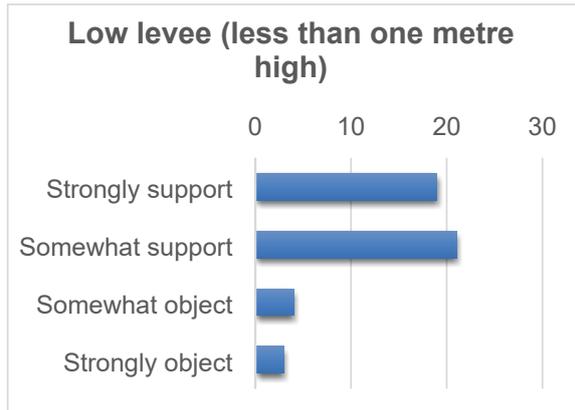


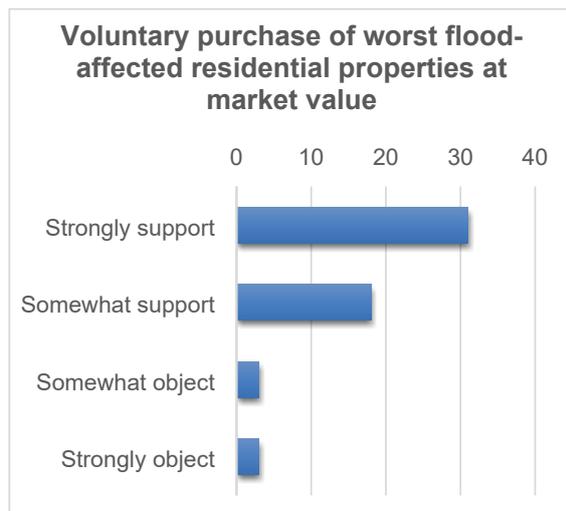
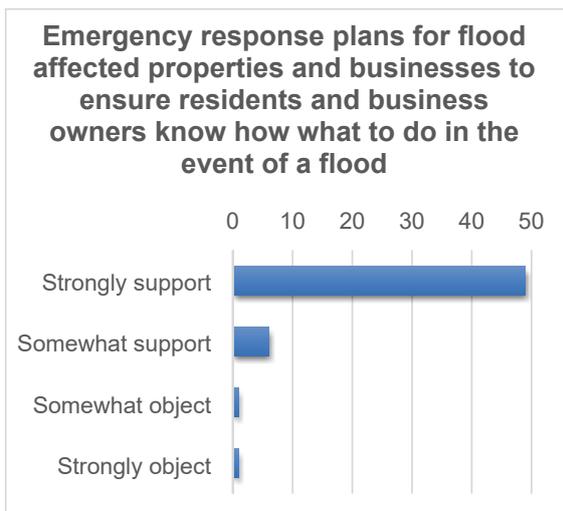
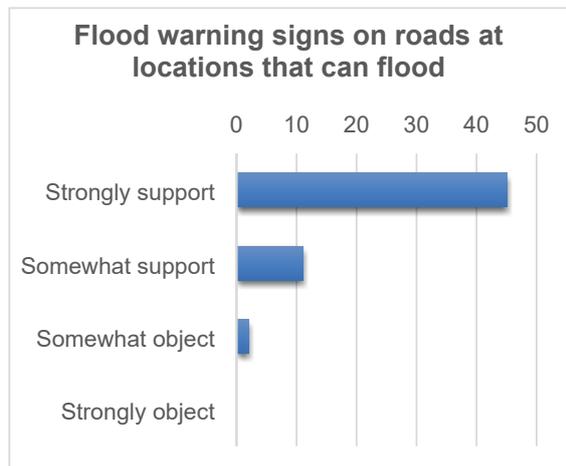
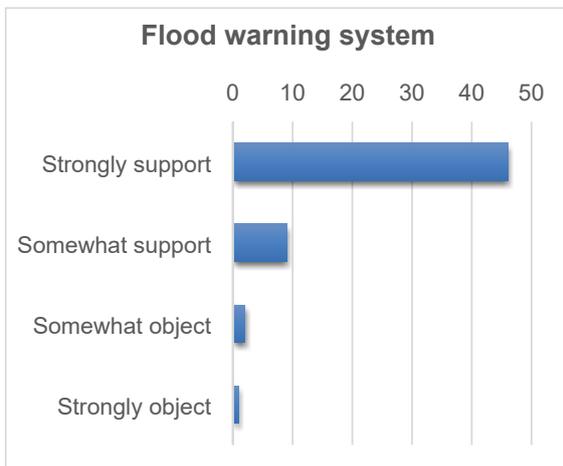
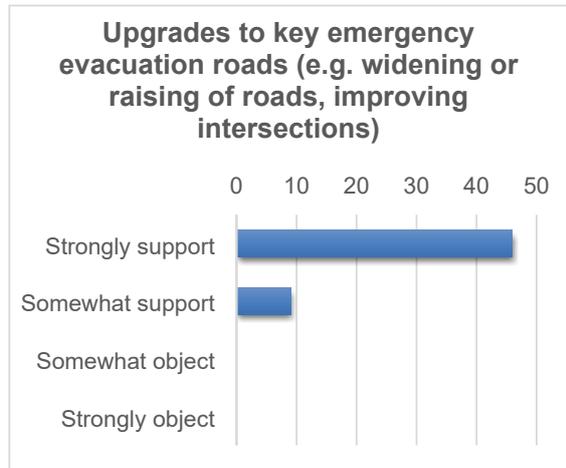
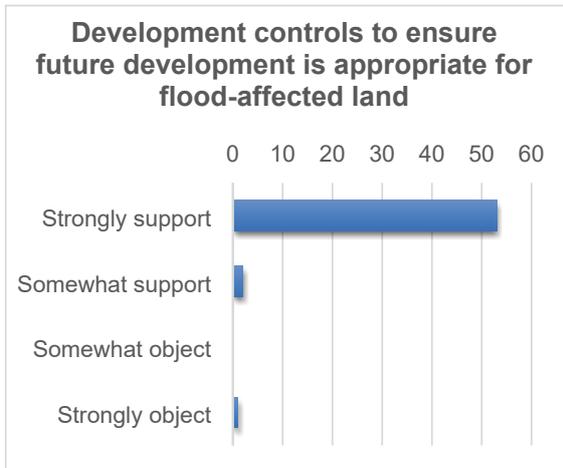
Other places respondents said they would look for updates and information included:

