ATTACHMENT BOOKLET

NORTHERN BEACHES COUNCIL MEETING

TUESDAY 16 DECEMBER 2025

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Green text – Northern Beaches Council supplementary
Black text – OLG Mandatory
Red text – OLG Optional

DRAFT NORTHERN BEACHES COUNCIL CODE OF MEETING PRACTICE

2025

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1 INTRODUCTION

The Northern Beaches Council Code of Meeting Practice (Meeting Code) is based on the Model Code of Meeting Practice for Local Councils in NSW (the Model Meeting Code) which is prescribed under section 360 of the *Local Government Act 1993* (the Act) and the *Local Government (General) Regulation 2021* (the Regulation).

The Meeting Code applies to all meetings of Council and Committees of Council of which all the members are Councillors (Committees of Council). Council committees whose members include persons other than Councillors may adopt their own rules for meetings unless the Council determines otherwise.

This Meeting Code incorporates the mandatory provisions of the Model Meeting Code.

2 MEETING PRINCIPLES

2.1 Council and committee meetings should be:

Transparent: Decisions are made in a way that is open and accountable.

Informed: Decisions are made based on relevant, quality information.

Inclusive: Decisions respect the diverse needs and interests of the local community.

Principled: Decisions are informed by the principles prescribed under Chapter 3 of the Act.

Trusted: The community has confidence that Councillors and staff act ethically and make decisions in the interests of the whole community.

Effective: Meetings are well organised, effectively run and skilfully chaired.

Orderly: Councillors, staff and meeting attendees behave in a way that contributes to the orderly conduct of the meeting.

Note: The Office of Local Government has issued a guideline on free speech in local government in NSW. The Guideline provides practical guidance to Councils on what free speech means in the context of NSW local government, including in relation to Council meetings. The Guidelines have been issued under section 23A of the Act meaning Councils must consider them when exercising their functions at meetings.

2.2 Council acknowledges:

(a) it has obligations with respect to the health and safety of employees, Councillors and members of the public who attend a Council meeting in accordance with the *Work Health and Safety Act 2011* and related regulations, and

(b) employees, Councillors and others who attend a Council meeting have obligations under the *Work Health and Safety Act 2011* and related regulations including that:

(i) they must take reasonable care that their acts or omissions do not

adversely affect the health and safety of others, and

(ii) they must comply, so as far as they are reasonably able, with any reasonable instruction that is given by Council to allow Council to comply with the Act.

2.3 Council is committed to ensuring:

(a) its meetings are conducted in a manner that satisfies its obligations under the *Work Health and Safety Act 2011* and related regulations, and

(b) it promotes a culture of safety and respect for all attendees at Council meetings.

3 BEFORE THE MEETING

Timing of ordinary Council meetings

3.1 Council shall, by resolution, set the frequency, time, date and place of its ordinary meetings.

Note: Under section 365 of the Act, Councils are required to meet at least ten (10) times each year, each time in a different month unless the Minister for Local Government has approved a reduction in the number of times that a Council is required to meet each year under section 365A.

Extraordinary meetings

3.2 If the Mayor receives a request in writing, signed by at least 2 Councillors, the Mayor must call an extraordinary meeting of the Council to be held as soon as practicable, but in any event, no more than 14 days after receipt of the request. The Mayor can be one of the 2 Councillors requesting the meeting.

3.3 The Mayor may call an extraordinary meeting without the need to obtain the signature of 2 Councillors.

Notice to the public of Council meetings

3.4 The Council must give notice to the public of the time, date and place of each of its meetings, including extraordinary meetings, and of each meeting of committees of the Council.

3.5 For the purposes of clause 3.4, notice of a meeting of the Council and of a committee of Council must be published before the meeting takes place. The notice must be published on the Council's website, and in such other manner that the Council is satisfied is likely to bring notice of the meeting to the attention of as many people as possible.

3.6 For the purposes of clause 3.4, notice of more than one meeting may be given in the same notice.

Notice to Councillors of ordinary Council meetings

3.7 The Chief Executive Officer must send to each Councillor, at least 3 days before each meeting of the Council, a notice specifying the time, date and

place at which the meeting is to be held, and the business proposed to be considered at the meeting.

3.8 The notice and the agenda for, and the business papers relating to, the meeting may be given to Councillors in electronic form, unless the Council determines otherwise, but only if all Councillors have facilities to access the notice, agenda and business papers in that form.

Notice to Councillors of extraordinary meetings

3.9 Notice of less than 3 days may be given to Councillors of an extraordinary meeting of the Council in cases of emergency.

Giving notice of business to be considered at Council meetings

3.10 A Councillor may give notice of any business they wish to be considered by the Council at its next ordinary meeting by way of a notice of motion. To be included on the agenda of the meeting, the notice of motion must be in writing and must be submitted by 12 noon, 14 days before the meeting is to be held.

Note: If a Councillor wishes to include a photograph or image in the business papers with their notice of motion, the Councillor must provide appropriate evidence supporting copyright approval for use of the images to the Chief Executive Officer or their delegate.

3.11 A Councillor may, in writing to the Chief Executive Officer, request the withdrawal of a notice of motion submitted by them prior to its inclusion in the agenda and business paper for the meeting at which it is to be considered.

Questions with notice

3.12 A Councillor may, by way of a notice submitted under clause 3.10, ask a question for response by the Chief Executive Officer about the performance or operations of the Council.

3.13 A Councillor is not permitted to ask a question with notice under clause 3.12 that would constitute an act of disorder.

3.14 The Chief Executive Officer or their nominee may respond to a question with notice submitted under clause 3.12 by way of a report included in the business papers for the relevant meeting of the Council or verbally at the meeting.

Note: If the preparation of a response is likely to divert significant time and resources of staff the Chief Executive Officer will notify the Councillor.

Agenda and business papers for ordinary meetings

3.15 The Chief Executive Officer must cause the agenda for a meeting of the Council or a committee of the Council to be prepared as soon as practicable before the meeting.

3.16 The Chief Executive Officer must ensure that the agenda for an ordinary meeting of the Council states:

(a) all matters to be dealt with arising out of the proceedings of previous meetings of the Council, and
(b) if the Mayor is the chairperson – any matter or topic that the chairperson proposes, at the time when the agenda is prepared, to put to the meeting, and
(c) all matters, including matters that are the subject of staff reports and reports of committees, to be considered at the meeting, and
(d) any business of which due notice has been given under clause 3.10.

3.17 Nothing in clause 3.16 limits the powers of the Mayor to put a Mayoral minute to a meeting without notice under clause 9.7.

3.18 The Chief Executive Officer must not include in the agenda for a meeting of the Council any business of which due notice has been given if, in the opinion of the Chief Executive Officer, the business is, or the implementation of the business would be, unlawful. The Chief Executive Officer must report, without giving details of the item of business, any such exclusion to the next meeting of the Council.

3.19 Where the agenda includes the receipt of information or discussion of other matters that, in the opinion of the Chief Executive Officer, is likely to take place when the meeting is closed to the public, the Chief Executive Officer must ensure that the agenda of the meeting:

(a) identifies the relevant item of business and indicates that it is of such a nature (without disclosing details of the information to be considered when the meeting is closed to the public), and
(b) states the grounds under section 10A(2) of the Act relevant to the item of business.

Note: Section 10A(2) of the Act provides for a meeting to be closed to the public in various circumstances including in relation to the discussion of:
(a) personnel matters concerning particular individuals (other than Councillors), and

(b) in certain circumstances, advice concerning litigation, or advice that would otherwise be privileged from production in legal proceedings on grounds of legal professional privilege.

3.20 The Chief Executive Officer must ensure that the details of any item of business which, in the opinion of the Chief Executive Officer, is likely to be considered when the meeting is closed to the public, are included in a business paper provided to Councillors for the meeting concerned. Such details must not be included in the business papers made available to the public and must not be disclosed by a Councillor or by any other person to another person who is not authorised to have that information.

Availability of the agenda and business papers to the public

3.21 Copies of the agenda and the associated business papers, such as correspondence and reports for meetings of the Council and committees of Council, are to be published on the Council's website, and must be made available to the public for inspection, or for taking away by any person free of charge at the offices of the Council, at the relevant meeting and at such other venues determined by the Council.

3.22 Clause 3.21 does not apply to the business papers for items of business identified under clause 3.19 as being likely to be considered when the meeting is closed to the public.

3.23 For the purposes of clause 3.21, copies of agendas and business papers must be published on the Council's website and made available to the public at a time that is as close as possible to the time they are available to Councillors.

3.24 A copy of an agenda, or of an associated business paper made available under clause 3.21, may in addition be given or made available in electronic form unless the Council determines otherwise.

Agenda and business papers for extraordinary meetings

3.25 The Council must ensure that the agenda for an extraordinary meeting of the Council deals only with the matters stated in the notice of the meeting.

3.26 Nothing in clause 3.25 limits the powers of the Mayor to put a Mayoral minute to an extraordinary meeting without notice under clause 9.7.

3.27 Despite clause 3.25, business may be considered at an extraordinary meeting of the Council at which all Councillors are present, even though due notice has not been given of the business, if the Council resolves to deal with the business on the grounds that it is urgent and requires a decision by the Council before the next scheduled ordinary meeting of the Council. A resolution adopted under this clause must state the reasons for the urgency.

3.28 A motion moved under clause 3.27 can be moved without notice but only after the business notified in the agenda for the extraordinary meeting has been dealt with. Despite any other provision of this code, only the mover of a motion moved under clause 3.27, and the chairperson, if they are not the mover of the motion, can speak to the motion before it is put.

3.29 If all Councillors are not present at the extraordinary meeting, the Council may only deal with business at the meeting that Councillors have not been given due notice of, where a resolution is adopted in accordance with clause 3.27 and the chairperson also rules that the business is urgent and requires a decision by the Council before the next scheduled ordinary meeting.

3.30 A motion of dissent cannot be moved against a ruling of the chairperson under clause 3.29 on whether a matter is urgent.

Prohibition of pre-meeting briefing sessions

3.31 Briefing sessions must not be held to brief Councillors on business listed on the agenda for meetings of the Council or committees of the Council.

Note: The prohibition on the holding of briefing sessions under clause 3.31 reflects the intent of Chapter 4, Part 1 of the Act which requires business of the Council to be conducted openly and transparently at a formal meeting of which due notice has been given and to which the public has access. Pre-meeting briefing sessions are inconsistent with the principles of transparency, accountability and public participation and have the potential to undermine confidence in the proper and lawful decision-making processes of the Council.

3.32 Nothing in clause 3.31 prevents a Councillor from requesting information from the Chief Executive Officer about a matter to be considered at a meeting, provided the information is also available to the public. Information requested under this clause must be provided in a way that does not involve any discussion of the information.

4 PUBLIC FORUMS

4.1 The Council may hold a public forum prior to meetings of the Council and committees of the Council for the purpose of hearing oral submissions from members of the public on items of business to be considered at the meeting. Public forums may also be held prior to meetings of other committees of the Council.

4.2 The Council may determine the rules under which public forums are to be conducted and when they are to be held.

4.3 The provisions of this code requiring the livestreaming of meetings also apply to public forums.

Note: The rules for conducting the public forum are provided in Appendix 1.

5 COMING TOGETHER

Attendance by Councillors at meetings

5.1 All Councillors must make reasonable efforts to attend meetings of the Council and of committees of the Council of which they are members.

Note: A Councillor may not attend a meeting as a Councillor (other than the first meeting of the Council after the Councillor is elected or a meeting at which the Councillor takes an oath or makes an affirmation of office) until they have taken an oath or made an affirmation of office in the form prescribed under section 233A of the Act.

5.2 The Council may determine standards of dress for Councillors when attending meetings.

5.3 A Councillor cannot participate in a meeting of the Council or of a committee of the Council unless personally present at the meeting, unless permitted to attend the meeting by audio-visual link under this code.

5.4 Where a Councillor is unable to attend one or more meetings of the Council or committees of the Council, the Councillor should submit an apology for the

meetings they are unable to attend, state the reasons for their absence from the meetings and request that the Council grant them a leave of absence from the relevant meetings.

5.5 The Council must not act unreasonably when considering whether to grant a Councillor's request for a leave of absence.

5.6 Where a Councillor makes an apology under clause 5.4, the Council must determine by resolution whether to grant the Councillor a leave of absence for the meeting for the purposes of section 234(1)(d) of the Act. If the Council resolves not to grant a leave of absence for the meeting, it must state the reasons for its decision in its resolution.

5.7 A Councillor's civic office will become vacant if the Councillor is absent from 3 consecutive ordinary meetings of the Council without prior leave of the Council, or leave granted by the Council at any of the meetings concerned, unless the holder is absent because they have been suspended from office under the Act, or because the Council has been suspended under the Act, or as a consequence of a compliance order under section 438HA.

The quorum for a meeting

5.8 The quorum for a meeting of the Council is a majority of the Councillors of the Council who hold office at that time and are not suspended from office.

5.9 Clause 5.8 does not apply if the quorum is required to be determined in accordance with directions of the Minister in a performance improvement order issued in respect of the Council.

5.10 A meeting of the Council must be adjourned if a quorum is not present:

(a) at the commencement of the meeting where the number of apologies received for the meeting indicates that there will not be a quorum for the meeting, or
(b) within half an hour after the time designated for the holding of the meeting, or
(c) at any time during the meeting.

5.11 In either case, the meeting must be adjourned to a time, date, and place fixed:

(a) by the chairperson, or
(b) in the chairperson's absence, by the majority of the Councillors present, or
(c) failing that, by the Chief Executive Officer.

5.12 The Chief Executive Officer must record in the Council's minutes the circumstances relating to the absence of a quorum (including the reasons for the absence of a quorum) at or arising during a meeting of the Council, together with the names of the Councillors present.

Note: If the meeting is to resume on another day, any decisions of the Council made prior to the lapsing of the meeting are to be implemented by the Chief Executive Officer and do not need to await the resumption

of the adjourned meeting. Unless urgent or resolved otherwise, it is the Council's practice not to implement decisions of the Council until 12 noon on the working day following the day on which the meeting was adjourned. The outstanding items are to be resubmitted to the adjourned meeting for determination.

5.13 Where, prior to the commencement of a meeting, it becomes apparent that a quorum may not be present at the meeting, or that the health, safety or welfare of Councillors, Council staff and members of the public may be put at risk by attending the meeting because of a natural disaster or a public health emergency, the Mayor may, in consultation with the Chief Executive Officer and, as far as is practicable, with each Councillor, cancel the meeting. Where a meeting is cancelled, notice of the cancellation must be published on the Council's website and in such other manner that the Council is satisfied is likely to bring notice of the cancellation to the attention of as many people as possible.

5.14 Where a meeting is cancelled under clause 5.13, the business to be considered at the meeting may instead be considered, where practicable, at the next ordinary meeting of the Council or at an extraordinary meeting called by the Mayor under clause 3.3.

Meetings held by audio-visual link

5.15 A meeting of the Council or a committee of the Council may be held by audio-visual link where the Mayor determines that the meeting should be held by audio-visual link because of a natural disaster or a public health emergency. The Mayor may only make a determination under this clause where they are satisfied that attendance at the meeting may put the health and safety of Councillors and staff at risk. The Mayor must make a determination under this clause in consultation with the Chief Executive Officer and, as far as is practicable, with each Councillor.

5.16 Where the Mayor determines under clause 5.15 that a meeting is to be held by audio-visual link, the Chief Executive Officer must:

(a) give written notice to all Councillors that the meeting is to be held by audio-visual link, and
(b) take all reasonable steps to ensure that all Councillors can participate in the meeting by audio-visual link, and
(c) cause a notice to be published on the Council's website and in such other manner the Chief Executive Officer is satisfied will bring it to the attention of as many people as possible, advising that the meeting is to be held by audio-visual link and providing information about where members of the public may view the meeting.

5.17 This code applies to a meeting held by audio-visual link under clause 5.15 in the same way it would if the meeting was held in person.

Note: Where a Council holds a meeting by audio-visual link under clause 5.15, it is still required under section 10 of the Act to provide a physical venue for members of the public to attend in person and observe the meeting.

Attendance by Councillors at meetings by audio-visual link

5.18 Councillors may attend and participate in meetings of the Council and committees of the Council by audio-visual link with the approval of the Council or the relevant committee where they are prevented from attending the meeting in person because of ill-health or other medical reasons or because of unforeseen caring responsibilities.

Note: The chairperson of the meeting must be personally present in order to chair the meeting where there are Councillors participating in person and by remote audio visual link.

5.19 Clause 5.18 does not apply to meetings at which a Mayoral election is to be held.

5.20 A request by a Councillor for approval to attend a meeting by audio-visual link must be made in writing to the Chief Executive Officer prior to the meeting in question and must provide reasons why the Councillor will be prevented from attending the meeting in person.

5.21 Councillors may request approval to attend more than one meeting by audio-visual link. Where a Councillor requests approval to attend more than one meeting by audio-visual link, the request must specify the meetings the request relates to in addition to the information required under clause 5.20.

5.22 The Council must comply with the Health Privacy Principles prescribed under the *Health Records and Information Privacy Act 2002* when collecting, holding, using and disclosing health information in connection with a request by a Councillor to attend a meeting by audio-visual link.

5.23 A Councillor who has requested approval to attend a meeting of the Council or a committee of the Council by audio-visual link may participate in the meeting by audio-visual link until the Council or committee determines whether to approve their request and is to be taken as present at the meeting. The Councillor may participate in a decision in relation to their request to attend the meeting by audio-visual link.

5.24 A decision whether to approve a request by a Councillor to attend a meeting of the Council or a committee of the Council by audio-visual link must be made by a resolution of the Council or the committee concerned. The resolution must state the meetings the resolution applies to.

5.25 If the Council or committee refuses a Councillor's request to attend a meeting by audio-visual link, their link to the meeting is to be terminated.

5.26 A decision whether to approve a Councillor's request to attend a meeting by audio-visual link is at the Council's or the relevant committee's discretion. The Council and committees of the Council must act reasonably when considering requests by Councillors to attend meetings by audio-visual link.

5.27 The Council and committees of the Council may refuse a Councillor's request to attend a meeting by audio-visual link where the Council or committee is satisfied that the Councillor has failed to appropriately declare and manage conflicts of interest, observe confidentiality or to comply with this code on one

or more previous occasions they have attended a meeting of the Council or a committee of the Council by audio-visual link.

5.28 This code applies to a Councillor attending a meeting by audio-visual link in the same way it would if the Councillor was attending the meeting in person. Where a Councillor is permitted to attend a meeting by audio-visual link under this code, they are to be taken as attending the meeting in person for the purposes of the code and will have the same voting rights as if they were attending the meeting in person.

5.29 A Councillor must give their full attention to the business and proceedings of the meeting when attending a meeting by audio-visual link. The Councillor's camera must be on at all times during the meeting except as may be otherwise provided for under this code.

5.30 A Councillor must be appropriately dressed when attending a meeting by audio-visual link and must ensure that no items are within sight of the meeting that are inconsistent with the maintenance of order at the meeting or that are likely to bring the Council or the committee into disrepute.

Entitlement of the public to attend Council meetings

5.31 Everyone is entitled to attend a meeting of the Council and committees of the Council. The Council must ensure that all meetings of the Council and committees of the Council are open to the public.