- Text message
- Neighbours
- NSW SES
- Phone
- Drive to inspect Bong Bong Rd
- Check outside
- Watch radars and tides

- Local news reports
- Government websites, e.g. Live Traffic, SES, BOM

Respondents were asked to indicate their level of support for the following options for managing flood risk in the Mullet Creek Catchment. Most were either strongly supportive or somewhat supportive of each option.





Respondents were asked if they had other suggestions for managing flood risk in the catchment. The key themes in the comments were:

1. Stormwater infrastructure
2. Stormwater infrastructure maintenance
3. Creek and vegetation maintenance
4. Development and planning
5. Roads
6. Community education and resilience
7. Evacuation
8. Signage
9. Voluntary Purchase Scheme

The feedback is summarised as follows:

### 1. Stormwater infrastructure

Several respondents made suggestions for stormwater infrastructure they believe would help:

- Essex St needs larger pipes to channel runoff that travels from London Street into Essex Street.
- Install debris control structure upstream of Blue Divers Bridge.
- Build huge retention basins in these locations:
  - Near Reed Park
  - Near Dimond Brothers Reserve
  - Acquire the corner block (Bong Bong Road and Hamilton Street) currently vacant and for sale, remove vegetation and turn it into a 5m depth retention basin to capture excess water. “We live next to that land and would support it!”.
- Starting at Dapto High School, dredge Mullet Creek out to 5m and use the silt to build 2m levees on both sides all the way to Lake Illawarra.
- Install weirs to slow water down from the top of the mountain:
  1. Put retention weirs at several locations down the mountain to slow the flow of water
  2. Put 1-in-100 retention basins in all developments, not just commercial units.

1 and 2 will slow the water down from the top of the mountain. By the time it gets to low-level areas, the flooding will be eased if not stopped. I put a plan together for Mr Bubb in the 1970s. He said it cost too much.

There is a perception all underground infrastructure is inadequate for servicing an increasing population and development and should be looked at.

Some acknowledged the effectiveness of existing infrastructure and had observed improvements since mitigation measures were put in place. They specified the:

- Ponds behind North Terrace, Dapto
- Easements near Regal Place, Brownsville that went in after the 1984 flood
- Detention basin in the reserve near Homestead Drive, Horsley.

Other parts of Dapto have flooded, but not our street. Very grateful. I know this area used to flood, but not since the ponds were created.

One respondent said their own stormwater infrastructure had prevented flooding at their property – “My house in Essex Street, which according to you, is in a flood risk area...has never flooded. We put a dish

drain at the side which causes any excess water to run down the side of the home and into the reserve and creek at the rear”.

One respondent had observed the effectiveness of levee walls to prevent flooding from the Clarence River in Grafton, NSW while living there for 25 years. They believe there is benefit to these. Another respondent believes any levees constructed would need to be better than the example photo shown in the FRMSP materials, saying “you have no idea until you see the floods firsthand”.

A respondent supportive of all the measures requested at least half of the recommended works be constructed in the next three years.

## **2. Stormwater infrastructure maintenance**

Some respondents called for improvements to the maintenance of stormwater infrastructure and want it to occur more frequently. There is a perception some drains are never cleared out and there is risk from blocked drains increasing flood impacts.

Some areas of concern included:

- The drains on the start of the street at Bong Bong Rd / Burringbar St
- Stormwater pits in the park (in the vicinity of St Lukes Ave, Brownsville)
- Drains through private properties not being kept clear of weeds and debris
- Where water drains opposite Urana Road after travelling along Prince Edward Drive, the drains sometimes block and water goes over the footpath. People have been observed using shovels to “easily” unblock them at these times. It was said the water level then quickly drops.

Suggestions were made to:

- Remove trees that have fallen across the drains causing blockage
- Keep vegetation and debris out of the ponds (said to be part of the Mullet Creek flood mitigation system) “so they continue their very effective role”
- Maintain flood gates.

## **3. Creek and vegetation maintenance**

Some respondents called for improvements to creek and vegetation maintenance. People want maintenance to occur more frequently to remove rubbish and weeds, including lantana.

There is a view Council should clean out debris and rubbish dumped into waterways and that Council is not responsive to these requests.

Some areas of concern included:

- The bridge at Bong Bong Rd getting banked up with weeds and debris
- The ponds and reserve behind properties on North Terrace, Dapto are said to no longer be maintained and rubbish is being dumped there
- The creek behind Essex Street is overgrown and gets blocked at times.
- Robins Creek.

Some believe dredging Mullet Creek will help, with a suggestion to use the silt to make higher banks. Another suggested putting a concrete base with high concrete walls in creeks after dredging them out, saying “The United Kingdom used this method 70+ years ago in built-up areas such as where I grew up in the London suburbs. Easy to maintain. No vegetation to block it. Cost effective in the long-term in worst-affected areas of estates”.

It was suggested to:

- Replace weeds with native grasses and other native vegetation
- Assist property owners to reduce loss of land due to flood erosion.

#### 4. Development and planning

Some respondents believe not allowing or limiting development on flood-affected land is needed, whereas others feel the current controls are suitable. There is a perception multi-developments contribute to worsening flood impacts. It was suggested to limit development west of Princes Highway and consider lower density/higher block sizes as development progresses west.

Our property has never flooded to the point we've been in danger, even in the 1982(?) flood. If it gets worse, I believe it's from future development. As a builder, I'm not opposed to future development - it just needs to be done better. At the moment, it's all about the money.

Some feel more care needs to be taken when granting building permits, to ensure there is adequate drainage for all future development in flood-affected areas. There is a view developers don't care and that developers should be stopped from changing the natural flow of watercourses to "squish in" more properties. It was said that building in flood-prone areas is "passing the buck onto others, causing mayhem and infrastructure damage" and that people should be encouraged to build somewhere where it's safe instead.

Some believe there should be higher flood mitigation requirements on developers. There was a suggestion to put 1-in-100 retention basins in all developments, not just commercial units. There is a view any new residential subdivisions should have reliable on-site stormwater detention, "This particularly needs enforcing for new subdivisions being considered in the Cleveland Road/Huntley areas". Another respondent viewed onsite detention as being ineffective if close to an ocean or creek output. It was commented that onerous requirements on developers is just as bad for the area as "poorly maintained flood risk".