5.32 Clause 5.31 does not apply to parts of meetings that have been closed to the public under section 10A of the Act.

5.33 A person (whether a Councillor or another person) is not entitled to be present at a meeting of the Council or a committee of the Council if expelled from the meeting:

(a) by a resolution of the meeting, or
(b) by the person presiding at the meeting if the Council has, by resolution, authorised the person presiding to exercise the power of expulsion.

5.34 On the adoption of this code and at the commencement of each Council term, the Council must determine whether to authorise the person presiding at a meeting to exercise a power of expulsion.

Livestreaming of meetings

5.35 Each meeting of the Council or a committee of the Council is to be recorded by means of an audio-visual device.

5.36 At the start of each meeting of the Council or a committee of the Council, the chairperson must inform the persons attending the meeting that:

(a) the meeting is being recorded and made publicly available on the Council's website, and
(b) persons attending the meeting should refrain from making any defamatory statements.

5.37 The recording of a meeting is to be made publicly available on the Council's website at the same time as the meeting is taking place.

5.38 The recording of a meeting is to be made publicly available on the Council's website for at least 12 months after the meeting or for the balance of the Council's term, whichever is the longer period.

5.39 Clauses 5.35 - 5.38 do not apply to any part of a meeting that has been closed to the public in accordance with section 10A of the Act.

5.40 Recordings of meetings may be disposed of in accordance with the *State Records Act 1998*.

Attendance of the Chief Executive Officer and other staff at meetings

5.41 The Chief Executive Officer is entitled to attend, but not to vote at, a meeting of the Council or a meeting of a committee of the Council of which all of the members are Councillors.

5.42 The Chief Executive Officer is entitled to attend a meeting of any other committee of the Council and may, if a member of the committee, exercise a vote.

5.43 The Chief Executive Officer may be excluded from a meeting of the Council or a committee while the Council or committee deals with a matter relating to the standard of performance of the Chief Executive Officer or the terms of employment of the Chief Executive Officer.

5.44 The attendance of other Council staff at a meeting, (other than as members of the public) shall be determined by the Chief Executive Officer in consultation with the Mayor.

Note: In relation to clauses 14.13 and 14.14, Council staff may remain in a meeting when it is closed to the public if so determined in accordance with clause 5.44.

6 THE CHAIRPERSON

The chairperson at meetings

6.1 The Mayor, or at the request of or in the absence of the Mayor, the deputy Mayor (if any) presides at meetings of the Council.

6.2 If the Mayor and the deputy Mayor (if any) are absent, a Councillor elected to chair the meeting by the Councillors present presides at a meeting of the Council.

Election of the chairperson in the absence of the Mayor and deputy Mayor

6.3 If no chairperson is present at a meeting of the Council at the time designated for the holding of the meeting, the first business of the meeting must be the election of a chairperson to preside at the meeting.

6.4 The election of a chairperson must be conducted:

(a) by the Chief Executive Officer or, in their absence, an employee of the Council designated by the Chief Executive Officer to conduct the election, or
(b) by the person who called the meeting or a person acting on their behalf if neither the Chief Executive Officer nor a designated employee is present at the meeting, or if there is no Chief Executive Officer or designated employee.

6.5 If, at an election of a chairperson, 2 or more candidates receive the same number of votes and no other candidate receives a greater number of votes, the chairperson is to be the candidate whose name is chosen by lot.

6.6 For the purposes of clause 6.5, the person conducting the election must:

(a) arrange for the names of the candidates who have equal numbers of votes to be written on similar slips, and
(b) then fold the slips so as to prevent the names from being seen, mix the slips and draw one of the slips at random.

6.7 The candidate whose name is on the drawn slip is the candidate who is to be the chairperson.

6.8 Any election conducted under clause 6.3, and the outcome of the vote, are to be recorded in the minutes of the meeting.

Chairperson to have precedence

6.9 When the chairperson rises or speaks during a meeting of the Council:

(a) any Councillor then speaking or seeking to speak must cease speaking and, if standing, immediately resume their seat, and
(b) every Councillor present must be silent to enable the chairperson to be heard without interruption.

7 MODES OF ADDRESS

7.1 Where physically able to, Councillors and staff should stand when the Mayor enters the chamber and when addressing the meeting.

Note: The Mayor may excuse Councillors and staff from standing at any meeting.

7.2 If the chairperson is the Mayor, they are to be addressed as ‘Mr Mayor’, ‘Madam Mayor’ or ‘Mayor’.

7.3 If the chairperson is the Deputy Mayor, they are to be addressed as ‘Mr Deputy Mayor’, or ‘Madam Deputy Mayor’ or ‘Deputy Mayor’.

7.4 Where the chairperson is not the Mayor or deputy Mayor, they are to be addressed as either ‘Mr Chairperson’ or ‘Madam Chairperson’ or ‘Chair’.

7.5 A Councillor is to be addressed as ‘Councillor [surname]’.

7.6 A Council officer is to be addressed by their official designation or as Mr/Ms/Mx [surname]**.**

8 ORDER OF BUSINESS FOR ORDINARY COUNCIL MEETINGS

8.1 At a meeting of the Council, the general order of business is as fixed by resolution of the Council.

NOTE: For the purposes of Clause 8.1 the order of business for an ordinary Council meeting is as follows (Council resolution 25/TBA):

1. Acknowledgement of Country
2. Apologies and applications for leave of absence and remote attendance by councillors
3. Confirmation of minutes
4. Disclosures of interests
5. Presentations
6. Items resolved by exception
7. Mayoral minutes
8. Reports to council
9. Confidential matters
10. Notices of motions
11. Matters of urgency
12. Notices of rescission
13. Questions with notice
14. Responses to questions with notice

8.2 The order of business as fixed under clause 8.1 may be altered for a particular meeting of the Council if a motion to that effect is passed at that meeting. Such a motion can be moved without notice.

8.3 Despite any other provision of this code, only the mover of a motion referred to in clause 8.2 and the chairperson, if they are not the mover of the motion, can speak to the motion before it is put.

Note: The chairperson will have regard to attendance of members of the public and may, where the chairperson considers appropriate, move a motion to change the order of business so as not to unreasonably delay the consideration of matters of interest to members of the public attending in the gallery.

9 CONSIDERATION OF BUSINESS AT COUNCIL MEETINGS

Business that can be dealt with at a Council meeting

9.1 The Council must not consider business at a meeting of the Council:

(a) unless a Councillor has given notice of the business, as required by clause 3.10, and
(b) unless notice of the business has been sent to the Councillors in accordance with clause 3.7 in the case of an ordinary meeting or clause 3.9 in the case of an extraordinary meeting called in an emergency.

9.2 Clause 9.1 does not apply to the consideration of business at a meeting, if the business:

(a) is already before, or directly relates to, a matter that is already before the Council, or
(b) is the election of a chairperson to preside at the meeting, or
(c) is a matter or topic put to the meeting by way of a Mayoral minute, or
(d) is a motion for the adoption of recommendations of a committee of the Council.

9.3 Despite clause 9.1, business may be considered at a meeting of the Council at which all Councillors are present even though due notice has not been given of the business to Councillors, if the Council resolves to deal with the business on the grounds that it is urgent and requires a decision by the Council before the next scheduled ordinary meeting. A resolution adopted under this clause must state the reasons for the urgency.

9.4 A motion moved under clause 9.3 can be moved without notice. Despite any other provision of this code, only the mover of a motion referred to in clause 9.3 and the chairperson, if they are not the mover of the motion, can speak to the motion before it is put.

9.5 If all Councillors are not present at a meeting, the Council may only deal with business at the meeting that Councillors have not been given due notice of, where a resolution is adopted in accordance with clause 9.3, and the chairperson also rules that the business is urgent and requires a decision by the Council before the next scheduled ordinary meeting.

9.6 A motion of dissent cannot be moved against a ruling by the chairperson under clause 9.5.

Mayoral minutes

9.7 The Mayor may, by minute signed by the Mayor, put to the meeting without notice any matter or topic that the Mayor determines should be considered at the meeting.

9.8 A Mayoral minute, when put to a meeting, takes precedence over all business on the Council's agenda for the meeting. The Mayor may move the adoption of a Mayoral minute without the motion being seconded.

9.9 A recommendation made in a Mayoral minute put by the Mayor is, so far as it is adopted by the Council, a resolution of the Council.

Staff reports

9.10 A recommendation made in a staff report is, so far as it is adopted by the Council, a resolution of the Council.

Reports of committees of Council

9.11 The recommendations of a committee of the Council are, so far as they are adopted by the Council, resolutions of the Council.

9.12 If in a report of a committee of the Council distinct recommendations are made, the Council may make separate decisions on each recommendation.

Questions

9.13 A question must not be asked at a meeting of the Council unless it concerns a matter on the agenda of the meeting or notice has been given of the question in accordance with clauses 3.10 and 3.12, unless the Council determines otherwise in accordance with this code.

9.14 A Councillor may, through the chairperson, ask another Councillor about a matter on the agenda.

Note: The Council may move into closed session where a question will involve the discussion or receipt of matters referred to in clause 14.1.

9.15 A Councillor may, through the Mayor, ask the Chief Executive Officer about a matter on the agenda. The Chief Executive Officer may request another Council employee to answer the question.

Note: To avoid any potential for the perception of politicising staff, Councillors are discouraged from asking questions of staff that are more appropriately a matter for debate.

9.16 A Councillor or Council employee to whom a question is put is entitled to be given reasonable notice of the question and, in particular, sufficient notice to enable reference to be made to other persons or to information. Where a Councillor or Council employee to whom a question is put is unable to respond to the question at the meeting at which it is put, they may take it on notice and report the response to the next meeting of the Council.

9.17 Councillors must ask questions directly, succinctly, and without argument.

9.18 A Councillor is not permitted to ask a question under clause 9.14 or 9.15 that would constitute an act of disorder.

9.19 The chairperson must not permit discussion on any reply to, or refusal to reply to, a question put to a Councillor or Council employee. This includes questions with notice asked in accordance with clause 3.12, put to a Councillor or Council employee.

9.20 To ensure all matters on the agenda of the meeting can be dealt with, the chairperson may limit the time available for questions by Councillors on any one matter on the agenda, prior to debate of the motion, to 10 minutes. The chairperson is to ensure there is equitable opportunity amongst Councillors to ask questions within the 10 minute window.

10 RULES OF DEBATE

Motions to be seconded

10.1 Unless otherwise specified in this code, a motion or an amendment cannot be debated unless or until it has been seconded.

Notices of motion

10.2 A Councillor who has submitted a notice of motion under clause 3.10 is to move the motion the subject of the notice of motion at the meeting at which it is to be considered.

Note: The Chief Executive Officer may prepare a report/comment in relation to a notice of motion, where it is considered there may be legal, strategic, financial or policy implications which should be taken into consideration, for inclusion in the business papers for the meeting at which the notice of motion is to be considered by the Council.

Note: Where a notice of motion is adopted under 13.1, the Councillor/s that submitted the notice of motion will be noted in the minutes for that item.

Note: Where multiple Councillors have submitted a joint notice of motion, only one mover and one seconder will be recorded in the minutes.

10.3 If a Councillor who has submitted a notice of motion under clause 3.10 wishes to withdraw it, they may request its withdrawal at any time. If the notice of motion is withdrawn after the agenda and business paper for the meeting at which it is to be considered have been sent to Councillors, the chairperson is to note the withdrawal of the notice of motion at the meeting unless the Council determines to consider the notice of motion at the meeting.

10.4 In the absence of a Councillor who has placed a notice of motion on the agenda for a meeting of the Council:

(a) any other Councillor may, with the leave of the chairperson, move the motion at the meeting, or
(b) the chairperson may defer consideration of the motion until the next meeting of the Council.

Chairperson's duties with respect to motions

10.5 It is the duty of the chairperson at a meeting of the Council to receive and put to the meeting any lawful motion that is brought before the meeting.

10.6 The chairperson must rule out of order any motion or amendment to a motion that is unlawful or the implementation of which would be unlawful.

10.7 Before ruling out of order a motion or an amendment to a motion under clause 10.6, the chairperson is to give the mover an opportunity to clarify or amend the motion or amendment.

Amendments to motions

10.8 An amendment to a motion must be moved and seconded before it can be debated.

10.9 An amendment to a motion must relate to the matter being dealt with in the original motion before the Council and must not be a direct negative of the original motion. An amendment to a motion which does not relate to the matter being dealt with in the original motion, or which is a direct negative of the original motion, must be ruled out of order by the chairperson.

10.10 The mover of an amendment is to be given the opportunity to explain any uncertainties in the proposed amendment before a seconder is called for.

10.11 If an amendment has been lost, a further amendment can be moved to the motion to which the lost amendment was moved, and so on, but no more than one motion and one proposed amendment can be before Council at any one time.

10.12 While an amendment is being considered, debate must only occur in relation to the amendment and not the original motion. Debate on the original motion is to be suspended while the amendment to the original motion is being debated.

10.13 If the amendment is carried, it becomes the motion and is to be debated. If the amendment is lost, debate is to resume on the original motion.

10.14 An amendment may become the motion without debate or a vote where it is accepted by the Councillor who moved the original motion.

Note: Where possible, it is helpful for proposed amendments to be circulated in advance of the meeting to allow the Chief Executive Officer to consider any legal, strategic, financial or policy implications to support Councillors in their consideration of the amendment.

Note: Councillors are encouraged to submit amendments to the minute taker prior to meetings to ensure the exact motion is captured and for the efficiency of the meeting. The Chief Executive Officer may request large or complex amendments to be sent in writing to the minute taker prior to the amendment being displayed at the meeting.

Limitations on the number and duration of speeches

10.15 A Councillor who, during a debate at a meeting of the Council, moves an original motion, has the right to speak on each amendment to the motion and a right of general reply to all observations that are made during the debate in relation to the motion, and any amendment to it at the conclusion of the debate before the motion (whether amended or not) is finally put.

10.16 A Councillor, other than the mover of an original motion, has the right to speak once on the motion and once on each amendment to it.

10.17 A Councillor must not, without the consent of the Council, speak more than once on a motion or an amendment, or for longer than 5 minutes at any one time.

Note: Councillors are not obligated to speak for 5 minutes and are encouraged to self-moderate debate time based on the size of the business agenda.

10.18 Despite clause 10.17, the chairperson may permit a Councillor who claims to have been misrepresented or misunderstood to speak more than once on a motion or an amendment, and for longer than 5 minutes on that motion or

amendment to enable the Councillor to make a statement limited to explaining the misrepresentation or misunderstanding.

10.19 Despite clauses 10.15 and 10.16, a Councillor (including the chairperson) may move that a motion or an amendment be now put:

(a) if the mover of the motion or amendment has spoken in favour of it and no Councillor expresses an intention to speak against it, or
(b) if at least 2 Councillors have spoken in favour of the motion or amendment and at least 2 Councillors have spoken against it.

10.20 The chairperson must immediately put to the vote, without debate, a motion moved under clause 10.19. A seconder is not required for such a motion.

10.21 If a motion that the original motion or an amendment be now put is passed, the chairperson must, without further debate, put the original motion or amendment to the vote immediately after the mover of the original motion has exercised their right of reply under clause 10.15.

10.22 If a motion that the original motion or an amendment be now put is lost, the chairperson must allow the debate on the original motion or the amendment to be resumed.

10.23 All Councillors must be heard without interruption and all other Councillors must, unless otherwise permitted under this code, remain silent while another Councillor is speaking.

10.24 Once the debate on a matter has concluded and a matter has been dealt with, the chairperson must not allow further debate on the matter.

10.25 Clause 10.24 does not prevent a further motion from being moved on the same item of business where the original motion is lost provided the motion is not substantially the same as the one that is lost.

Note: Rules of debate process guide

1. Call for mover
2. Call for seconder
3. Questions to staff
4. Call for any dissent
If no dissent, the chairperson may declare the item carried

5. Mover to speak
6. Seconder to speak
7. First dissent speaker
8. Second dissent speaker
9. Ask whether Councillors seek for the item to be put
If item is not requested to be put, the chairperson will call for other speakers/amendments

10. Invite original mover to have right of reply
11. Vote on item

11 VOTING

Voting entitlements of Councillors

11.1 Each Councillor is entitled to one vote.

11.2 The person presiding at a meeting of the Council has, in the event of an equality of votes, a second or casting vote.

11.3 Where the chairperson declines to exercise, or fails to exercise, their second or casting vote, in the event of an equality of votes, the motion being voted upon is lost.

Voting at Council meetings

11.4 A Councillor who is present at a meeting of the Council but who fails to vote on a motion put to the meeting is taken to have voted against the motion.

11.5 If a Councillor who has voted against a motion put at a Council meeting so requests, the Chief Executive Officer must ensure that the Councillor's dissenting vote is recorded in the Council's minutes.

11.6 The decision of the chairperson as to the result of a vote is final unless the decision is immediately challenged and not fewer than 2 Councillors rise and call for a division.

11.7 When a division on a motion is called, the chairperson must ensure that the division takes place immediately. The Chief Executive Officer must ensure that the names of those who vote for the motion and those who vote against it are recorded in the Council's minutes for the meeting.

11.8 When a division on a motion is called, any Councillor who fails to vote will be recorded as having voted against the motion in accordance with clause 11.4 of this code.

11.9 Voting at a meeting, including voting in an election at a meeting, is to be by open means (such as on the voices, by show of hands or by a visible electronic voting system as determined by the chairperson). However, the Council may resolve that the voting in any election by Councillors for Mayor or Deputy Mayor is to be by secret ballot.

Voting on planning decisions

11.10 The Council or a Council committee must not make a final planning decision without receiving a staff report containing an assessment and recommendation in relation to the matter put before the Council for a decision.

11.11 Where the Council or a Council committee makes a planning decision that is inconsistent with the recommendation made in a staff report, it must provide reasons for its decision and why it did not adopt the staff recommendation.

11.12 The Chief Executive Officer must keep a register containing, for each planning decision made at a meeting of the Council or a Council committee (including, but not limited to a committee of the Council), the names of the Councillors

who supported the decision and the names of any Councillors who opposed (or are taken to have opposed) the decision.

11.13 For the purpose of maintaining the register, a division is taken to have been called whenever a motion for a planning decision is put at a meeting of the Council or a Council committee.

11.14 Each decision recorded in the register is to be described in the register or identified in a manner that enables the description to be obtained from another publicly available document.

11.15 Clauses 11.12–11.14 apply also to meetings that are closed to the public.

Note: The requirements of clause 11.12 may be satisfied by maintaining a register of the minutes of each planning decision.

12 COMMITTEE OF THE WHOLE

12.1 The Council may resolve itself into a committee to consider any matter before the Council.

12.2 All the provisions of this code relating to meetings of the Council, so far as they are applicable, extend to and govern the proceedings of the Council when in committee of the whole, except the provisions limiting the number and duration of speeches and encouraging Councillors and staff to stand when addressing the meeting.

Note: Clauses 10.15 – 10.25 limit the number and duration of speeches.

12.3 The Chief Executive Officer or, in the absence of the Chief Executive Officer, an employee of the Council designated by the Chief Executive Officer, is responsible for reporting to the Council the proceedings of the committee of the whole. It is not necessary to report the proceedings in full, but any recommendations of the committee must be reported.

12.4 The Council must ensure that a report of the proceedings (including any recommendations of the committee) is recorded in the Council's minutes. However, the Council is not taken to have adopted the report until a motion for adoption has been made and passed.

13 DEALING WITH ITEMS BY EXCEPTION

13.1 The Council or a committee of Council may, at any time, resolve to adopt multiple items of business on the agenda together by way of a single resolution where it considers it necessary to expedite the consideration of business at a meeting.

13.2 Before the Council or committee resolves to adopt multiple items of business on the agenda together under clause 13.1, the chairperson must list the items of business to be adopted and ask Councillors to identify any individual items of business listed by the chairperson that they intend to vote against the recommendation made in the business paper or that they wish to speak on.

13.3 The Council or committee must not resolve to adopt any item of business under clause 13.1 that a Councillor has identified as being one they intend to vote against the recommendation made in the business paper or to speak on.

13.4 Where the consideration of multiple items of business together under clause 13.1 involves a variation to the order of business for the meeting, the Council or committee must resolve to alter the order of business in accordance with clause 8.2.

13.5 A motion to adopt multiple items of business together under clause 13.1 must identify each of the items of business to be adopted and state that they are to be adopted as recommended in the business paper.

13.6 Items of business adopted under clause 13.1 are to be taken to have been adopted unanimously.

13.7 Councillors must ensure that they declare and manage any conflicts of interest they may have in relation to items of business considered together under clause 13.1.

13.8 Where a Councillor wishes to commend Council staff on an item of business due to be adopted under clause 13.1 a notation in the minutes can be included at the discretion of the Chief Executive Officer. If Councillors wish to include specific wording this must be submitted to the Chief Executive Officer by 12 noon on the working day following the meeting.

14 CLOSURE OF COUNCIL MEETINGS TO THE PUBLIC

Grounds on which meetings can be closed to the public

14.1 The Council or a committee of the Council may close to the public so much of its meeting as comprises the discussion or the receipt of any of the following types of matters:

(a) personnel matters concerning particular individuals (other than Councillors),
(b) the personal hardship of any resident or ratepayer,
(c) information that would, if disclosed, confer a commercial advantage on a person with whom the Council is conducting (or proposes to conduct) business,
(d) commercial information of a confidential nature that would, if disclosed:
    (i) prejudice the commercial position of the person who supplied it, or
    (ii) confer a commercial advantage on a competitor of the Council, or
    (iii) reveal a trade secret,
(e) information that would, if disclosed, prejudice the maintenance of law,
(f) matters affecting the security of the Council, Councillors, Council staff or Council property,
(g) advice concerning litigation, or advice that would otherwise be privileged from production in legal proceedings on the ground of legal professional privilege,
(h) information concerning the nature and location of a place or an item of Aboriginal significance on community land,

(i) alleged contraventions of the Council's code of conduct.

14.2 The Council or a committee of the Council may also close to the public so much of its meeting as comprises a motion to close another part of the meeting to the public.

Matters to be considered when closing meetings to the public

14.3 A meeting is not to remain closed during the discussion of anything referred to in clause 14.1:

(a) except for so much of the discussion as is necessary to preserve the relevant confidentiality, privilege or security, and
(b) if the matter concerned is a matter other than a personnel matter concerning particular individuals, the personal hardship of a resident or ratepayer or a trade secret – unless the Council or committee concerned is satisfied that discussion of the matter in an open meeting would, on balance, be contrary to the public interest.

14.4 A meeting is not to be closed during the receipt and consideration of information or advice referred to in clause 14.1(g) unless the advice concerns legal matters that:

(a) are substantial issues relating to a matter in which the Council or committee is involved, and
(b) are clearly identified in the advice,
(c) are fully discussed in that advice, and
(d) are subject to legal professional privilege.

14.5 If a meeting is closed during the discussion of a motion to close another part of the meeting to the public (as referred to in clause 14.2), the consideration of the motion must not include any consideration of the matter or information to be discussed in that other part of the meeting other than consideration of whether the matter concerned is a matter referred to in clause 14.1.

14.6 For the purpose of determining whether the discussion of a matter in an open meeting would be contrary to the public interest, it is irrelevant that:

(a) a person may misinterpret or misunderstand the discussion, or
(b) the discussion of the matter may:
    (i) cause embarrassment to the Council or committee concerned, or to Councillors or to employees of the Council, or
    (ii) cause a loss of confidence in the Council or committee.

14.7 In deciding whether part of a meeting is to be closed to the public, the Council or committee concerned must consider any relevant guidelines issued by the Departmental Chief Executive of the Office of Local Government.

Notice of likelihood of closure not required in urgent cases

14.8 Part of a meeting of the Council, or of a committee of the Council, may be closed to the public while the Council or committee considers a matter that has not been identified in the agenda for the meeting under clause 3.19 as a matter

that is likely to be considered when the meeting is closed, but only if:

(a) it becomes apparent during the discussion of a particular matter that the matter is a matter referred to in clause 14.1, and
(b) the Council or committee, after considering any representations made under clause 14.9, resolves that further discussion of the matter:
    (i) should not be deferred (because of the urgency of the matter), and
    (ii) should take place in a part of the meeting that is closed to the public.

Note: Clause 14.8 reflects section 10C of the Act.

Representations by members of the public

14.9 The Council, or a committee of the Council, may allow members of the public to make representations to or at a meeting, before any part of the meeting is closed to the public, as to whether that part of the meeting should be closed.

Note: Clause 14.9 reflects section 10A(4) of the Act.

14.10 A representation under clause 14.9 is to be made after the motion to close the part of the meeting is moved and seconded.

14.11 Despite clauses 14.9 and 14.10, the Council may resolve to close the meeting to the public in accordance with this Part to hear a representation from a member of the public as to whether the meeting should be closed to consider an item of business where the representation involves the disclosure of information relating to a matter referred to in clause 14.1.

14.12 Where the matter has been identified in the agenda of the meeting under clause 3.19 as a matter that is likely to be considered when the meeting is closed to the public, in order to make representations under clause 14.9, members of the public must first make an application to the Council in a manner determined by the Council.

Expulsion of non-Councillors from meetings closed to the public

14.13 If a meeting or part of a meeting of the Council or a committee of the Council is closed to the public in accordance with section 10A of the Act and this code, any person who is not a Councillor and who fails to leave the meeting when requested, may be expelled from the meeting as provided by section 10(2)(a) or (b) of the Act.

14.14 If any such person, after being notified of a resolution or direction expelling them from the meeting, fails to leave the place where the meeting is being held, a police officer, or any person authorised for the purpose by the Council or person presiding, may, by using such force as is reasonably necessary, remove the first-mentioned person from that place and, if necessary restrain that person from re-entering that place for the remainder of the meeting.

Note: Failure to comply with a direction to leave a meeting is an offence under section 660 of the Act carrying a maximum penalty of 20 penalty units.

Obligations of Councillors attending meetings by audio-visual link

14.15 Councillors attending a meeting by audio-visual link must ensure that no other person is within sight or hearing of the meeting at any time that the meeting is closed to the public under section 10A of the Act.

Information to be disclosed in resolutions closing meetings to the public

14.16 The grounds on which part of a meeting is closed must be stated in the decision to close that part of the meeting and must be recorded in the minutes of the meeting. The grounds must specify the following:

(a) the relevant provision of section 10A(2) of the Act,
(b) the matter that is to be discussed during the closed part of the meeting,
(c) the reasons why the part of the meeting is being closed, including (if the matter concerned is a matter other than a personnel matter concerning particular individuals, the personal hardship of a resident or ratepayer or a trade secret) an explanation of the way in which discussion of the matter in an open meeting would be, on balance, contrary to the public interest.

Resolutions passed at closed meetings to be made public

14.17 If the Council passes a resolution during a meeting, or a part of a meeting, that is closed to the public, the chairperson must make the resolution public as soon as practicable after the meeting, or the relevant part of the meeting, has ended, and the resolution must be recorded in the publicly available minutes of the meeting.

14.18 Resolutions passed during a meeting, or a part of a meeting, that is closed to the public must be made public by the chairperson under clause 14.17 during a part of the meeting that is livestreamed where practicable.

14.19 The Chief Executive Officer must cause business papers for items of business considered during a meeting, or part of a meeting, that is closed to public, to be published on the Council's website as soon as practicable after the information contained in the business papers ceases to be confidential.

14.20 The Chief Executive Officer must consult with the Council and any other affected persons before publishing information on the Council's website under clause 14.19 and provide reasons for why the information has ceased to be confidential.

15 KEEPING ORDER AT MEETINGS

Points of order

15.1 A Councillor may draw the attention of the chairperson to an alleged breach of this code by raising a point of order. A point of order does not require a seconder.

15.2 A point of order must be taken immediately it is raised. The chairperson must suspend the business before the meeting and permit the Councillor raising the

point of order to state the provision of this code they believe has been breached. The chairperson must then rule on the point of order – either by upholding it or by overruling it.

Questions of order

15.3 The chairperson, without the intervention of any other Councillor, may call any Councillor to order whenever, in the opinion of the chairperson, it is necessary to do so.

15.4 A Councillor who claims that another Councillor has committed an act of disorder, or is out of order, may call the attention of the chairperson to the matter.

15.5 The chairperson must rule on a question of order immediately after it is raised but, before doing so, may invite the opinion of the Council.

15.6 The chairperson's ruling must be obeyed unless a motion dissenting from the ruling is passed.

Motions of dissent

15.7 A Councillor can, without notice, move to dissent from a ruling of the chairperson on a point of order or a question of order. If that happens, the chairperson must suspend the business before the meeting until a decision is made on the motion of dissent.

15.8 If a motion of dissent is passed, the chairperson must proceed with the suspended business as though the ruling dissented from had not been given. If, as a result of the ruling, any motion or business has been rejected as out of order, the chairperson must restore the motion or business to the agenda and proceed with it in due course.

15.9 Despite any other provision of this code, only the mover of a motion of dissent and the chairperson can speak to the motion before it is put. The mover of the motion does not have a right of general reply.

Acts of disorder

15.10 A Councillor commits an act of disorder if the Councillor, at a meeting of the Council or a committee of the Council:

(a) contravenes the Act, the Regulation or this code, or
(b) assaults or threatens to assault another Councillor or person present at the meeting, or
(c) moves or attempts to move a motion or an amendment that has an unlawful purpose or that deals with a matter that is outside the jurisdiction of the Council or the committee, or addresses or attempts to address the Council or the committee on such a motion, amendment or matter, or
(d) uses offensive or disorderly words, or
(e) makes gestures or otherwise behaves in a way that is sexist, racist, homophobic or otherwise discriminatory, or, if the behaviour occurred in the Legislative Assembly, would be considered disorderly, or

(f) imputes improper motives to or unfavourably personally reflects upon any other Council official, or a person present at the meeting, except by a motion, or
(g) says or does anything that would promote disorder at the meeting or is otherwise inconsistent with maintaining order at the meeting.

Note: The Legislative Assembly's Speaker's Guidelines state that "Members are not to use language, make gestures, or behave in any way in the Chamber that is sexist, racist, homophobic or otherwise exclusionary or discriminatory. Such conduct may be considered offensive and disorderly, in accordance with Standing Order 74".

Note: Standing Order 74 'Quarrels not permitted' states that "74. The Speaker may intervene: 1. When offensive or disorderly words are used by a Member. 2. To prevent a quarrel between Members arising out of debates or proceedings in the House."

Note: Councillors must be mindful of their own and Council's obligations under the *Work Health and Safety Act 2011* and related regulations.

15.11 The chairperson may require a Councillor:

(a) to apologise without reservation for an act of disorder referred to in clauses 15.10(a), (b), (d), (e), or (g), or
(b) to withdraw a motion or an amendment referred to in clause 15.10(c) and, where appropriate, to apologise without reservation, or
(c) to retract and apologise without reservation for any statement that constitutes an act of disorder referred to in clauses 15.10(d), (e), (f) or (g).

15.12 A failure to comply with a requirement under clause 15.11 constitutes a fresh act of disorder for the purposes of clause 15.10.

15.13 Where a Councillor fails to take action in response to a requirement by the chairperson to remedy an act of disorder under clause 15.11 at the meeting at which the act of disorder occurred, the chairperson may require the Councillor to take that action at each subsequent meeting until such time as the Councillor complies with the requirement. If the Councillor fails to remedy the act of disorder at a subsequent meeting, they may be expelled from the meeting under clause 15.18.

How disorder at a meeting may be dealt with

15.14 If disorder occurs at a meeting of the Council, the chairperson may adjourn the meeting for a period of not more than 15 minutes and leave the chair. The Council, on reassembling, must, on a question put from the chairperson, decide without debate whether the business is to be proceeded with or not. This clause applies to disorder arising from the conduct of members of the public as well as disorder arising from the conduct of Councillors.

Expulsion from meetings

15.15 All chairpersons of meetings of the Council and committees of the Council are authorised under this code to expel any person, including any Councillor, from

a Council or committee meeting, for the purposes of section 10(2)(b) of the Act.

15.16 Clause 15.15 does not limit the ability of the Council or a committee of the Council to resolve to expel a person, including a Councillor, from a Council or committee meeting, under section 10(2)(a) of the Act.

15.17 A Councillor may, as provided by section 10(2)(a) or (b) of the Act, be expelled from a meeting of the Council for having failed to comply with a requirement under clause 15.11 or clause 15.13. The expulsion of a Councillor from the meeting for that reason does not prevent any other action from being taken against the Councillor for the act of disorder concerned.

15.18 A member of the public may, as provided by section 10(2)(a) or (b) of the Act, be expelled from a meeting of the Council for engaging in or having engaged in disorderly conduct at the meeting.

15.19 Members of the public attending a meeting of the Council:

(a) must remain silent during the meeting unless invited by the chairperson to speak,
(b) must not bring flags, signs or protest symbols to the meeting, and
(c) must not disrupt the meeting.

15.20 Without limiting clause 15.18, a contravention of clause 15.19 or an attempt to contravene that clause, constitutes disorderly conduct for the purposes of clause 15.18. Members of the public may, as provided by section 10(2) of the Act, be expelled from a meeting for a breach of clause 15.19.

15.21 Where a Councillor or a member of the public is expelled from a meeting, the expulsion and the name of the person expelled, if known, are to be recorded in the minutes of the meeting.

15.22 If a Councillor or a member of the public fails to leave the place where a meeting of the Council is being held immediately after they have been expelled, a police officer, or any person authorised for the purpose by the Council or person presiding, may, by using such force as is reasonably necessary, remove the Councillor or member of the public from that place and, if necessary, restrain the Councillor or member of the public from re-entering that place for the remainder of the meeting.

Note: Failure to comply with a direction to leave a meeting is an offence under section 660 of the Act carrying a maximum penalty of 20 penalty units.

How disorder by Councillors attending meetings by audio-visual link may be dealt with

15.23 Where a Councillor is attending a meeting by audio-visual link, the chairperson or a person authorised by the chairperson may mute the Councillor's audio link to the meeting for the purposes of enforcing compliance with this code.

15.24 If a Councillor attending a meeting by audio-visual link is expelled from a meeting for an act of disorder, the chairperson of the meeting or a person

authorised by the chairperson, may terminate the Councillor's audio-visual link to the meeting.

Use of mobile phones and the unauthorised recording of meetings

15.25 Councillors, Council staff and members of the public must ensure that mobile phones are turned to silent during meetings of the Council and committees of the Council.

15.26 A person must not live stream or use an audio recorder, video camera, mobile phone or any other device to make a recording (including a photograph) within the Council chambers, immediately before, during or directly after the proceedings of a meeting of the Council or a committee of the Council without the prior authorisation of the Council or the committee. Authorisation requires a resolution of the Council or committee on the request, and the Council or committee shall consider the implications for the privacy of residents or other individuals who may be recorded when considering whether to pass such as resolution.

Note: Clause 15.26 does not apply to circumstances where the Chief Executive Officer or delegate arranges for photographs of Councillors and/or the chambers for record keeping purposes.

Note: Clause 15.26 does not apply to media organisations where prior approval from the Chief Executive Officer or delegate in consultation with the chairperson is granted.

15.27 Without limiting clause 15.18, a contravention of clause 15.26 or an attempt to contravene that clause, constitutes disorderly conduct for the purposes of clause 15.18. Any person who contravenes or attempts to contravene clause 15.26, may, as provided for under section 10(2) of the Act, be expelled from the meeting.

15.28 If any such person, after being notified of a resolution or direction expelling them from the meeting, fails to leave the place where the meeting is being held, a police officer, or any person authorised for the purpose by the Council or person presiding, may, by using such force as is reasonably necessary, remove the first-mentioned person from that place and, if necessary, restrain that person from re-entering that place for the remainder of the meeting.

Note: Failure to comply with a direction to leave a meeting is an offence under section 660 of the Act carrying a maximum penalty of 20 penalty units.

16 CONFLICTS OF INTEREST

16.1 All Councillors and, where applicable, all other persons, must declare and manage conflicts of interest they have in matters being considered at meetings of the Council and committees of the Council in accordance with the Council's code of conduct. All declarations of conflicts of interest must be recorded in the minutes of the meeting at which the declaration was made.

16.2 Councillors attending a meeting by audio-visual link must declare and manage

any conflicts of interest they have in matters being considered at the meeting in accordance with the Council's code of conduct. Where a Councillor has declared a conflict of interest in a matter being discussed at the meeting, the Councillor's audio-visual link to the meeting must be suspended or terminated and the Councillor must not be in sight or hearing of the meeting at any time during which the matter is being considered or discussed by the Council or committee, or at any time during which the Council or committee is voting on the matter.

17 DECISIONS OF THE COUNCIL

Council decisions

17.1 A decision supported by a majority of the votes at a meeting of the Council at which a quorum is present is a decision of the Council.

17.2 Decisions made by the Council must be accurately recorded in the minutes of the meeting at which the decision is made.

Rescinding or altering Council decisions

17.3 A resolution passed by the Council may not be altered or rescinded except by a motion to that effect of which notice has been given in accordance with this code.

17.4 If a notice of motion to rescind a resolution is given at the meeting at which the resolution is carried, the resolution must not be carried into effect until the motion of rescission has been dealt with.

17.5 If a motion has been lost, a motion having the same effect must not be considered unless notice of it has been duly given in accordance with this code.

17.6 A notice of motion to alter or rescind a resolution, and a notice of motion which has the same effect as a motion which has been lost, must be signed by 3 Councillors if less than 3 months has elapsed since the resolution was passed, or the motion was lost.

Note: Where a notice of rescission that was submitted without a replacement motion is carried, a new replacement motion cannot be considered unless prior notice has been given in accordance with clause 3.10.

Note: The provisions of clause 9.2 and 9.3 have no effect in respect of a replacement motion given without notice in accordance with clause 3.10, where clause 17.6 applies.

17.7 If a motion to alter or rescind a resolution has been lost, or if a motion which has the same effect as a previously lost motion is lost, no similar motion may be brought forward within 3 months of the meeting at which it was lost. This clause may not be evaded by substituting a motion differently worded, but in principle the same.