There was a request to send someone out to inspect allegedly illegal piping of the land at the rear of properties on Ena Avenue, which some residents believe is causing their properties to flood.

#### 5. Roads

Some respondents spoke about road raising as a potential mitigation option. Suggestions included raising:

- Daisy Bank Drive (Cleveland Rd, where it dips low near Dapto High)
- The intersection of Bong Bong / Hamilton Rds by 0.05m, place 2x2m pipes under Bong Bong Rd and dredge out Dapto East Brook to Mullet Creek.
- The first 500m of Darkes Rd by 0.5m with culverts every 50m.
- The first 600m of West Dapto Rd by 0.5m with culverts every 50m.
- The first 600m of Cleveland Rd from bridge by 0.5m with culverts every 50m.
- The intersection of Darkes / West Dapto Rd by 0.5m.
- The intersection of Sheaffes / West Dapto Rd by 0.5m.

Don't waste millions of \$\$\$ (of my rates) building ridiculous link roads. Use the \$\$\$ to RAISE low-lying roads and allow water to freely flow under, via use of properly constructed concrete/steel pipes.

Some respondents had concerns about roads being cut off in floods, including:

- Cleveland Road west of Dapto High School.
- West Dapto Rd
- Bong Bong Rd
- Fairwater Drive near the public school

It was commented that all roads except Fowlers Road Bridge have been closed six times.

In recent heavy rains, Cleveland Road west of Dapto High School has been impassable to all but high vehicles, not only affecting residents, but Dapto High School. It appears to be a problem with drainage from farmland and the fact there is no exit for it.

When asked where we live, we say "Dapto Island". Last week 6/10/22 I had to drive through floodwater, as the highway at Kembla Grange was covered in 6 inches - 1 foot of water. The bridge at Fowlers Rd is good, but you still have to get to it.

Support was expressed for option EM11, the proposed Western Ring, with a request to complete it ASAP. A resident of Lockheed Hudson Drive, off Hayes Lane, said in the three years they have lived there, they've gotten stuck numerous times because West Dapto Rd, Bong Bong Rd and Fairwater Drive near the public school had water over the road.

## 6. Community education and resilience

There is a view having a resilient community would help. One respondent said their husband is a retired deputy regional control manager for the Clarence-Nambucca area. The issues he most commonly observed were residents refusing to evacuate and driving through floodwaters. They believe education is paramount in these two areas.

## 7. Evacuation

The Principal of Dapto High School said the school has capacity to become an emergency evacuation centre with a kitchen, showers, toilets, modest food supplies etc. He said they have never been asked, but are keen and able to assist.

## 8. Signage

There was a suggestion to install flood warning signs and depth indicators on roads at locations that can flood within the next three months.