17.8 The provisions of clauses 17.5–17.7 concerning lost motions do not apply to motions of adjournment.

17.9 A notice of motion submitted in accordance with clause 17.6 may only be withdrawn under clause 3.11 with the consent of all signatories to the notice of motion.

17.10 A motion to alter or rescind a resolution of the Council may be moved on the report of a committee of the Council and any such report must be recorded in the minutes of the meeting of the Council.

17.11 Subject to clause 17.7, in cases of urgency, a motion to alter or rescind a resolution of the Council may be moved at the same meeting at which the resolution was adopted, where:

(a) a notice of motion signed by 3 Councillors is submitted to the chairperson at the meeting, and
(b) the Council resolves to deal with the motion at the meeting on the grounds that it is urgent and requires a decision by the Council before the next scheduled ordinary meeting of the Council.

17.12 A motion moved under clause 17.11(b) can be moved without notice. Despite any other provision of this code, only the mover of a motion referred to in clause 17.12(b) and the chairperson, if they are not the mover of the motion, can speak to the motion before it is put.

17.13 A resolution adopted under clause 17.11(b) must state the reasons for the urgency.

Recommitting resolutions to correct an error

17.14 Despite the provisions of this Part, a Councillor may, with the leave of the chairperson, move to recommit a resolution adopted at the same meeting:

(a) to correct any error, ambiguity or imprecision in the Council's resolution, or
(b) to confirm the voting on the resolution.

17.15 In seeking the leave of the chairperson to move to recommit a resolution for the purposes of clause 17.14(a), the Councillor is to propose alternative wording for the resolution.

17.16 The chairperson must not grant leave to recommit a resolution for the purposes of clause 17.14(a), unless they are satisfied that the proposed alternative wording of the resolution would not alter the substance of the resolution previously adopted at the meeting.

17.17 A motion moved under clause 17.14 can be moved without notice. Despite any other provision of this code, only the mover of a motion referred to in clause 17.14 and the chairperson, if they are not the mover of the motion, can speak to the motion before it is put.

17.18 A motion of dissent cannot be moved against a ruling by the chairperson under clause 17.14.

17.19 A motion moved under clause 17.14 with the leave of the chairperson cannot be voted on unless or until it has been seconded.

18 TIME LIMITS ON COUNCIL MEETINGS

18.1 Meetings of the Council and committees of the Council are to conclude no later than 10pm.

18.2 A short break of not less than 10 minutes is to be taken within the first 2 hours at each ordinary and extraordinary meeting of Council and committees of the Council.

18.3 If the business of the meeting is unlikely to be finished by, or is unfinished at 10pm, the Council or the committee of Council may by resolution extend the time of the meeting by one 30-minute interval for the purpose of dealing with the remaining items on the agenda. If at 10.30pm the business of the meeting is not concluded, an automatic extension will occur to enable the completion of debate and voting on the current matter (where the matter under consideration has already been moved and seconded).

Note: Clause 18.3 provides for the welfare and safety of Councillors and staff attending meetings.

18.4 If the business of the meeting is unfinished at 10pm and the Council does not resolve to extend the meeting or at the conclusion of any extensions in accordance with clause 18.3, the chairperson must following conclusion of debate and voting on the current matter (where the matter under consideration has already been moved and seconded) then either:

(a) defer consideration of the remaining items of business on the agenda to the next ordinary meeting of the Council, or
(b) adjourn the meeting to a time, date and place fixed by the chairperson.

18.5 Clause 18.4 does not limit the ability of the Council or a committee of the Council to resolve to adjourn a meeting at any time. The resolution adjourning the meeting must fix the time, date and place that the meeting is to be adjourned to.

18.6 Where a meeting is adjourned under clause 18.4 or 18.5, the Chief Executive Officer must:

(a) individually notify each Councillor of the time, date and place at which the meeting will reconvene, and
(b) publish the time, date and place at which the meeting will reconvene on the Council's website and in such other manner that the Chief Executive Officer is satisfied is likely to bring notice of the time, date and place of the reconvened meeting to the attention of as many people as possible.

Note: If the meeting is to resume on another day, any decisions of the Council made prior to the lapsing of the meeting are to be implemented by the Chief Executive Officer and do not need to await the resumption of the adjourned meeting. Unless urgent or resolved otherwise, it is the

Council's practice not to implement decisions of the Council until 12 noon on the working day following the day on which the meeting was adjourned. The outstanding items are to be resubmitted to the adjourned meeting for determination.

19 AFTER THE MEETING

Minutes of meetings

19.1 The Council is to keep full and accurate minutes of the proceedings of meetings of the Council.

Note: Clause 19.1 reflects section 375(1) of the Act.

19.2 At a minimum, the Chief Executive Officer must ensure that the following matters are recorded in the Council's minutes:

(a) the names of Councillors attending a Council meeting and whether they attended the meeting in person or by audio-visual link,
(b) details of each motion moved at a Council meeting and of any amendments moved to it,
(c) the names of the mover and seconder of the motion or amendment,
(d) whether the motion or amendment was passed or lost, and
(e) such other matters specifically required under this code.

Note: The wording of motions ruled out of order by the Mayor/ chairperson will not be included in the minutes (in this case only the Mayor's ruling will be included).

19.3 Notations in minutes requested by individual Councillors, except those identified in clause 13.8, will only be included following a resolution of Council approving their inclusion.

19.4 The minutes of a Council meeting must be confirmed at a subsequent meeting of the Council.

19.5 Any debate on the confirmation of the minutes is to be confined to whether the minutes are a full and accurate record of the meeting they relate to.

19.6 When the minutes have been confirmed, they are to be signed by the person presiding at the subsequent meeting.

19.7 The confirmed minutes of a meeting may be amended to correct typographical or administrative errors after they have been confirmed. Any amendment made under this clause must not alter the substance of any decision made at the meeting.

19.8 The confirmed minutes of a Council meeting, when the meeting was open to the public, must be published on the Council's website. This clause does not prevent the Council from also publishing unconfirmed minutes of its meetings on its website prior to their confirmation.

Access to correspondence and reports laid on the table at, or submitted to, a

meeting

19.8 The Council and committees of the Council must, during or at the close of a meeting, or during the business day following the meeting, give reasonable access to any person to inspect correspondence and reports laid on the table at, or submitted to, the meeting.

19.9 Clause 19.8 does not apply if the correspondence or reports relate to a matter that was received or discussed or laid on the table at, or submitted to, the meeting when the meeting was closed to the public.

19.10 Clause 19.8 does not apply if the Council or the committee resolves at the meeting, when open to the public, that the correspondence or reports are to be treated as confidential because they relate to a matter specified in section 10A(2) of the Act.

19.11 Correspondence or reports to which clauses 19.9 and 19.10 apply are to be marked with the relevant provision of section 10A(2) of the Act that applies to the correspondence or report.

Implementation of decisions of the Council

19.12 The Chief Executive Officer is to implement, without undue delay, lawful decisions of the Council.

20 COUNCIL COMMITTEES

Application of this Part

20.1 This Part only applies to committees of the Council whose members are all Councillors.

Council committees whose members are all Councillors

20.2 The Council may, by resolution, establish such committees as it considers necessary.

20.3 A committee of the Council is to consist of the Mayor and such other Councillors as are elected by the Councillors or appointed by the Council.

20.4 The quorum for a meeting of a committee of the Council is to be:

(a) such number of members as the Council decides, or
(b) if the Council has not decided a number – a majority of the members of the committee.

Functions of committees

20.5 The Council must specify the functions of each of its committees when the committee is established but may from time to time amend those functions.

Notice of committee meetings

20.6 The Chief Executive Officer must send to each Councillor, regardless of whether they are a committee member, at least 3 days before each meeting of the committee, a notice specifying:

(a) the time, date and place of the meeting, and
(b) the business proposed to be considered at the meeting.

20.7 Notice of less than 3 days may be given of a committee meeting called in an emergency.

Non-members entitled to attend committee meetings

20.8 A Councillor who is not a member of a committee of the Council is entitled to attend, and to speak at a meeting of the committee. However, the Councillor is not entitled:

(a) to give notice of business for inclusion in the agenda for the meeting, or
(b) to move or second a motion at the meeting, or
(c) to vote at the meeting.

Chairperson and deputy chairperson of Council committees

20.9 The chairperson of each committee of the Council must be:

(a) the Mayor, or
(b) if the Mayor does not wish to be the chairperson of a committee, a member of the committee elected by the Council, or
(c) if the Council does not elect such a member, a member of the committee elected by the committee.

20.10 The Council may elect a member of a committee of the Council as deputy chairperson of the committee. If the Council does not elect a deputy chairperson of such a committee, the committee may elect a deputy chairperson.

20.11 If neither the chairperson nor the deputy chairperson of a committee of the Council is able or willing to preside at a meeting of the committee, the committee must elect a member of the committee to be acting chairperson of the committee.

20.12 The chairperson is to preside at a meeting of a committee of the Council. If the chairperson is unable or unwilling to preside, the deputy chairperson (if any) is to preside at the meeting. If neither the chairperson nor the deputy chairperson is able or willing to preside, the acting chairperson is to preside at the meeting.

Procedure in committee meetings

20.13 Subject to any specific requirements of this code, each committee of the Council may regulate its own procedure. The provisions of this code are to be taken to apply to all committees of the Council.

20.14 Whenever the voting on a motion put to a meeting of the committee is equal,

the chairperson of the committee is to have a casting vote as well as an original vote unless the Council or the committee determines otherwise in accordance with clause 20.13.

20.15 Voting at a Council committee meeting is to be by open means (such as on the voices, by show of hands or by a visible electronic voting system).

Mayoral minutes

20.16 The provisions of this code relating to Mayoral minutes also apply to meetings of committees of the Council in the same way they apply to meetings of the Council.

Closure of committee meetings to the public

20.17 The provisions of the Act and Part 14 of this code apply to the closure of meetings of committees of the Council to the public in the same way they apply to the closure of meetings of the Council to the public.

20.18 If a committee of the Council passes a resolution, or makes a recommendation, during a meeting, or a part of a meeting that is closed to the public, the chairperson must make the resolution or recommendation public as soon as practicable after the meeting or part of the meeting has ended and report the resolution or recommendation to the next meeting of the Council. The resolution or recommendation must also be recorded in the publicly available minutes of the meeting.

20.19 Resolutions passed during a meeting, or a part of a meeting that is closed to the public must be made public by the chairperson under clause 20.18 during a part of the meeting that is livestreamed where practicable.

20.20 The Chief Executive Officer must cause business papers for items of business considered during a meeting, or part of a meeting, that is closed to public, to be published on the Council's website as soon as practicable after the information contained in the business papers ceases to be confidential.

20.21 The Chief Executive Officer must consult with the committee and any other affected persons before publishing information on the Council's website under clause 20.20 and provide reasons for why the information has ceased to be confidential.

Disorder in committee meetings

20.22 The provisions of the Act, the Regulation, and this code relating to the maintenance of order in Council meetings apply to meetings of committees of the Council in the same way they apply to meetings of the Council.

Minutes of Council committee meetings

20.23 Each committee of the Council is to keep full and accurate minutes of the proceedings of its meetings. At a minimum, a committee must ensure that the following matters are recorded in the committee's minutes:

(a) the names of Councillors attending a meeting and whether they attended

the meeting in person or by audio-visual link,
(b) details of each motion moved at a meeting and of any amendments moved to it,
(c) the names of the mover and seconder of the motion or amendment,
(d) whether the motion or amendment was passed or lost, and
(e) such other matters specifically required under this code.

20.24 The minutes of meetings of each committee of the Council must be confirmed at a subsequent meeting of the committee.

20.25 Any debate on the confirmation of the minutes is to be confined to whether the minutes are a full and accurate record of the meeting they relate to.

20.26 When the minutes have been confirmed, they are to be signed by the person presiding at the subsequent meeting.

20.27 The confirmed minutes of a meeting may be amended to correct typographical or administrative errors after they have been confirmed. Any amendment made under this clause must not alter the substance of any decision made at the meeting.

20.28 The confirmed minutes of a meeting of a committee of the Council must be published on the Council's website. This clause does not prevent the Council from also publishing unconfirmed minutes of meetings of committees of the Council on its website prior to their confirmation.

21 IRREGULARITES

21.1 Proceedings at a meeting of a Council or a Council committee are not invalidated because of:

(a) a vacancy in a civic office, or
(b) a failure to give notice of the meeting to any Councillor or committee member, or
(c) any defect in the election or appointment of a Councillor or committee member, or
(d) a failure of a Councillor or a committee member to declare a conflict of interest, or to refrain from the consideration or discussion of, or vote on, the relevant matter, at a Council or committee meeting in accordance with the Council's code of conduct, or
(e) a failure to comply with this code.

22 DEFINITIONS

the Act	means the *Local Government Act 1993*
act of disorder	means an act of disorder as defined in clause 15.10 of this code
amendment	in relation to an original motion, means a motion moving an amendment to that motion
audio recorder	any device capable of recording speech
audio-visual link	means a facility that enables audio and visual communication between persons at different places
business day	means any day except Saturday or Sunday or any other day the whole or part of which is observed as a public holiday throughout New South Wales
chairperson	in relation to a meeting of the Council – means the person presiding at the meeting as provided by section 369 of the Act and clauses 6.1 and 6.2 of this code, and in relation to a meeting of a committee – means the person presiding at the meeting as provided by clause 20.9 of this code
Chief Executive Officer	Refers to the statutory General Manager as defined by the *Local Government Act 1993*
this code	means the Council's adopted code of meeting practice
committee of the Council	means a committee established by the Council in accordance with clause 20.2 of this code (being a committee consisting only of Councillors) or the Council when it has resolved itself into committee of the whole under clause 12.1
Council official	includes Councillors, members of staff of a Council, administrators, Council committee members, delegates of Council and any other person exercising functions on behalf of the Council
day	means calendar day
division	means a request by two Councillors under clause 11.7 of this code requiring the recording of the names of the Councillors who voted both for and against a motion
livestream	a video broadcast of a meeting transmitted across the internet concurrently with the meeting
open voting	means voting on the voices or by a show of hands or by a visible electronic voting system or similar means
planning decision	means a decision made in the exercise of a function of a Council under the *Environmental Planning and Assessment Act 1979* including any decision relating to a development application, an environmental planning instrument, a development control plan, a planning agreement or a development contribution plan under that Act, but not including the making of an order under Division 9.3 of Part 9 of that Act

performance improvement order	means an order issued under section 438A of the Act
quorum	means the minimum number of Councillors or committee members necessary to conduct a meeting
the Regulation	means the *Local Government (General) Regulation 2021*
year	means the period beginning 1 July and ending the following 30 June

APPENDIX 1 – CONDUCTING THE PUBLIC FORUM

A1.1 A public forum will be conducted prior to each ordinary meeting of the Council for the purpose of hearing oral submissions from members of the public on mayoral minutes, reports to council and notices of motion (collectively, items of business), to be considered at the meeting.

A1.2 The public forum will be held in Council Chambers from 6.00pm 7 days prior to an ordinary meeting of the Council.

A1.3 The Mayor or their nominee will preside as chairperson at the forum with all Councillors invited to attend.

Note: As the forum is not part of the Council meeting, a quorum is not required.

A1.4 For each forum a person may apply to speak on no more than 2 items of business on the agenda of the Council meeting.

A1.5 No more than 2 speakers are to be permitted to speak 'for' or 'against' each item of business on the agenda for the Council meeting. The order of speakers for each item is determined by the order of receipted 'for' and 'against' applications.

A1.6 To speak at a public forum, a person must first make an application to the Council in the approved form. Applications to speak open when the business papers are published and must be received by 5pm on the business day prior to the date on which the public forum is to be held. Applications must identify the item of business on the agenda of the Council meeting the person wishes to speak on, and whether they wish to speak 'for' or 'against' the item.

Note: The Chief Executive Officer or their delegate may refuse an application to speak at a public forum where the application does not meet the outlined requirements or there is a genuine and demonstrable concern relating to the applicant or their dealings with the Council or their intentions.

A1.7 To speak at a public forum, a speaker must attend in person.

A1.8 Legal representatives acting on behalf of others must identify their status as a legal representative when applying to speak.

A1.9 When speaking at the forum, speakers will be granted 3 minutes each to address the forum and this time limit is to be managed by the chairperson.

A1.10 The chairperson may permit a speaker an extension of one minute where time permits, and, in consideration of the impact on the remaining speakers.

A1.11 Speakers must not digress from the item of business on which they applied to speak. If a speaker digresses to irrelevant matters, the chairperson is to direct the speaker not to do so. If the speaker fails to observe a direction from the chairperson, the chairperson may immediately require the person to stop speaking and they will not be further heard.

A1.12 A public forum should not be used to raise questions or complaints. Such matters should be forwarded in writing to the council where they will be responded to by appropriate council officers.

A1.13 Any Councillors in attendance must disclose and manage any conflicts of interest they may have in relation to any item of business at public forum.

A1.14 Speakers must comply with this code and all other relevant Council codes, policies and procedures. Speakers must refrain from engaging in disorderly conduct, publicly alleging breaches of the Council's Code of Conduct or making other potentially defamatory statements.

A1.15 If the chairperson considers that a speaker has engaged in conduct of the type referred to in clause A1.14, the chairperson may direct the person to refrain from the inappropriate behaviour and to withdraw and unreservedly apologise for any inappropriate comments. Where the speaker fails to comply with the chairperson's direction, the chairperson may immediately require the person to stop speaking.

A1.16 Clause A1.15 does not limit the ability of the chairperson to deal with disorderly conduct by speakers in accordance with the provisions of Part 15 of the Code of Meeting Practice.

A1.17 Where a speaker engages in conduct of the type referred to in clause A1.16, the Chief Executive Officer or their delegate may refuse further applications from that person to speak at public forums for such a period as the Chief Executive Officer or their delegate considers appropriate.

A1.18 Where, prior to the commencement of the public forum, it becomes apparent that the health, safety or welfare of Councillors, Council staff and members of the public may be put at risk by attending the forum, the chairperson may, in consultation with the Chief Executive Officer, cancel the forum. Where a forum is cancelled, notice of the cancellation must be published on the Council's website and in such other manner that the council is satisfied is likely to bring notice of the cancellation to the attention of as many people as possible.

northern beaches council

Community and Stakeholder Engagement Report

Code of Meeting Practice 2025

Consultation period: 24 October to 4 December 2025

Contents

1. Summary

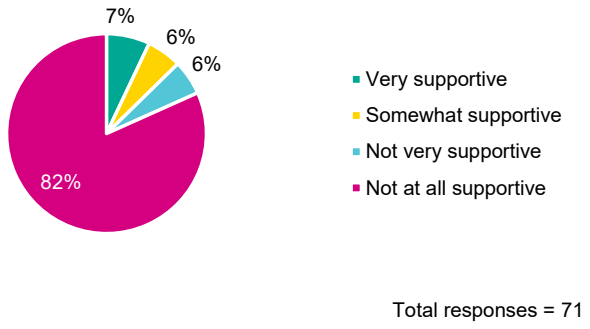
This report outlines the outcomes of community and stakeholder engagement as part of a legislative obligation on Council to implement a Code of Meeting Practice that is consistent with the NSW Government's mandated Model Code of Meeting Practice.

The feedback provided during consultation indicated a broad dissatisfaction with the Code of Meeting Practice generally, with key themes being:

- Concerns about democratic values, restriction of participation, public voices and expression
- Lack of transparency and accountability
- Excessive authority and control

The main issue raised was the proposal to move the public forum one week prior to Council meetings instead of keeping it during or just prior to the Council meeting, with a number of respondents indicating a preference for the forum to be retained on the same evening as the Council meeting. While holding a public forum is, and has always been, optional; the mandatory requirements of the Model Code operate so that the forum cannot be part of the formal Council meeting, and Council's options in relation to this requirement are limited by practical considerations such as the start and finish times of the meeting.

1.1. Key outcomes

Total unique responses	73[1]	
How responses were received	Submission/Comment form Written responses (email/letter)	Completions: 71 Number received: 2
Online sentiment question: How supportive are you of the draft Code of Meeting Practice (2025)		

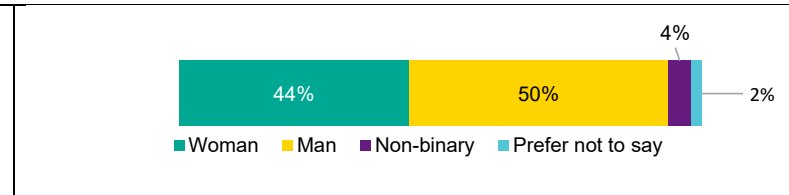
[1] We note that while this was a survey-style feedback form, it was not a statistically representative survey, and participants opted-in to provide feedback

1.2. How we engaged

Have Your Say: visitation stats	Visitors: 987	Visits: 1,276
Electronic direct mail (EDM)	Community Engagement (fortnightly) newsletter: 3 editions	Distribution: 20,476 subscribers
	Council (weekly) e-News: 2 editions	Distribution: 56,860 subscribers
	The Drift (Library newsletter): 1 edition	Distribution: 59,525
	The Wave (Disability newsletter): 1 edition	Distribution: 1,411

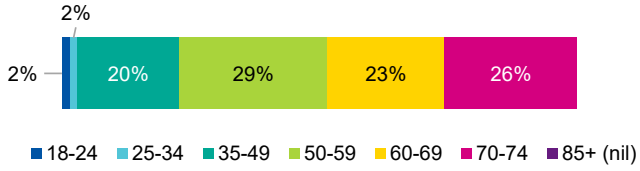
1.3. Who responded[2]

Gender



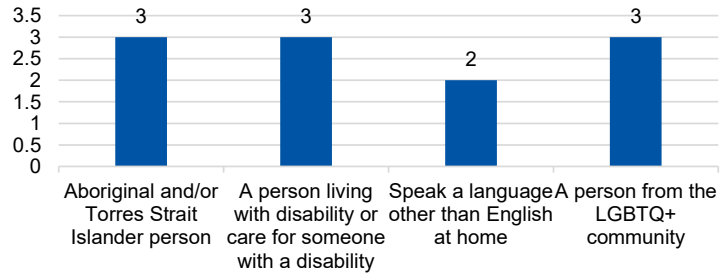
Total responses = 68

Age groups

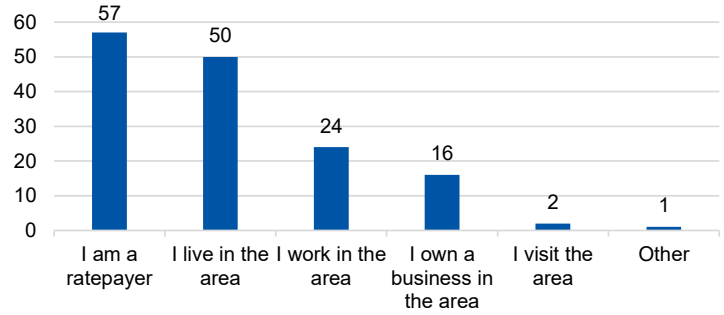
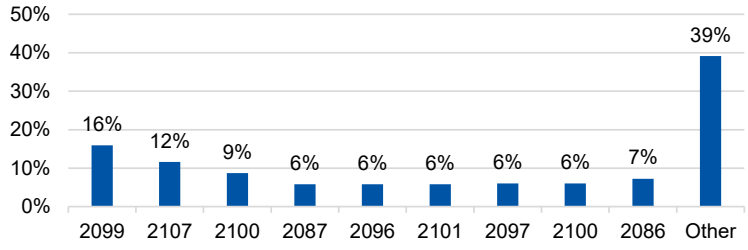


Total responses = 66

Priority populations[3]



[2] Demographic data was gathered by request only. The data represented only includes those respondents who provided this detail.
[3] Respondents could select more than one option

	Total responses = 11
Connection to Northern Beaches[4]	 Total responses = 150
Postcodes	 Total responses = 69

[4] Respondents could select more than one option

2. Background

As part of a tranche of reforms to the Councillor Conduct Framework, the NSW Government released a revised Model Code of Meeting Practice in August 2025 (2025 Model Meeting Code) with the stated aim to 'ensure meetings are conducted in a dignified and orderly way befitting to a chamber of democracy and to promote community confidence in councils and their decisions.'

The 2025 Model Meeting Code has 2 elements:

- **mandatory provisions**
- **non-mandatory provisions** covering areas of meeting practice that are common to most councils but where there may be a need for some variation in practice between councils based on local circumstances. The non-mandatory provisions also operate to set a benchmark based on what the Office of Local Government sees as best practice.

Council is obligated to adopt a new Code of Meeting Practice which includes the mandatory provisions of the 2025 Model Meeting Code by 31 December 2025. In order to meet this obligation, Council undertook an exhibition of a draft Code of Meeting Practice that is compliant with the Model Code.

While the exhibition of the draft Northern Beaches Council Code of Meeting Practice provided the opportunity for the community to consider and comment on the framework governing Council meetings, the Code predominantly consists of mandatory provisions set by the NSW Government.

3. Engagement objectives

Community and stakeholder engagement aimed to:

- build community and stakeholder awareness of participation activities
- provide accessible information so community and stakeholders can participate in a meaningful way
- identify community and stakeholder concerns, local knowledge and values
- communicate to community and stakeholders how their input was incorporated into the planning and decision making process
- provide vulnerable and marginalised groups access to the engagement process.

4. Engagement approach

Community and stakeholder engagement for the Code of Meeting Practice was conducted between 24 October to 4 December 2025 and consisted of a series of activities that provided opportunities for community and stakeholders to contribute.

The engagement was planned, implemented and reported in accordance with Council's Community Engagement Strategy (2022).

A project page[5] was established on our engagement platform with information provided in an accessible and easy to read format.

The project was primarily promoted through our regular email newsletter (EDM) channels.

Feedback was captured through an online comment form embedded onto the project page.

An open-field comments box provided community members a space to explain or elaborate on their support, not support or neutral sentiment as well as any other feedback they wished to contribute.

The submission form also recorded demographic information (including postcode, age and gender) to support analysis of LGA representation. **A total of 73 submissions were received.** No weighting was applied to the data.

Email and written comments were also invited. [5]

[5] https://yoursay.northernbeaches.nsw.gov.au/code-meeting-practice-2025

1. Findings

The overwhelming sentiment is negative, with many submissions describing the changes as anti-democratic and a threat to free speech and community participation. There is also a perception that moving the public forum to a week before the Council meeting will create a disconnect between community input and decision-making.

Some hold a view that Council has misrepresented the mandatory components of the Model Code of Meeting Practice by removing the public forum from the Council meeting. There also appears to be a misconception that the community would no longer be able to attend the Council meeting as a result of the changes. This is incorrect.

Some submissions provided more general feedback rather than commenting directly on the draft Code of Meeting Practice.

Table 1: Issues, change requests and other considerations

Theme	Issues, change requests and other considerations raised	Council's response
Concerns about democratic values	Multiple submissions express a general belief that the proposed changes (in particular changes to public forum) undermine democratic principles, limit public participation, and erode community influence in local government decisions. Some submissions are concerned that the proposed timing gap between the public forum and the Council meeting will limit the 'impact' the views raised in the forum will have on the final decisions made.	We acknowledge the community's general feedback. While council meetings are formal decision-making forums and not designed for open debate from members of the public, the public's right to attend remains protected, and meetings will continue to be open and livestreamed. Staff recommend Council retain the optional public forum to be held one week prior to the Council meeting to: • ensure there is sufficient time to allow for up to 2 speakers for and 2 against each agenda item • ensure both Councillors and the community are able to attend by being held outside business hours • provide time for Councillors to consider the matters addressed by speakers, prior to the Council meeting.
Restriction of participation and public voice and expression	There is a recurring theme around the restriction of public forums, removal of protest symbols, and limitations on expressing dissent,	Removal of protest signs are a mandatory provision in the Code. Council has no option to amend this provision.

Theme	Issues, change requests and other considerations raised	Council's response
	which are viewed as attacks on freedom of speech and individual rights.	
Lack of transparency and accountability	Submissions highlight concerns about decision-making processes lacking openness, with Council perceived as acting without sufficient community input or clear communication. Some submissions indicate a misunderstanding that the meetings will no longer be open to the public to attend. Some submissions highlight concerns that the changes to the public forum will not require Councillors to attend and there is a perception that Councillors will decide not to attend.	Council remains committed to transparency and public accountability. All Council meetings and the public forum will continue to be open to the public, recorded and livestreamed, ensuring real-time open access for the community on the deliberations of the Council. With regards to Councillor attendance at the public forum, the forum will continue to be livestreamed which will provide a public record of Councillor attendance. In addition, minutes are made publicly available as per the mandatory requirements.
Excessive authority and control	Concerns are raised about councils and mayors being given too much power, including the ability to exclude dissenting voices, which is seen as undemocratic and potentially leading to authoritarian practices.	The Model Code provides an option for the chairperson to be granted the authorisation to expel any person, including any Councillor, from a Council meeting or committee meeting. This provision is put forward so as not to limit the options available to the chairperson in exercising their duties. Local government is a representative democracy where councillors are elected via a democratic process to represent the local community. Decisions made by the Council require a majority vote by those elected representatives who are obligated to consider the interests of the broader local government area and community members.
Support for proposed changes to public forum	Some respondents indicated support for the proposed changes.	Noted

Appendix 1 Verbatim community and stakeholder responses*

Number	Submission
1	This is clearly a move by council members to avoid public scrutiny and accountability. There are many council members who are already under fire for their lack of accountability l, virtue signalling and egregious expenses for utterly irrelevant topics for them.
2	Council's change to the public forum via the code of meeting practice is a slap in the face to all ratepayers and to the concept of Local Government. It has been advertised as a forced change by the NSW Government, where in fact the changes to Public Forum are totally in Council's hands. On this basis, the policy as it stands should not proceed until Council takes full ownership of this. Furthermore, it should not be called a "public forum", it is a discussion on Council's agenda, so a better name would be "Agenda Forum". Below I have outlined why these changes to the Public Forum are anti-democratic, anti-free speech and anathema to a functioning liberal democracy. A1.2 The public forum will be held in Council Chambers from 6.00pm 7 days prior to an ordinary meeting of the Council. This point separates the public from the elected council, with no mandatory Councillor attendance a divide between the issues and the ratepayer will exist. Councillors are elected to represent and hear from the people, not be separate for them. Councillors can hide behind emails and not return calls because they don't want to a deal with a "problem" ratepayer. Public Forum allows for that divide to be breached. A1.6 To speak at a public forum, a person must first make an application to the Council in the approved form. Applications to speak open when the business papers are published and must be received by 5pm on the business day prior to the date on which the public forum is to be held. Applications must identify the item of business on the agenda of the Council meeting the person wishes to speak on, and whether they wish to speak 'for' or 'against' the item. Note: The Chief Executive Officer or their delegate may refuse an application to speak at a public forum where the application does not meet the outlined requirements or there is a genuine and demonstrable concern relating to the applicant or their dealings with the Council or their intentions. The issue is with the note. An unelected bureaucrat has final say on who is they consider should be allowed to speak at Council. If they do not like a group that disagrees with said unelected bureaucrat, they can shut them down. This is censorship and impedes the implied right of political communication. A1.11 Speakers must not digress from the item of business on which they applied to speak. If a speaker digresses to irrelevant matters, the chairperson is to direct the speaker not to do so. If the speaker fails to observe a direction from the chairperson, the chairperson may immediately require the person to stop speaking and they will not be further heard. While succinctness in three minutes is extremely important, this point can be weaponized by the Council to shut down the implied right of political communication. Often an issues need to explained with comparison, if thechairperson doesn't like what's being said for a politically motivated reason, they can shut down the speech. This is a free speech issue and impedes the right to political communication. A1.12 A public forum should not be used to raise questions or complaints. Such matters should be forwarded in writing to the council where they will be responded to by appropriate council officers. The point of a public forum is to address Council on matters that they have not addressed properly. It is the ratepayers chance to make their voice heard when the system seems to have failed them. This once again disrupts the implied right of political communication.

**Personal identifying information, and content which is discriminatory, hateful or which may defame, offend, insult, humiliate or intimidate has been redacted. Spelling and grammatical errors have been amended only where misinterpretation or offence may be caused.*

	A1.14 Speakers must comply with this code and all other relevant Council codes, policies and procedures. Speakers must refrain from engaging in disorderly conduct, publicly alleging breaches of the Council's Code of Conduct or making other potentially defamatory statements. This point states that speakers must refrain for alleging breaches of Council's Code of conduct – this here means that if a Councillor or staff does in fact breach the code of conduct A1.15 If the chairperson considers that a speaker has engaged in conduct of the type referred to in clause A1.14, the chairperson may direct the person to refrain from the inappropriate behaviour and to withdraw and unreservedly apologise for any inappropriate comments. Where the speaker fails to comply with the chairperson's direction, the chairperson may immediately require the person to stop speaking. This doesn't define what "disorderly conduct" is. Again this can be used for political motives by the Chair and Councillors to shut down anyone speaking against their actions and trying or trying to hold them accountable for their actions. The key words in that sentence is "considers" meaning that it is not objective, but subjective to the chairperson. This can be used to censor speakers with genuine concern about the actions of Councillors and the staff of Northern Beaches Council. A1.16 Clause A1.15 does not limit the ability of the chairperson to deal with disorderly conduct by speakers in accordance with the provisions of Part 15 of the Code of Meeting Practice. A1.17 Where a speaker engages in conduct of the type referred to in clause A1.16, the Chief Executive Officer or their delegate may refuse further applications from that person to speak at public forums for such a period as the Chief Executive Officer or their delegate considers appropriate. A1.18 Where, prior to the commencement of the public forum, it becomes apparent that the health, safety or welfare of Councillors, Council staff and members of the public may be put at risk by attending the forum, the chairperson may, in consultation with the Chief Executive Officer, cancel the forum. Where a forum is cancelled, notice of the cancellation must be published on the Council's website and in such other manner that the council is satisfied is likely to bring notice of the cancellation to the attention of as many people as possible. This clause here is a way to shut down speakers that council does not like. Ultimately, the Chair and the CEO will censor speakers and groups if they do not like what they have to say. This is in violation of the implied right to political communication. A1.18 Where, prior to the commencement of the public forum, it becomes apparent that the health, safety or welfare of Councillors, Council staff and members of the public may be put at risk by attending the forum, the chairperson may, in consultation with the Chief Executive Officer, cancel the forum. Where a forum is cancelled, notice of the cancellation must be published on the Council's website and in such other manner that the council is satisfied is likely to bring notice of the cancellation to the attention of as many people as possible. While Health and Safety is paramount, this item can be used to silence inconvenient debate. If there is another rate rise, whats to stop the CEO and Chair from shutting down the forum so no one can speak against it. Our community deserves more than a token forum. We deserve genuine participation, open dialogue, and the right to raise concerns without fear of being silenced. These provisions do not strengthen democracy, they weaken it. They do not empower residents, they constrain them. I urge councillors to reject this framework and instead design a process that truly welcomes community voice: one that is accessible, inclusive, and accountable. Because democracy is not tidy, it is not convenient, and it cannot be reduced to three minutes behind a microphone — nor cancelled when it becomes politically inconvenient.
3	A significant backwards step in openness, transparency and accountability to the northern beaches community. Another factor in diminishing the community's trust in this Council

4	I would like to see the public forum remain. This gives the community the only opportunity to address councillors on matters that mean a lot to them. Removing public forum diminishes confidence the public has with council
5	Introduction Council's proposed changes to the Public Forum are a serious concern. They represent a step away from genuine community engagement and accountability. While these changes have been advertised as a forced requirement of the NSW Government, in reality the decision rests entirely in Council's hands. On this basis, the policy should not proceed until Council takes full ownership of it. Furthermore, the term "Public Forum" is misleading. What is being proposed is not a true forum for public voice, but a controlled discussion on Council's agenda. A more accurate name would be "Agenda Forum." Concerns with Specific Clauses • A1.2 — Separation Between Council and the People The forum is scheduled seven days prior to the ordinary meeting, with no requirement for councillors to attend. This separates the public from their elected representatives. Councillors are elected to hear from the people, not avoid them. Without mandatory attendance, councillors can hide behind emails and avoid accountability. Public Forum should bridge that divide, not reinforce it. • A1.6 — Unelected Bureaucrats Controlling Speech Applications to speak must be lodged in advance, and the Chief Executive Officer or their delegate may refuse them. This gives unelected officials the power to decide who is allowed to speak. If they dislike a group or its message, they can shut it down. This is censorship and impedes the implied right of political communication. • A1.11 — Chairperson's Subjective Power Speakers must not digress from the item of business. While brevity is important, this rule can be weaponised. Issues often require comparison or context, but if the chairperson does not like what is being said, they can silence it. This undermines free speech and the implied right of political communication. • A1.12 — Silencing Complaints The forum cannot be used to raise questions or complaints. Yet the purpose of a public forum is to give ratepayers a chance to speak when the system has failed them. This restriction denies residents their voice and disrupts the implied right of political communication. • A1.14–A1.15 — Vague Definitions of Disorderly Conduct Speakers must refrain from alleging breaches of the Code of Conduct or making "potentially defamatory" statements. Clause A1.15 allows the chairperson to demand an apology or cut the speaker off. The problem is that "disorderly conduct" is undefined, and the chairperson's power is subjective — based on what they consider inappropriate. This opens the door to politically motivated censorship of genuine concerns. • A1.16–A1.17 — Banning Speakers Clause A1.16 extends the chairperson's powers under Part 15 of the Code, and A1.17 allows the CEO to refuse future applications from a speaker for any period they deem appropriate. This punishes dissent rather than engaging with it, silencing voices instead of hearing them. • A1.18 — A Political Weapon Disguised as Safety Clause A1.18 allows the chairperson, in consultation with the CEO, to cancel a forum if they believe health, safety, or welfare may be at risk. While health and safety are paramount, this clause is dangerously broad. It can be invoked not for genuine threats but to silence inconvenient debate. For example, if there is another rate rise, what is to stop the CEO and Chair from cancelling the forum so no one can speak against it? This is not about safety — it is about control. It is a political weapon to shut down dissent and violates the implied right of political communication. Conclusion Our community deserves more than a token forum. We deserve genuine participation, open dialogue, and the right to raise concerns without fear of being silenced. These provisions do not strengthen democracy — they weaken it. They do not empower residents — they constrain them. Council should reject this framework and instead design a process that truly welcomes

	community voice: one that is accessible, inclusive, and accountable. Democracy is not tidy, it is not convenient, and it cannot be reduced to three minutes behind a microphone — nor cancelled when it becomes politically inconvenient.
6	To: Northern Beaches Council Re: Submission on Proposed Code of Meeting Practice – Public Participation Changes Dear Councillors, I write to express concern regarding the proposed changes to the Council's Code of Meeting Practice, specifically the removal of public addressing rights during Council meetings and the requirement that community submissions be made only via a separate "public forum" held seven days prior. While alignment with the Model Code is acknowledged, the proposal as drafted risks unintentionally weakening transparency, accountability, and genuine participatory democracy within the Northern Beaches local government area. 1. Timing and Disconnection From Decision-Making Holding the public forum a full week before the Council meeting creates an artificial disconnect between community input and decision-making. Seven days is long enough for circumstances, information, staff recommendations, or amendments to change—yet too long for community presenters to respond. At present, speaking at a meeting allows residents to directly influence debate in real time, at the point when elected representatives are actually making decisions. This immediacy is critical to genuine democracy. A pre-meeting forum, detached from the session of decision-making, risks becoming symbolic rather than meaningful. 2. Public Visibility and Accountability Public interaction at Council meetings creates accountability—Councillors must listen to residents in the same space and context in which they vote. Moving submissions to an earlier separate event: Removes the public from the forum in which decisions are made Diminishes witness accountability Reduces the pressure on elected representatives to hear and weigh community sentiment at the decisive moment This will inevitably reduce confidence in Council processes. 3. Reduced Flexibility for Residents Many residents only become aware of agenda items when the business papers are published—often a few days before meetings. Requiring registration and attendance seven days before removes their ability to participate meaningfully if new issues emerge, amendments are introduced, or information changes. This disadvantages citizens who: Work full time