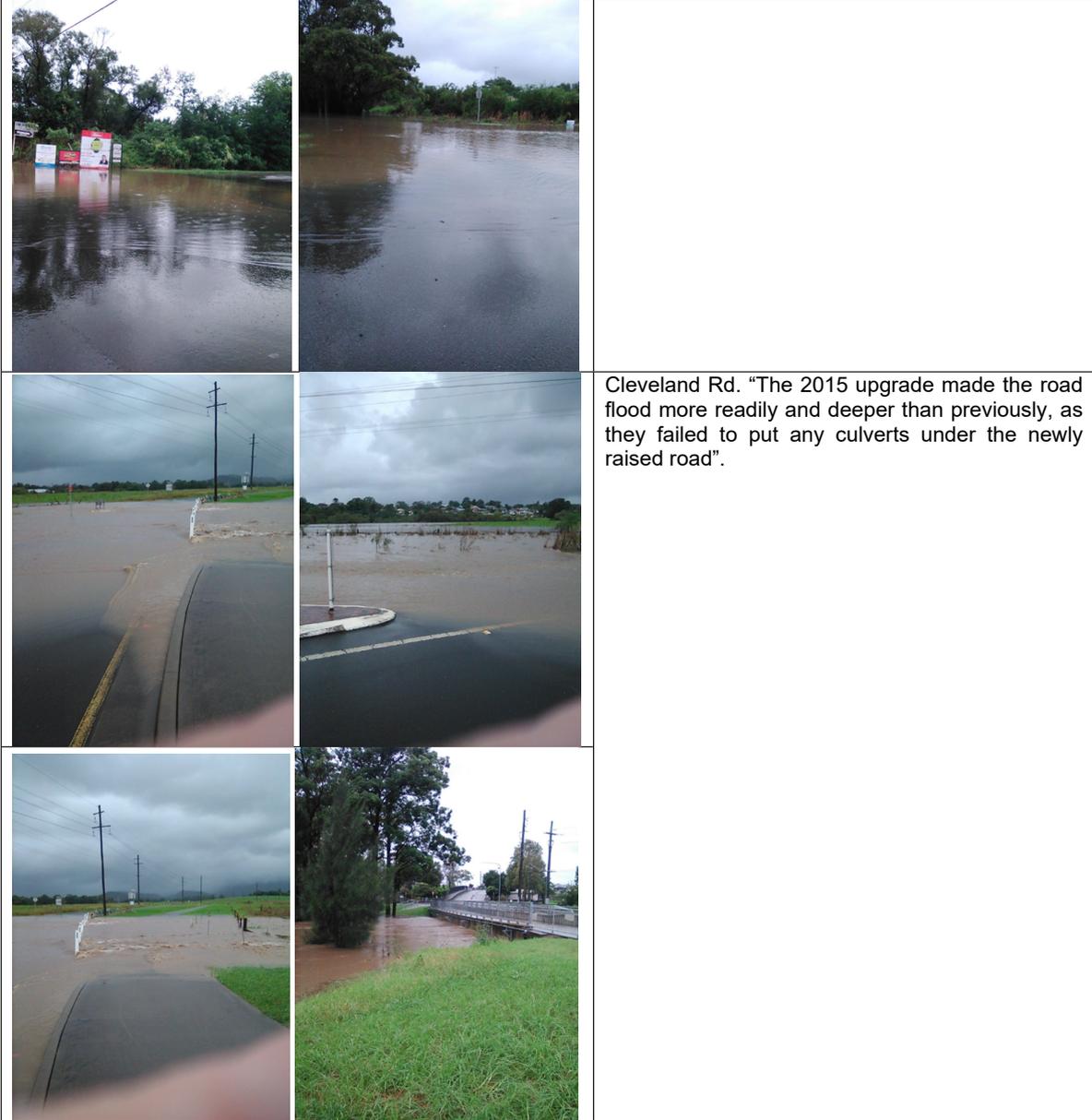
## 9. Voluntary Purchase Scheme

A respondent who somewhat objects to the Scheme believes properties should be purchased at real estate value, not market value – or the highest dollar amount of the two – as they believe in some cases, pensioners won't be able to replace their home.

## Photos accompanying submissions

Photo	Location and/or comment
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	<p>St Luke's Ave, Brownsville. "In 1984, the flood came to the front steps. Two doors up the south end. This is what it looked like. I have lived here 57 years. Never seen it like this. Hope there is no more to come."</p>
	<p>Bong Bong Road/Hamilton/Burringbar Roads intersection and East Dapto Brook on the north side of Bong Bong/Hamilton Roads. "Bong Bong Road is the first place to flood in Dapto as Council has not dredged / cleaned out this brook".</p>





### Aboriginal stakeholder meeting

Two representatives of a Traditional Custodian group indicated there are sites and artefacts near the proposed locations of some of the recommended options. The details of these locations are withheld from this report in line with cultural protocol, but were shared with the engineers working on this project. They requested to have a site officer present to monitor when the Enhanced Storage Areas go in. They would like to better understand the footprint of potential roadworks and requested archaeological testing take place if Council is looking to expand the footprint of roads near creeks.

### Open submissions

We received open written submissions from:

- An operator of an electrical distribution network
- An engineering consultancy firm on behalf of an industrial landowner
- A development investment group on behalf of an industrial landowner.

Lengthy and/or technical submissions were provided in full to the team working on the FRMSP. Following is a summary of the key points raised in these submissions.

There were requests for:

- More clarity around how “true hazard” will be assessed for developments
- An update to the model outputs in the Study to reflect the most up-to-date information available i.e. the survey of the existing terrain.
- More information regarding the location of waterway cross-sections
- The impacts of the proposed road raising along West Dapto Road to be modelled and provided as part of the revised FRMSP.