	Care for family Have mobility/transport limitations Cannot commit a week in advance Public participation should not become harder. 4. Livestreaming Alone Is Not Sufficient Public Access Although livestreaming the forum increases public visibility, it is not a substitute for participation at Council meetings. A broadcast without decision-making linkage is performative and not deliberative democracy. Livestreaming does not give residents a voice at the table—it simply documents their exclusion from it. 5. Risk of Perception of Reduced Transparency At a time when trust in institutions is fragile, any change that reduces public presence in decision-making forums may be perceived as Council insulating itself from scrutiny or dissent, even if that is not the intention. A healthy democracy requires not just actual transparency, but visible transparency. 6. Alternative Solutions Council Should Consider I respectfully propose that Council adopt a model consistent with both the Model Code and genuine community engagement: Option A – Maintain public address rights at Council meetings If the Model Code allows councils discretion, this option should be preserved. Option B – Hybrid participation framework Keep the pre-meeting forum for early commentary Retain the option for speakers on the night of the meeting (even if time-limited or subject to registration) This preserves efficiency while safeguarding democracy. Option C – Permit speaking requests in response to late amendments or new business Ensuring the public can respond when the agenda or staff reports change. Option D – Provide evidence demonstrating need for this change Before implementation, Council should publish: How many speakers have caused delay or disorder Whether current processes fail efficiency standards

	Consultation analysis showing community support for the change Without demonstrated necessity, the change appears retrograde. 7. Principle of Local Government – Public Ownership of Meetings Council meetings do not belong to Councillors—they belong to the community. Removing the public from the very forum where their representatives debate and vote alters the nature of local democracy. Residents elect councillors, and therefore residents must retain the right to address them at the point of decision-making—not merely at a separate preliminary event. Conclusion I urge Council to reconsider the proposed removal of public addressing rights at Council meetings and adopt a model that enhances—rather than diminishes—public connection, responsiveness, and democratic accountability. Community confidence is strengthened when elected representatives welcome scrutiny and value direct engagement. Thank you for considering this submission. I would welcome the opportunity to speak further or present in person should the final model continue to restrict democratic access.
7	My concerns relate solely to the Public Forum. As a person who spoke at meetings about general community issues as well as agenda items, I am disappointed that Council has so readily fallen in line with a draft code devised by State Government officers. Was Council given any options and if so what points of view were conveyed to the Minister for Local Government or Departmental officers? The removal of what I consider to be a democratic system is evidence of how current State and Federal Labor Governments are heading. Freedom of speech and access to information about government decisions is being gradually and stealthily removed. Obviously certain of the current Councillors are happy to fall in line with limiting opportunities for a community voice. This will not be forgotten by the community.
8	Prohibiting the public taking part in Council Meetings and exiling them to Public Fora to which no Councellor is required to attend, seems to be aimed more at shutting out the public than actually listening to public concerns. Despite the declared purpose of these fora to hear input from the public, in truth they are clearly designed to silence the public, or at the very least provide a platform to enable ignoring all public contributions. We should not be surprised at this given the Council track record af asking for feedback and input, then promptly ignoreing the very feedback requested (rate rises being a case in point). There is also an additional cost associated with these proposed public fora. Council is already poor money managers and this is just another example of profligate spending on unnecessary meetings to which Councellors are invited but not obligated to attend. So how will the purpose of them be met, managed, responded to and acted on? They won't.
9	For due process, a Public forum must be held immediately before the Council meeting starts.
10	The draft code is little more than an attempt to thwart democracy. The code stifles transparency and simply aids an inefficient and seriously hopeless bunch of inept councillors.
11	Our members of the public who pay local rates that find the council should be allowed to talk on matters with the public address segment. If this is done separately from the actual meeting costs will blow out which NBC can not currently afford.
12	The option of public forum before council meeting should be adopted but definitely not seven days prior. It looses all relevance in terms of the opportunity of public comment

	because of length of time between forum and meeting. It should be prior to the meeting of council on the same evening
13	Th government states "The council may hold a public forum prior to meetings of the council and committees of the council for the purpose of hearing oral submissions from members of the public on items of business to be considered at the meeting." and yet this council is stating they will not hold these prior to meetings. So; inaccurate presentation once again which seems to be spin to fit in with this council's agenda - to silence and keep any dissent 'behind closed doors' - more so when under the draft terms in the council document is listed; "A public forum should not be used to raise questions or complaints. Such matters should be forwarded in writing to the council where they will be responded to by appropriate council officers." As a Public Forum is a place to make such matters public this reads as another means of silencing dissent and keeping such subjects hidden so just the spin is heard. What happens when an Item is added late to an Agenda - too late for anyone to apply to address it? This would allow the council to structure meetings and anything it does not want scrutinised, or addressed by others, to be pushed through via the mechanisms the council itself has put in place and may be a form of corruption and being too heavy handed in trying to keep the council narrative unchallenged. It reads of yet another attempt to silence community and also infers a heavy-handed bullying approach. The council would do well to stick to being accurate - the sleight of hand interpretation of what is actually stated by the state government's documents and that coming out of this council reads like an attempt to shut down the Public Forum, and the Public Address. No wonder people want their former councils back. It's very disappointing to be met with council spin, again, in so serious a matter - more so when the council claims to have the bulk of its staff drawn from locals.
14	The fact that it costs money to host a separate night and some or all councillors will not be there is totally disrespectful. I don't feel listened to as a ratepayer as it is. You do not have to do this, you have a choice.
15	This is the further erosion of accountability by a PR driven anti-democratic council that should be dismissed.
16	I believe that Council exists to serve the community, and that genuine community participation is a cornerstone of transparent and accountable local government. For this reason, I am concerned that the proposed Code of Meeting Practice limits the ability of residents and ratepayers to listen, speak, or otherwise engage during council meetings. Local councils are the level of government closest to the people. Residents should therefore have the opportunity not only to observe, but also to contribute to discussions on matters that directly affect them. Restricting public access or speaking rights undermines public trust and weakens the democratic process.
17	Because it is part of a control agenda that presumes that people are to have no voice, in fact to be imprisoned in 15 minute cities or smart cities with 24/7 surveillance and living under communist style regime with a point system, credit points and no freedom. Wake up NBC and see where you are placing not only the citizens but your own imprisonment
18	I am not at all supportive of the above draft as i believe that it directly conflicts with the values of the democratic society that Australia claims to uphold. Foremost, section four and twelve of the draft are gross attacks on the freedom's of the public and will create a disconnect between communities and their local governments. Giving councils the power to prohibit, relocate, and schedule public forums on their own terms dangerously limits the public's ability to stay informed with, and contribute to, the local government, which will in turn create a disconnect and entirely cripple the voice of the people. Furthermore, live-streaming council meetings is far from an adequate replacement for two primary reasons - 1), It does not allow for any form of public participation in council meetings. 2), It limits the ability of those inapt with technology (such as elderly people), to view council meetings. In sum, I believe section four of the draft to be attack on the ability of the people to involve themselves in local government and it will wholly degrade the ability of communities to voice their concerns, these issues are a betrayal of democratic

	values Furthermore, section 15 further undermines the values of democracy. I believe that the removal of flags, signs and protest symbols is breach of individual expression and ability to voice concerns, whilst also lacking any substantial logical basis. A sign is not violent, nor is a flag, nor is a symbol, and there is no reason to ban them. These things are simply expressions of ideas, by limiting individual ability to express ideas in such a way and by stripping away the means of protest the ability of local's to voice their concerns is further eroded by this draft. To summarise, i do not support this draft as i believe it to be regressive and an attack on the fundamental, citizen-centered values of a democratic system. The council must be open to the influence, voice, and expression of the community it seeks to represent. The council must not become an echo-chamber.
19	**Comment 1:** Counselors are not obliged to sit and listen to the public forum, so no one is likely to attend to hear. The forum is designed to be separate by a week from the agenda item that the form is to refer to thereby losing its impact with counselors. The Mireille's powers are too great and completely inappropriate to throw out counselors that ask questions or might be seem to be annoying the mayor should be thrown out not the counselors. This is undemocratic and very bad for democracy. Also. **Comment 2:** Keep the Public Forum where it belongs — in the main meeting, with all Councillors present.That's accountability. That's respect.
20	We live in a democracy and these changes are not democratic. Council and other government agencies work for the people and do not decide what is good for us, unless a vote or referendum is held. I do not consent to these changes nor does my family and friends. Councilors represent the residents, so therefore the decision making should be clear and transparent which this is the not the case with these changes.
21	I feel this is a loss of democracy . The proposed changes to public address and public forum are detrimental to the community, The new Model Code which allows councils to determine whether or not to hold a public forum is a serious backward step for democratic free speech. This new Model code could be used to avoid hearing inconvenient views and speeches . Council should not be cocooned in an echo chamber. Additionally the new code that if Council decides to hold a forum, mandatory provisions in the Model Code will require the forum to be held before the Council meeting (not during), this is also regressive as it removes the residents ability to have more direct effect on councillors on the night of the decision making.
22	Council needs to be held to account. Council is serving the constituents of this community and shutting down their capacity to object or shine a light on misuse of ratepayers money is simply undemocratic.
23	Public forums and public representation during council meetings are an essential component of democracy. It is the use of our money that is being discussed and decisions made upon. This is not a private affair. Public attendance at all council meetings must be maintained
24	Public forum must be maintained, we the rate payers should not be silenced. It is only right that the people who you represent are given a voice. If this is taken away it is a very sad day. The council is there to serve the people NOT TO SELF SERVE.
25	This is a loss of democracy and a backward step for democratic free speech. The proposed changes to public address and public forum are detrimental to the community. We do not want council to avoid hearing inconvenient views and speeches and to remove the residents ability to have more direct effect on councillors on the night of the decision making.
26	The public has a legal right to attend council meetings and speak — this is not optional, and it is not subject to arbitrary restriction. Under the Local Government Act 1993 (NSW) and the NSW Model Code of Meeting Practice, residents must be allowed to: ☑ Enter council meetings (except during lawfully declared confidential matters)

	☑ Speak in public forums ☑ Participate in democratic processes without intimidation or exclusion Council exists to serve the community — not to silence or block it. Any attempt to prevent public attendance or shut down community voice without lawful grounds is a breach of governance obligations, transparency requirements, and democratic rights. I formally request: 1. Written confirmation that the public is permitted to attend council meetings 2. The procedure to register to speak 3. The link to the adopted Code of Meeting Practice Residents will not accept closed-door governance. We expect transparency, accountability, and respect for lawful democratic rights.
27	It is paramount that the public can address the council on matters on the agenda at the council meeting to ensure that the voice of the community is heard. Council is elected to represent the community and any decision of council needs to first and foremost reflect the opinions and values of the community it is meant to represent. There is no guarantee that councillors would even attend or listen to a seperate 'community forum'. This suggestion is abhorrent and undemocratic and council needs to reject and condemn the Minn's government attempt to reduce community input. What has been happening under this Labor government has been an absolute disgrace. 37 storeys imposed onto our community without adequate investment in public transport infrastructure to cope with the increase is just one example. Council has overall been to complacent and complicit and we need more actual courage and determination to object to these unacceptable impositions by a government that does not align with the interests and values if our community. It is time to show some courage and reject this nonsense.
28	I feel this is a loss of democracy . The proposed changes to public address and public forum are detrimental to the community, The new Model Code which allows councils to determine whether or not to hold a public forum is a serious backward step for democratic free speech. This new Model code could be used to avoid hearing inconvenient views and speeches . Council should not be cocooned in an echo chamber. Additionally the new code that if Council decides to hold a forum, mandatory provisions in the Model Code will require the forum to be held before the Council meeting (not during), this is also regressive as it removes the residents ability to have more direct effect on councillors on the night of the decision making.
29	I do not support the draft Code. This is a loss to our democratic rights. These proposed changes to public address and public forum are a retreat from free speech. The public should be allowed to have their say at Council meetings on the day of the meeting and not just 7 days before.
30	The public forum from my observation has been well attended , this change I feel will lead to disengagement by citizens which I feel will inevitably lead to negative views about engagement and representation which we as a society can ill afford . Having the public meeting before a Council meeting where Councillors vote on various issues related or unrelated sets the tone that at all times rate payers are not just addresses or postcodes but real visible people in their communities and no second meeting on another night keeps that front and centre on actual voting night in my opinion.
31	I feel this is a loss of democracy . The proposed changes to public address and public forum are detrimental to the community, The new Model Code which allows councils to determine whether or not to hold a public forum is a serious backward step for democratic free speech. This new Model code could be used to avoid hearing inconvenient views and speeches . Council should not be cocooned in an echo chamber. Additionally the new code that if Council decides to hold a forum, mandatory provisions in the Model Code will require the forum to be held before the Council meeting (not during),

	this is also regressive as it removes the residents ability to have more direct effect on councillors on the night of the decision making,
32	Members of the public should be able to attend and hear about all council business and also be allowed to speak without having to comply with a convoluted process to obtain prior approval
33	We should be allowed to attend council meeting and speak on matters that are important to us. These changes take that away
34	Blocking freedom of speech is contrary to National and International human rights. https://www.ag.gov.au/rights-and-protections/human-rights-and-anti-discrimination/human-rights-scrutiny/public-sector-guidance-sheets/right-freedom-opinion-and-expression
35	It's enough that they don't listen but intolerable that we won't even be heard
36	It is essential that the public can attend council meetings. It is a part of our democratic rights, and it is the councils obligation to keep their work open for review - in particular in light of recent declining support and trust and the need for the council to restore it. The solution to inefficient meetings is not to lock out the public - which is the one and only customer and target audience of the councils work. The solution is proper conduct and respectful behaviour from all parties. Listening to recent meetings, it is clear that the public is not the issue here, it is the internal bickering between councillors. The chair of the meeting needs to lead, and lead by example.
37	No more development NB is already overcrowded.. NB is already densely populated. Stop more development.
38	We live in a democracy supposedly, we have rights and the dictatorship you are creating is totally against free speech and our rights to demonstrate. Council has a poor reputation for just about everything and you really need to start listening to the people, and really listen to those of us who actually have some commonsense.
39	"The new Model Code allows councils to determine whether or not to hold a public forum. This is an optional provision". Could you clarify this? Does this mean the council can decide to have a forum on whatever topic NOT in a public forum if it so decides? What are the conditions to decide not to hold a forum publicly and who gets to decide? With regards to our current federal government direction and increasing secrecy on matters that affect the general public, especially as our elected officials, I don't agree with this at all.
40	I am all for council meetings being efficient, balanced by giving people to live in the community an opportunity to be heard on issues that are on the agenda. How does putting on a meeting before the meeting for community members to be heard make it more efficient? Perhaps vet the community people who wish to speak more carefully to ensure their speech is on a specific topic on the agenda and ask them to put their key points in their submission and only allow up to 5 members of the public to speak.
41	I dont think council should be making decisions based on what a few people in the public forum say. Council represents the whole of the northern beaches, not just the tiny percentage who go to the public forum. Having the forum as part of the meeting puts pressure on councillors to make a decision on what they have been told in public forum, which is just one persons version or opinion. There's no chance for the comments to be fact checked. Having it a week before the meeting allows councillors to hear the speakers point, but then additional time to research what they've heard before a decision has to be made. Also, having speakers in the viewing area appears to encourage a lot of grandstanding from a particular councillor.

42	The proposed CONDUCTING THE PUBLIC FORUM is effectively stopping the community from having a fair say on topics by limiting the number of people that are allowed to speak and holding the forum without councilors needing to be at the forum to hear the community views.
43	This is nothing other than a blatant attempt by an incompetent council to preclude ratepayers from having their say on matters that affect them . Councillors should be ashamed to allow these changes to pass. This is not good government as it merely masks incompetence by not permitting the ratepayers to have their say simply on a whim of Council. This is not transparency, this is bad governance.
44	Ratepayers and all communities should be allowed to voice opinions etc to councillors and have a say on matters. We have seen that if you would just leave all decisions to our councillors the local area would deteriorate beyo beyond repair
45	Once again this council is attempting to completely silence residents by removing the Public Forum. What's more what you have stated this means is inaccurate and does not put forward accurately what the state government has stated the changes are; is this matter really just another subject to apply 'spin' to - is that really appropriate - free speech being turned into spin to suit your won agenda? The state government has said it is " Encouraging councils to hold public forums preferably before committee meetings," - this council is stating that they said; "public forums may not be held as part of the council meeting for hearing submissions on items of business on the agenda for the meeting" and yet that does not appear ONCE in any of the documents the state government as made available to everyone. Are you lying on purpose or is that 'permissible spin' under this council? What else has become 'permissible spin'? We've been hearing it since May 2016 by now - and it's getting worse. 'Out of sight, out of mind' seems to be this council's approach Conditions listed in the form a Public Forum would take place under such as 'A public forum should not be used to raise questions or complaints.' will not silence dissent or the hide the many failures of this council, and reads of authoriatarism and trying to bully residents; which seems to be an ever increasing expereince - but then this is the 3rd time this council has tried to silence or remove the public forum. A big NO from us. Another FAIL on accuracy - another fail on working for residents - smacks of Warringah council culture and policy; yuck.
46	The public pay the salaries of public ‘servants’. The Public have a right to present to their ‘servants’. The ‘servants’ are responsible to the Public. The ‘servants’ need to hear and respond to the Publics’ demands
47	It is imperative that Ratepayers and residents of the Northern Beaches are allowed to attend the one and only monthly meeting to present, make suggestions and request reply on any issues that affect the community from the Council that we OWE. We pay the rates and you REPORT TO US, we make the rules - certainly not you or the bureaucrats who think that they are a law unto themselves Council should be transparent, listen to their constituents and represent us in the manner that we see fit ... I do not agree with the proposed 2025 Model Meeting Code and demand that ALL counsellors vote NO on the proposed draft code. If you approve this proposal it will be duly noted at the next election cycle
48	Most of the counselors are already completely out of touch with the public and seen to forget they are public servants working on behalf of the rate payers. Further separating the public from the decision making would he to make this disconnect so much worse. It's a shame there are only a small handful of counselors like De Luca that truly care about the public. Instead we have idiots like hijack spending public money on foolish ventures to Newcastle. There is little oversight and accountability. Do not make it worse but then I suspect that these counselors do wish for less accountability.
49	We attend NB Council meetings every month and feel it is so important for the community to have a voice and for the councillors and CEO and Mayor to listen to us on the same night. By your own admission, it is not mandatory for councillors to attend the public form if it was on another night and I feel they will not be willing to attend two meetings. Already

	there is over 50 percent of pollsters who voted to keep the public form before the regular meeting each Month. As per the way it is. Perhaps if there wasn't so much procedural formality and council etiquette the real issues could be addressed effectively. Last meeting there were so many points of order and interruptions that the speaker lost time. It's a surprise that Mr Hoenig could devise such a plan . A hard stop at 11pm is better than attending a seperate meeting. Have discipline and structure and don't argue all points and you might be more efficient. Also control content constituents submissions to new content. We've heard about, rates, rubbish, roads and dog park submissions many times. Be selective, keep relevant and on point. Structure ! It was like a school yard squabble last meeting. !
50	The intention of the Minister's draft is to separate Councillors/staff members from meetings in which community members are involved/concerned with regard to whatever motion is to be tabled. This is Socialism at play, not Democracy. Local Councils are all about SERVING the community and spending rate payer's money wisely. Currently, rate payers who wish to address Councillors gathered for a meeting, are able to speak on matters so that their three minute address remains fresh in the minds of Councillors before a vote takes place. For rate payers to be forced to speak one week prior to the meeting in which Councillors will vote, loses the importance of being heard, avoids transparency/accountability and makes a mockery of fair governance and due diligence. The draft gives the Mayor far too much power to dismiss from meetings those who might oppose his/her views. It's currently the Mayor's function to ensure Council meetings follow the Code of meeting Practice and from attending many previous Council meetings, the Mayor does not know or strictly follow such Practice. Rate payers and other community members, including small business owners, must be heard in a timely manner, not weeks before certain Motions are to be debated/ruled upon. The whole of this 'draft' needs to be dismissed as being far too autocratic for it's intended purpose.
51	Loss of community interaction with their elected councilors.
52	We are in a democracy.
53	I appreciate the chance to comment on the draft Code. My feedback concerns public participation — specifically the proposed removal of public address within Council meetings and the operation of public forums. 1. Retain Public Address in Meetings I do not support removing the opportunity for residents to speak during the formal Council meeting. Public address is a vital accountability mechanism. It ensures Councillors hear community views directly before voting, those comments become part of the webcast and record, and residents see their concerns acknowledged in real time. The Model Code does not require councils to abolish in-meeting public address — it only provides an optional framework for public forums. Retaining a short, well-managed public address segment (for example, two speakers for and against each listed item, three minutes each) would preserve transparency without unduly extending meeting times. 2. Councillor Attendance at Public Forums I support allowing the public forum to be held on another night or in another format if that encourages more participation. However, if the forum is separated from the ordinary meeting, Councillors should be required to make reasonable efforts to attend in person. Clause 5.1 of the draft code already requires reasonable attendance at Council and committee meetings; extending this expectation to public forums would ensure elected representatives remain directly engaged with community views that inform the decisions they later make in the chamber. 3. Summary of Requested Changes 1. Re-introduce or retain a "Public Address" section within the formal meeting agenda. 2. Add a clause requiring Councillors to make reasonable efforts to attend public forums held on different nights. 3. Continue livestreaming both sessions so that community contributions are recorded and visible.

	Public participation underpins trust in local government. These adjustments would balance efficiency with accountability and demonstrate Northern Beaches Council's commitment to genuine, accessible community engagement.
54	Because Councillors are to represent the community and the community deserve a voice as its rate payer funded.
55	The council is there for for the community. The closed nature of this feels like a dictatorship not a democracy.
56	'Conflict of interest' should be defined (for the info of both Councillors and the public). What a shame a 'Code' is thought to be necessary.
57	Because your spending rate payers money, and rate payers should be entitled to voice their opinions Wether council.like it or not. It's called democracy
58	Silence the public is outrageous
59	I like having the public forum on a different night. I like not having political banners or symbols. I don't like that briefings are being stopped, how do councillors have the information they need to make considered decisions? I don't like that public address is being removed
60	I do not support moving the public forum to seven days before the Council meeting. The NSW Government's Model Code does not require this change - it simply says councils may hold a forum "prior to meetings". That includes the same day. The current same-day forum works because councillors hear the community directly before they vote, in full public view. Shifting it earlier risks councillors not attending, leaving residents to speak to an empty room. The benefit of "more reflection time" is meaningless if they're not there to listen. I've also witnessed poor standards during public addresses – councillors talking among themselves, backs to speakers, or scrolling on phones. This behaviour disrespects residents and breaches the Code's principles of order and respect. The Code should clearly require all councillors to face the speaker, no side conversations, and stay off devices unless needed for the meeting. Respect goes both ways. The public are told to behave - councillors are not likewise admonished. Finally, I strongly oppose limiting speakers to agenda items only. Community members must be able to speak on any topic of local relevance – including ongoing projects, new issues or emerging concerns. Not every matter fits neatly into a business paper, and removing this right undermines transparency and early community input. If you want to limit time spent in the meeting, make sure what's on the agenda is relevant, instead of cutting the public's voice. Please: 1. Keep the public forum on the same day; 2. Require councillor attendance and respectful conduct; 3. Allow residents to speak on any community topic. That's how genuine accountability and trust are built.
61	It's a joke, why split them apart? Enable more costs and allow issues fo be seperate. Can we start thinking about the people the council is meant to serve rather than some councillors and beaurocrats and their own agenda.
62	It's important that council meetings are able to operate efficiently and effectively. While community input is crucial, this shouldn't be able to be used to hijack council meetings and stop the council from doing its work. We all want council's to operate efficiently and for the benefit of everyone in the community - not just a vocal minority.
63	This draft is just another blatant attempt to dismiss community concerns by totally expelling them, or brutally restricted them from addressing Councillors at meetings regarding issues that are part of that meeting's agenda. The Code of Meeting Practice is not compulsory reading/learning matter for the rate payers, it is structured for all Councillors, including the Mayor and CEO, with most of those individuals not

	understanding it or not adherring to it anyway. The proposed changes will do nothing to enhance the relationship between Council and those who foot the bill for Council's money wasting practices/projects, the rate payers. This amounts to autocracy, not democracy.
64	Need to keep an open and transparent meeting process
65	The rules are too complicated and should be simplified. Too much time and ratepayer money is being wasted on uneneccessary complexity
66	I think it is sensible to have all councils across NSW following agreed guidelines when holding meetings.
67	Another great use of our tax money...
68	the points brought up are very relevant
69	The changes to public forums don't seem sensible.
70	Having public forum 1 week before the meeting gives Councillors the ability to properly consider resident responses.
71	Seems sensible.
72	**(1)** The cowardly behaviour of this council has now been further reinforced by the decision to stop members of the public from directly addressing councillors. Seems this council REALLY dos not like being held accountable. I am also still waiting to hear from Ethan about his use of ratepayers' money to fund his education. You will have no place to hide at the next election. Thank you once again to Vincent, who continues to show his integrity in opposing this. **(2)** Thank you Jody for your response and for your commitment to be present at the public fora. I guess that is the point though- unlike the council meetings, there is no obligation for councillors to be present at the public fora and I would therefore ask all the councillors and the CEO to provide a similar commitment to attend these. Very hard to continue being a representative voice of the people when you distance yourselves from that voice.
73	Dear Mr Phillips and Mr Farrington, Being able to speak at a public forum on issues/decisions about to be addressed at council meetings is key for transparency and adequate public consultation. To abandon or curtail such public meetings is a travesty perpetrated against the community. It violates basic principles of fairness and justice. Speaking at Public Forums prior to council meetings is essential for our democracy and for good governance. Before decisions are taken at council meetings they need broad airing and public inputs since they impact directly on the community. The public needs to have its voices heard on all matters affecting them, whether directly or indirectly. Along with many others in our community, I urge you to nether interfere with nor curtail the longstanding, reasonable and prudent practice of allowing the public to speak at Public Forums prior to council meetings.

Personal identifying information, and content which is discriminatory, hateful or which may defame, offend, insult, humiliate or intimidate has been redacted. Spelling and grammatical errors have been amended only where misinterpretation or offence may be caused.

Document administration	
Version	1.0
Date	5 December 2025
Approval	Responsible manager: Executive Manager Governance & Risk
Status	Final

Related Projects	Code of Meeting Practice 2025 review
Notes	Community and stakeholder views contained in this report do not necessarily reflect the views of the Northern Beaches Council or indicate a commitment to a particular course of action.

Contact: Governance Team
Phone: 02 4428 4100
Mr Scott Phillips
General Manager
Northern Beaches Council
[redacted]

Dear Mr Phillips

I write regarding an update on the introduction of the Model Meeting Code for councils.

Earlier this week the Legislative Council debated a motion to disallow the Local Government (General) Amendment (Model Code of Meeting Practice) Regulation 2025 (the Amendment Regulation). This is the amending regulation that prescribed the updated 2025 Model Code of Meeting Practice for Local Councils in NSW (2025 Model Meeting Code).

While the motion was debated in the Legislative Council (25 November 2025), there wasn't a vote on whether the regulation should be disallowed. With the adjournment of Parliament for the year, we need to wait until Parliament resumes in February 2026 to see if there will be a vote.

Because Parliament didn't vote on the disallowance motion, the Amendment Regulation and the 2025 Model Meeting Code still have legal force and the new provisions will come into effect on 1 January 2026.

If the disallowance motion passes in February 2026, it will have the effect of repealing the Amendment Regulation and restoring the previous 2021 Model Meeting Code, as of the day the Amendment Regulation is disallowed.

In response to misunderstandings in the sector, including some raised during the debate, we are working through an updated FAQs on the 2025 Model Meeting Code, which will include supplementary guidance.

In the meantime, councils should continue working towards the adoption of a code of meeting practice based on the current 2025 Model Meeting Code. Councils must adopt a code of meeting practice that incorporates the mandatory provisions of the 2025 Model Meeting Code no later than 31 December 2025.

The 2025 Model Meeting Code and FAQs are available on the Model Code of Meeting Practice for Local Councils in NSW – Office of Local Government NSW webpage of OLG's website.

If you have further questions, please contact the Office of Local Government's Council Governance Team on 02 4428 4100 or by email at olg@olg.nsw.gov.au."

Regards
Brett Whitworth PSM
Deputy Secretary, Local Government
Department of Planning, Housing and Infrastructure
Office of Local Government | Department of Planning, Housing and Infrastructure
[redacted]
5 O'Keeffe Ave, NOWRA NSW 2541
www.olg.nsw.gov.au

MINUTES

COMMUNITY SAFETY ADVISORY COMMITTEE

held in Manly Town Hall on

THURSDAY 14 AUGUST 2025

Minutes of the Community Safety Advisory Committee
held on Thursday 14 August 2025
in Manly Town Hall
Commencing at 9:00 AM

ATTENDANCE:

Committee Members

Cr Sue Heins	Frenchs Forest Ward – Mayor - Chair
Cr Candy Bingham	Manly Ward
Cr Vincent De Luca OAM	Narrabeen Ward (alternate)
Cr Rowie Dillon	Pittwater Ward
Supt John Duncan	Northern Beaches Police Area Command
Det Act Insp Nicole Turner	Northern Beaches Police Area Command
Aileen Ogilvie	Northern Beaches Community Drug Action Team
Sarah Sweeney	Northern Beaches Mental Health Interagency
Sam King	Northern Beaches Youth Interagency
Sarah Kingsbeer	Northern Sydney Housing and Homelessness Interagency
Melissa Palermo	Northern Sydney Local Health District
Sherryn Moltzen	Sydney North Health Network | Northern Sydney PHN
Libby Paulsen	Community Representative – Frenchs Forest Ward
Lucy Band	Community Representative – Manly Ward
Mary Brearton	Community Representative – Narrabeen Ward
Kylie Ferguson	Community Representative – Pittwater Ward
Nicola Penn	Representing Zali Steggall OAM MP Federal Member for Warringah
Kim Preston-Hiney	Representing James Griffin MP State Member for Manly
Matt Haran	Representing Jacqui Scruby MP State Member for Pittwater
Gypsy Bryant	Representing Michael Regan MP State Member for Wakehurst

Council Officer Contacts

Scott Phillips	Chief Executive Officer
David Kerr	Director Community and Recreation
Kylie Walshe	Executive Manager Community, Arts and Culture
Jeremy Smith	Executive Manager Parks & Open Space
Kate Bock	Acting Manager, Rangers
Will Wrathall	Manager Community Development
Helen Askew	Program Support Officer Community Development

Visitors

Briana Wherry	Team Leader Social Planning and Strategy

1.0 ACKNOWLEDGEMENT OF COUNTRY

The Mayor acknowledged the traditional custodians of the land on which the meeting gathered, and paid respect to Elders past and present.

2.0 APOLOGIES

Apologies were received from:

Dr Sophie Scamps, Federal Member for Mackellar
Cr Nick Beaugeard, Curl Curl Ward
Eugene McGarrell, Sydney North Health Network | Northern Sydney PHN
Azmeena Kelly, Executive Manager Environmental Compliance
Doug Brooker, Northern Beaches Liquor Accord
Michele Bell, Northern Sydney Community Network (Seniors sector)
Kath Young, Community Safety Coordinator

The following members were not in attendance:

Matt Cross MP, State Member for Davidson
Northern Beaches Domestic Violence Network (vacant)
Community Representative Curl Curl Ward (vacant).

3.0 DISCLOSURES OF INTEREST

There were no disclosures of pecuniary or non-pecuniary conflicts of interest.

4.0 CONFIRMATION OF MINUTES OF PREVIOUS MEETINGS

4.1 MINUTES OF THE COMMUNITY SAFETY ADVISORY COMMITTEE MEETING HELD ON 8 MAY 2025

The minutes of the Community Safety Advisory Committee Meeting held on 8 May 2025, copies of which were previously circulated to all members, were confirmed as a true and correct record of the proceedings of that meeting.

Moved Mary Breaton, seconded: Kylie Ferguson

5.0 ACTIONS UPDATE

5.1 ACTIONS UPDATE

Progress against the actions as included in the Agenda were noted by the Committee.

ITEM NO.	ACTION	RESPONSIBLE OFFICER	PROGRESS
5	Report on outcomes of the survey of young people on legal graffiti walls.	Sam King Will Wrathall	Update at Item 6.3

6.3	Provide an update on the development of a Good Neighbour Guideline.	Azmeena Kelly	Report will be provided at May 2026 meeting.

6.0 AGENDA ITEMS

6.1 POLICE REPORT - SUPERINTENDENT JOHN DUNCAN

Superintendent John Duncan and Detective Acting Inspector Nicole Turner provided an update on Northern Beaches Police Area Command matters. It was requested the Committee hold in confidence discussion of policing matters which do not appear in these Minutes.

The Northern Beaches LGA Recorded Crime Statistics to March 2025 from the NSW Bureau of Crime Statistics and Research (BOCSAR) included in the Agenda were noted and further current information highlighted.

Local current higher incident issues include stolen motor vehicles, break ins to non-dwellings, fraud and sexual offences. Motor vehicle number plates stolen from cars continues.

A recent reduction in steal from retail has occurred following adoption of new strategies including Police engagement with retail operators and Liquor Accord.

Domestic violence assault incidents remain stable with Police investigations resulting in 80% of charges being laid. Council's webpage Domestic and family violence support services includes a number of resources, as well as the Northern Beaches Domestic & Family Violence Services Referral Guide.

Engagement with youth continues across the Northern Beaches Area Command. Where appropriate, Police Youth Liaison Officers refer individuals to diversion programs and conferences with parents.

Recent Northern Beaches Police Area Command community engagement initiatives include:

- Push Up Challenge in partnership with local youth mental health service
- Constable Charlie Penguin visiting Bear Cottage Manly
- Polar plunge at Dee Why raising funds for Special Olympics and torch relay
- Artworks and youth event scheduled for September at Dee Why.

DISCUSSION

Police referred to GoodSAM which provides GPS triangulation solutions across emergency, volunteering and support services, recently enabling successful rescue of a person from Belrose dense bushland.

Discussion explored how this is used, with Police detailing how this tool can send messages to phones once contacting Police in an emergency, enables GPS location and also the capacity for people to capture video footage and share with Police.

The search and rescue app what3words was also raised, another digital tool to assist with triangulation in emergencies.

ITEM NO.	ACTION	RESPONSIBLE OFFICER	DUE DATE
6.1	Northern Beaches Police Area Command to provide a redacted version of the information shared, showing trends.	Northern Beaches Police Area Command	ASAP

6.2 ENVIRONMENTAL COMPLIANCE REPORT

On behalf of the Executive Manager Environment Compliance, the Acting Manager, Rangers provided an overview and presentation on compliance and regulatory statistics for the period May-July 2025.

Companion Animal Management
- 72 compliance actions were investigated in this period with 5 infringements issued.
- 70 dog attacks were reported to Council, 13 of which occurred on private property.
- 374 proactive patrols were completed across beaches and parks with 13 penalties issued.
- A community education night was held at Glen St Theatre on 7 May 2025 in partnership with Pets Professional Guild of Australia to promote responsible pet ownership and dog park etiquette.

School Zones
- 201 school patrols were conducted with 322 infringement notices issued.

Manly night patrols
- A reduction in statistics was noted during the autumn/winter season.

Proactive Compliance
- As a result of a joint Council and NSW Health team investigation, skin penetration businesses were contacted to highlight professional requirements around use of cosmetic injectables.
- A Tools of the Trade event was held on 31 July 2025 to raise awareness about asbestos concerns in conjunction with Council's Place and Economic Team.
- There was discussion regarding actions that can be taken against tobacconist venues regarding perceived illicit activity, noting non-compliance of premises regarding vaping can be reported online.

6.3 LEGAL GRAFFITI WALLS

The Chair of the Northern Beaches Youth Interagency briefed the Committee on the outcomes of a legal graffiti walls survey conducted amongst young people. Background information was included in the Agenda and presentation.

Northern Beaches Council has five legal graffiti walls:
1. Belrose, Wyatt Reserve soccer wall
2. Collaroy Plateau, soccer Oval Blandford St
3. Allambie, soccer oval, Allambie Rd soccer ova
4. Allambie, Millers Reserve
5. Manly Vale, Campbell Pde and Passmore Reserve.