- Plans for flood reliable access to West Dapto and Darkes Road areas prior to the Northcliffe Drive extension going in.
- The length of the flood warning time for Kembla Grange Estate
- Prioritisation of the timing of the Northcliffe Drive extension (EM9) and construction of the eastern portion, as it is perceived to have long-term operational benefit for an industrial/commercial site.
- Construction of a new levee along Dapto Creek.

The submission from the operator of the electrical distribution network provided advice regarding their flood response plan and impacts of floods on the network.

A flood mitigation strategy that assists in maintaining road access to critical infrastructure allows for electricity supply to be maintained for a longer period and quicker restoration of supply.

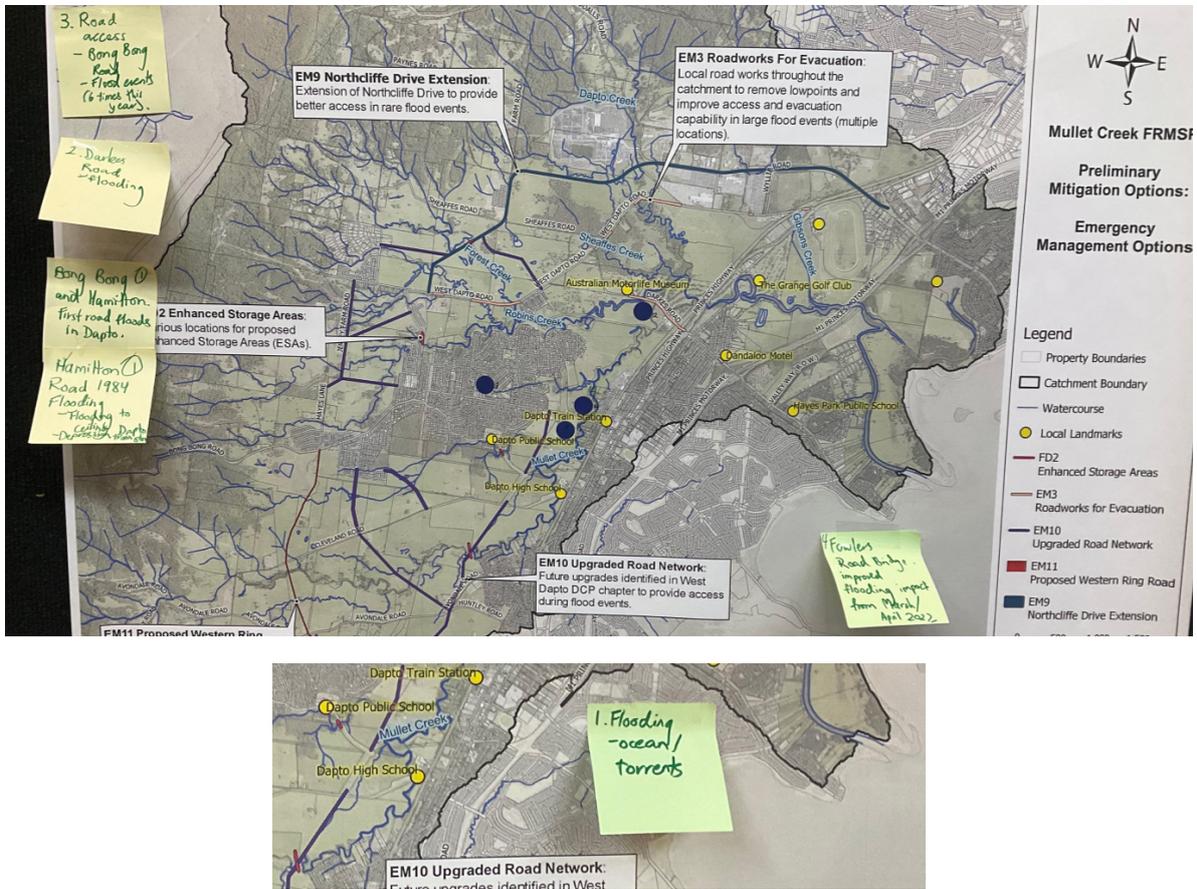
### Information session

Twenty people attended an information session at Dapto Ribbonwood Centre on 13 October 2022. The photos show some of the attendees, members of the project team and information displays at the event. Those pictured provided their consent to be included in these photos.



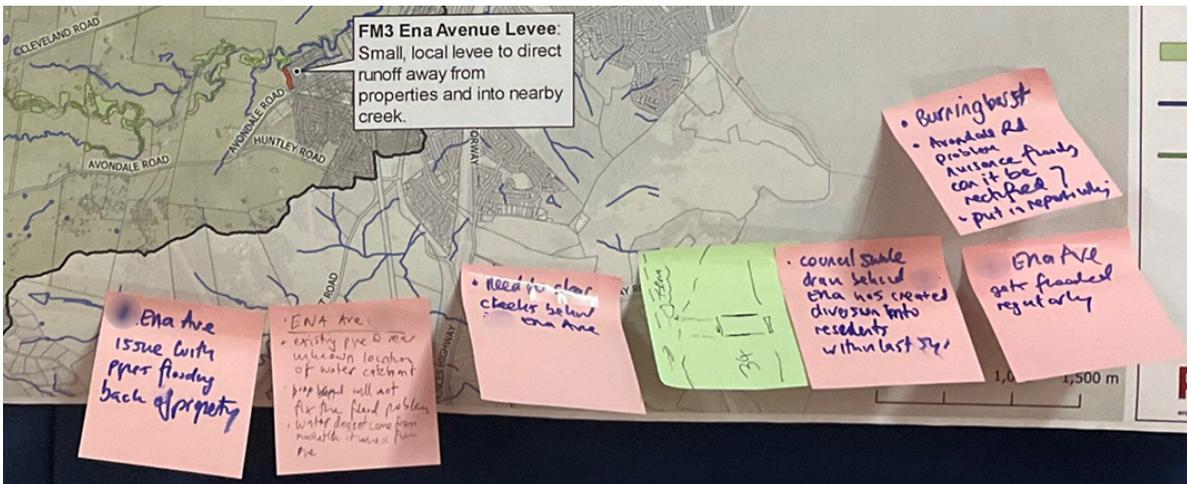
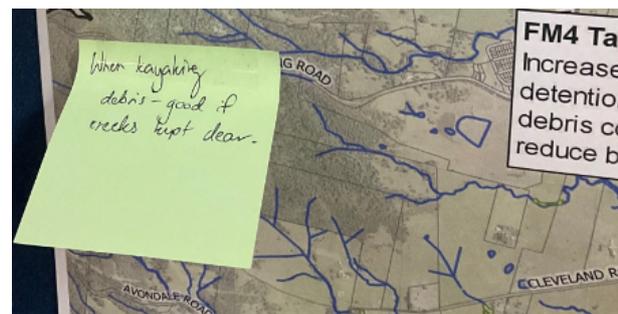
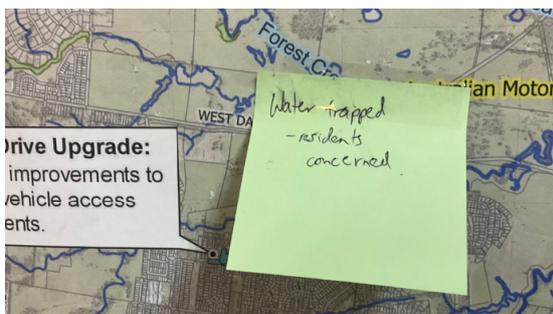
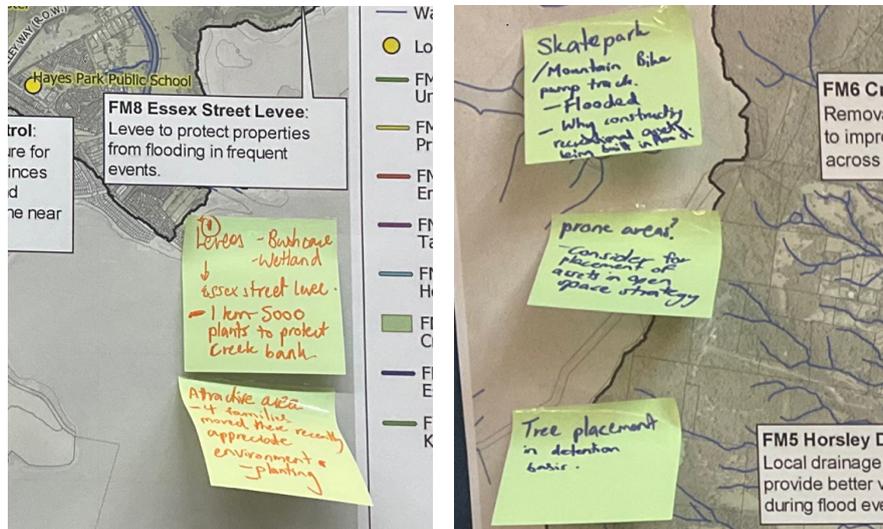
### Preliminary emergency management options

Attendees provided comments on post-it notes and attached them to large maps showing the location of the preliminary options for emergency management. Road closures and access were the most common concern.



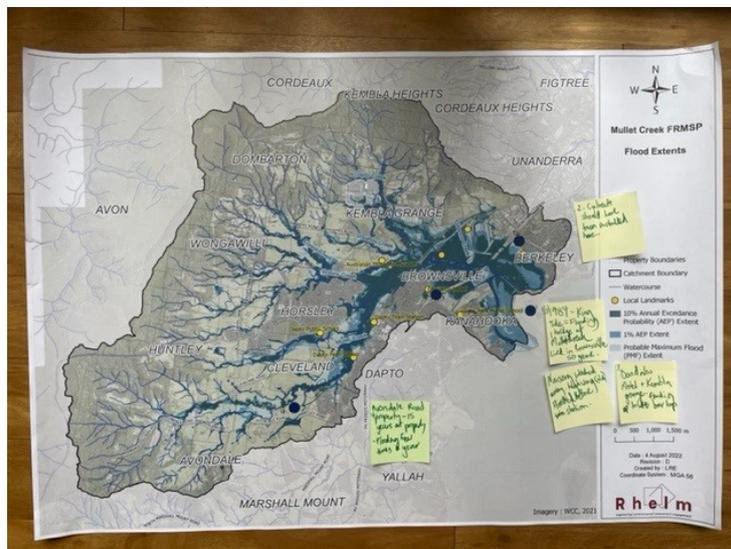
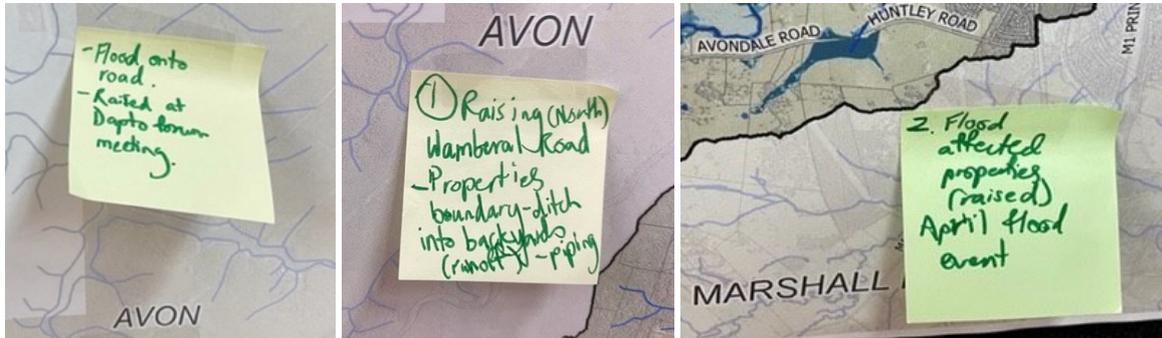
**Preliminary flood modification options**

Attendees provided comments on post-it notes and attached them to large maps showing the location of the preliminary options for flood modification. People noted areas of concern, in particular around Ena Avenue, and suggested ways to reduce flood impacts. People raised concerns about locating recreational areas, facilities and assets on flood-prone land. It was commented that the greening and tree planting that has taken place in the area is of value to the community.



**Flood extents**

Attendees provided comments on post-it notes and attached them to large maps showing the flood extents. People noted their observations of flooding and flood impacts in these areas.



A resident of Ena Avenue also spoke about flooding that occurs at their property. They said the creek is blocked and there are diversions in the reserve at the rear of their property.

### Next steps

We will use this feedback to inform any required revisions to the draft Floodplain Risk Management Study and Plan. These are preliminary discussions about the recommended options. They will each require further investigation, consultation and approvals before going ahead. We will continue sharing information with the community and key stakeholders and seek input as we progress.