Legal walls are public spaces where graffiti and street art are allowed by any member of the public and the open access approach creates an avenue for creative expression. These works are temporary and ephemeral in nature. Street Art provides more information about the laws and etiquette of the legal walls in the Northern Beaches.

The walls have been utilised for youth workshops in conjunction with youth interagencies such as Headspace and Street Work, providing engaging and accessible activities for their clients and promoting programs and awareness campaigns, eg. Mental Health Month and Youth Week.

A survey was conducted resulting in 47 young people and 12 youth service staff responses.

Key survey findings:
- Most consistent responses concerned a lack of awareness and understanding of etiquette, rules, process for approvals and legal status of the walls, (e.g. respecting other artists' work,

avoiding offensive content)
- Responses expressed concerns about Police, public judgment and harassment
- Challenges or obstacles for use include the perception of personal skills and artistic ability, accessing location, carrying paint on public transport, availability of quality spray materials on the Northern Beaches.
- Responses indicate positive sentiment towards legal walls and street art on the Northern Beaches, with some support for more dedicated spaces, particularly in northern parts of the Northern Beaches.

It is noted that as a small survey, it is only reflective of a narrow section of young people and youth services, and not representative of all young people or broader community sentiment.

However, the following analysis was provided:
- Use of legal walls focused on nurturing local artistic talent, providing an outlet for expression for locals and visitors, and supporting positive mental wellbeing for young people.
- Whilst many young people are not interested in using legal graffiti walls, many young people expressed their desired interest to use them
- Whilst there was some support for more dedicated spaces, responses indicated more support towards increased education and promotion of existing walls to increase their positive prosocial use.

DISCUSSION

Thanks were given to the Northern Beach Youth Interagency for the information provided. Exploration of additional legal walls, particularly in the northern part of the LGA was discussed. It was suggested that consideration for additional legal graffiti walls warrants further exploration through community consultation.

There was further discussion on potential partnerships between schools, businesses and Council to develop a program or process that helps celebrate artistic expression and provides education particularly to young people (e.g. Years 5-7) to understand how to use legal graffiti walls and understand the difference between tagging and art.

ITEM NO.	ACTION	RESPONSIBLE OFFICER	DUE DATE
6.3	Council, in collaboration with the Northern Beaches Youth Interagency, conduct further community consultation and research regarding additional legal graffiti walls, to inform educational initiatives and consider any specific needs in the north of the Northern Beaches LGA.	Will Wrathall Sam King	May 2026

6.4 REVIEW OF COMMUNITY SAFETY PLAN

The Committee noted the presentation on the review of the Northern Beaches Community Safety Plan 2021-2026 and the background as provided in the Agenda.

An initial survey for Committee members identified the following priority areas:

- Safe transport
- Community supports / services
- Fraud
- Ebikes – safety of riders and pedestrians.

The survey will remain open for committee members to contribute and further input is encouraged.

In conjunction with the Community Safety Plan review, evaluation of the following strategies and plans will also be considered:

- 20 year Better Together Social Sustainability Strategy 2040
- 4 year Disability Inclusion Action Plan

The next steps for the broader engagement plan are to:

- Advertise the engagement via the Your Say page in September
- Provide further updates at Committee meetings including the opportunity for input and to share information to their relevant networks.

DISCUSSION

The ageing population of the Northern Beaches was discussed, along with the increase of dementia in the community. During the review, their perspective and those of family and friends should be sought.

It was noted that the Dementia Alliance will be consulted and feedback considered in the development of these strategies and plans.

6.5 COMMUNITY SAFETY UPDATE

A community safety update was included in the Agenda, for noting by the Committee.

7.0 GENERAL BUSINESS

7.1 COMMUNITY DRUG ACTION TEAM UPDATE

Community Drug Action Teams (CDAT) are a group of local services and community members who work together to reduce the harms associated with the use of alcohol and other drugs in local communities.

In 2024, the Northern Beaches CDAT conducted a survey across the LGA to identify the drugs most commonly used by our community and we asked them the ways they would like us to address issues.

Alcohol and energy drinks were both in the top five areas of concern. Given the known health impacts of these, for example how mixing caffeine with alcohol reduces how drunk people feel and increases risk taking behaviours, a campaign has been developed to raise awareness of the mixing of alcohol and energy drinks, focusing on adults 18-35.

Reporting non-compliance of premises regarding vaping was raised, which can be reported online.

7.2 eBIKE COMMUNITY FORUM

An eBike Community Forum is being held on 21 August 2025 at Mona Vale Surf Life Saving Club. As the meeting is fully booked, it will be recorded for community information. Additionally, an update will be provided by Members of Parliament representatives at a future Community Safety Advisory Committee meeting.

SUMMARY OF ACTIONS

ITEM NO.	ACTION	RESPONSIBLE OFFICER	DUE DATE
6.1	Northern Beaches Police Area Command to provide a redacted version of the information shared, showing trends.	Northern Beaches Police Area Command	ASAP
6.3	Council, in collaboration with the Northern Beaches Youth Interagency, conduct further community consultation and research regarding additional legal graffiti walls, to inform educational initiatives and consider any specific needs in the north of the Northern Beaches LGA.	Will Wrathall Sam King	May 2026

The meeting concluded at 10.55am

This is the final page of the minutes comprising 8 pages
numbered 1 to 8 of the Community Safety Advisory Committee
held on Thursday 14 August 2025 and confirmed on Thursday 13 November 2025

NORTHERN BEACHES COUNCIL

MIDDLE HARBOUR FLOOD STUDY

DRAFT REPORT

OCTOBER 2025

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MIDDLE HARBOUR FLOOD STUDY

DRAFT REPORT

OCTOBER 2025

Project Middle Harbour Flood Study	**Project Number** 121073
Client Northern Beaches Council	**Client's Representative** Valerie Tulk
Project Manager Michael Reeves	

Revision History

Revision	Description	Distribution	Authors	Reviewer	Date
0	Draft Stage 1 Report	Northern Beaches Council	Fabien Joly, Michael Reeves	Michael Reeves	JUN 22
1	Draft Stage 2 Report	Northern Beaches Council	Fabien Joly, Michael Reeves	Michael Reeves	NOV 22
2	Draft Stage 3 Report	Northern Beaches Council	Fabien Joly, Michael Reeves	Michael Reeves	JUL 23
3	Draft Stage 4 Report	Northern Beaches Council	Fabien Joly, Michael Reeves	Richard Dewar	MAR 24
4	Draft Report for Public Exhibition	Northern Beaches Council	Michael Reeves	Michael Reeves	OCT 25

Cover Image: Channel between Elm Avenue and Calool Crescent, Belrose. WMAwater.

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MIDDLE HARBOUR FLOOD STUDY

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LIST OF ACRONYMS

1D	One-dimensional
2D	Two-dimensional
AEP	Annual Exceedance Probability
ARI	Average Recurrence Interval
ARF	Areal Reduction Factor
ARR	Australian Rainfall and Runoff
AWS	Automatic Weather Station
BoM	Bureau of Meteorology
CPU	Central Processing Unit
DCP	Development Control Plan
DEM	Digital Elevation Model
DPE	Department of Planning and Environment
ELVIS	Elevation Information System
FRMS&P	Floodplain Risk Management Study and Plan
FPA	Flood Planning Area
FPCC	Flood Planning Constraint Category
FPL	Flood Planning Level
GIS	Geographic Information System
GPT	Gross Pollutant Trap
GPU	Graphics Processing Unit
GSDM	Generalised Short Duration Method
HEC-RAS	One-dimensional hydraulic model
HPC	Heavily Parallelised Compute
IFD	Intensity, Frequency and Duration (Rainfall)
LEP	Local Environmental Plan
LGA	Local Government Area
mAHD	meters above Australian Height Datum
MIKE	Suite of hydraulic modelling packages from DHI
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
SIX	Spatial Information Exchange
SW	Sydney Water
TUFLOW	One-dimensional (1D) and two-dimensional (2D) flood and tide simulation software (hydraulic model)
WBNM	Watershed Bounded Network Model (hydrologic model)

ADOPTED TERMINOLOGY

Australian Rainfall and Runoff (ARR, ed Ball et al, 2019) recommends terminology that is not misleading to the public and stakeholders. Therefore the use of terms such as “recurrence interval” and “return period” are no longer recommended as they imply that a given event magnitude is only exceeded at regular intervals such as every 100 years. However, rare events may occur in clusters. For example there are several instances of an event with a 1% chance of occurring within a short period, for example the 1949 and 1950 events at Kempsey. Historically the term Average Recurrence Interval (ARI) has been used.

ARR 2019 recommends the use of Annual Exceedance Probability (AEP). AEP is the probability of an event being equalled or exceeded within a year. AEP may be expressed as either a percentage (%) or 1 in X. Floodplain management typically uses the percentage form of terminology. Therefore a 1% AEP event or 1 in 100 AEP has a 1% chance of being equalled or exceeded in any year.

ARI and AEP are often mistaken as being interchangeable for events equal to or more frequent than 10% AEP. The table below describes how they are subtly different.

For events more frequent than 50% AEP, expressing frequency in terms of Annual Exceedance Probability is not meaningful and misleading particularly in areas with strong seasonality. Therefore the term Exceedances per Year (EY) is recommended. Statistically a 0.5 EY event is not the same as a 50% AEP event, and likewise an event with a 20% AEP is not the same as a 0.2 EY event. For example an event of 0.5 EY is an event which would, on average, occur every two years. A 2 EY event is equivalent to a design event with a 6 month ARI where there is no seasonality, or an event that is likely to occur twice in one year.

The Probable Maximum Flood (PMF) is the largest flood that could possibly occur on a catchment. It is related to the Probable Maximum Precipitation (PMP). The PMP has an approximate probability. Due to the conservativeness applied to other factors influencing flooding a PMP does not translate to a PMF of the same AEP. Therefore an AEP is not assigned to the PMF.

This report has adopted the approach recommended by ARR and uses % AEP for all events rarer than the 50 % AEP and EY for all events more frequent than this as shown in the table below.

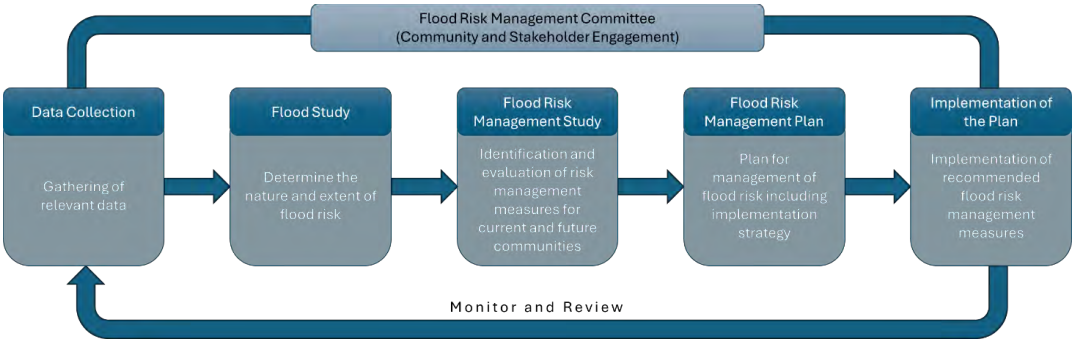
Frequency Descriptor	EY	AEP (%)	AEP (1 in x)	ARI
Very Frequent	12			
	6	99.75	1.002	0.17
	4	98.17	1.02	0.25
	3	95.02	1.05	0.33
	2	86.47	1.16	0.5
	1	63.21	1.58	1
Frequent	0.69	50	2	1.44
	0.5	39.35	2.54	2
	0.22	20	5	4.48
	0.2	18.13	5.52	5
	0.11	10	10	9.49
Rare	0.05	5	20	19.5
	0.02	2	50	49.5
	0.01	1	100	99.5
Very Rare	0.005	0.5	200	199.5
	0.002	0.2	500	499.5
	0.001	0.1	1000	999.5
	0.0005	0.05	2000	1999.5
Extreme	0.0002	0.02	5000	4999.5
			↓	
			PMP/ PMP Flood	

FOREWORD

The NSW State Government's Flood Prone Land Policy, contained in the Flood Risk Management Manual (Reference 1), provides a framework to ensure the sustainable use of floodplain environments. The Policy is specifically structured to provide solutions to existing flooding problems in rural and urban areas. In addition, the Policy provides a means of ensuring that any new development is compatible with the flood hazard and does not create additional flooding problems in other areas.

Under the Policy, the management of flood liable land remains the responsibility of local government. The State Government subsidises flood mitigation works to alleviate existing problems and provides specialist technical advice to assist Councils in the discharge of their floodplain management responsibilities.

The Policy provides for technical and financial support by the Government through five sequential stages:



This document constitutes the first and second stages of the management process for the Middle Harbour catchment. It presents a compilation of the data collected and has defined flood behaviour and flood risk for the catchment area.

This study was commissioned under the 2005 NSW Floodplain Development Manual (Reference 2), however, it is recognised that the 2023 Flood Risk Management Manual (Reference 1) was gazetted shortly after the project commenced. While the study was undertaken in accordance with the 2005 manual, there are elements that are consistent to both the 2005 and 2023 manuals. Where appropriate, the 2023 manual is referenced where project methodology or outputs are consistent with the 2023 manual.

ACKNOWLEDGEMENTS

This study was undertaken by WMAwater Pty Ltd, on behalf of Northern Beaches Council (Council). Council has prepared this document with financial assistance from the NSW Government through its Floodplain Management Program. The document does not necessarily represent the opinions of the NSW Government or the Department of Climate Change, Energy, the Environment and Water (DCCEWW).

A number of organisations and individuals have contributed both time and valuable information to this study. The assistance of the following in providing data and/or guidance to the study is gratefully acknowledged:

- Middle Harbour Flood Study Technical Working Group
- Residents of the study area
- Northern Beaches Council
- Department of Climate Change, Energy, the Environment and Water
- State Emergency Service

EXECUTIVE SUMMARY

This flood study provides information about the existing flood risk across a number of catchments which drain to Middle Harbour within the Northern Beaches Council (Council) Local Government Area (LGA). The study involved development of computer models of the study area. The models were used to estimate flood behaviour for a range of flood sizes, from smaller relatively frequent events to extreme but very rare events. The flood modelling tools and spatial mapping from this study can be used by Council to understand flood risk within the study area for the purpose of decision-making about land-use planning, determining flood impacts of proposed developments, assessing risk for future development due to flooding and to assess the effectiveness of potential measures to reduce flood risk in the future.

Background

Council engaged WMAwater to undertake the Middle Harbour Flood Study. The study area comprises parts of Belrose, Davidson, parts of Frenchs Forest, Forestville and Killarney Heights. It covers the region of Northern Beaches LGA that drains to Middle Harbour Creek, an area of approximately 2,600 hectares (26 km^2).

This study is the first flood study undertaken for the majority of the suburbs, with the exception of those within the Frenchs Creek catchment, which was subject to the Frenchs Forest Flood Study in 2010 (Reference 3). That study is outdated and the current study includes the Frenchs Creek catchment.

Community Consultation

Community consultation is an important component of the flood study, and as such the community was informed of the study and provided the opportunity to contribute information at the commencement of the study. Council set up a website to allow residents to submit information on their experience of flooding and upload relevant photos and videos. A total of 645 responses were received. The consultation is an essential component of the setup and calibration of flood models.

Model Development

Estimation of flood behaviour in the study area was undertaken as a two-stage process consisting of:

1. Hydrologic modelling using WBNM to convert rainfall to runoff
2. Hydraulic modelling using TUFLOW to estimate overland flow distributions, flood depths, levels and velocities.

The WBNM hydrologic model consists of 859 sub-catchments covering the entire study area. The sub-catchments were delineated using the available terrain data with consideration of hydraulic controls. Typical model parameters were adopted as there is not sufficient information to define these specifically for this study area.

The TUFLOW hydraulic model covers the majority of the study area and is represented with a 1 m by 1 m grid. The best available terrain and structure data was incorporated into the model, along with model adjustments to ensure that hydraulic features (including gutters, channels and trash

racks) were adequately represented. The simulated runoff hydrographs from the WBNM model are applied to the TUFLOW model as inflows.

Model Calibration

There is only limited data for model calibration. Records of overland flow and flooding throughout the study area generally consist of qualitative descriptions, rather than recorded flood levels for specific events. As such, a rigorous model calibration was not possible.

The historic events of 1998, 2020 and 2022 have been simulated and compared with the observed flood behaviour, primarily captured by the questionnaire provided to residents as part of this study. The results indicate an overall good match to the observed flood behaviour with key flow paths being represented and modelled flood depths typically being within ±0.2 m of that observed. A sensitivity analysis was also undertaken for the 2022 calibration event.

Design Flood Modelling

Design flood modelling was undertaken in accordance with Australian Rainfall and Runoff (ARR) 2019 guidelines, including adoption of design rainfalls from the Bureau of Meteorology (BoM), design rainfall losses, consideration of areal reduction factors (ARF) and blockage of hydraulic structures. ARR 2019 requires an ensemble of temporal patterns to be run for each duration and these were simulated in the hydrologic and hydraulic models. The critical storm duration (duration that produces the highest flood level) was determined based on the mean of the 10 temporal patterns for each duration and varied across the catchment from 10 minutes to 45 minutes. A 20 minute storm was found to adequately represent the typical behaviour across the study area. The design flood events simulated were the 50%, 20%, 10%, 5%, 2%, 1%, 0.5%, 0.2%, 0.1% and 0.05% annual exceedance probability (AEP) events. The Probable Maximum Flood (PMF) was also simulated in accordance with the Generalised Short Duration Method (GSDM). The critical duration for the PMF was 15 minutes. Design flood depths, levels, velocities, hydraulic hazard and hydraulic categories were mapped and are provided in Appendix C, with tabulated results provided in Appendix D.

Sensitivity Analysis

A sensitivity analysis was undertaken for key modelling parameters by varying the adopted values and assessing the change in peak flood levels. Peak flood levels are relatively insensitive to changes throughout the urban areas, with increasing sensitivity in the downstream forested areas. Future scenarios were also investigated, including climate change and cumulative development to assess potential impacts to flood levels.

1. INTRODUCTION

1.1. Study Objectives

Northern Beaches Council (Council) have engaged WMAwater to undertake the Middle Harbour Flood Study. This study is jointly funded by Department of Climate Change, Energy, the Environment and Water (DCCEEW) and Council. The flood study is the first step in the NSW flood program and will provide the basis for subsequent steps such as the Flood Risk Management Study and Plan (FRMS&P).

The main driver for this study is the need for quality design flood data for existing flood behaviour defined using computer models. Those models use the data available to create an accurate representation of the existing catchment flood behaviour. Once the models are established, calibrated (if possible) and validated, they can be used to subsequently undertake a FRMS&P to identify existing flood risk and develop mitigation options to reduce this risk. The outputs of the study will also be used in planning for future development of the catchment and providing advice to the community and emergency response agencies.

The objective of this study is to improve understanding of flood behaviour and impacts, and better inform management of flood risk in the study area. It aims to provide an understanding of the full range of flood behaviour and consequences in the study area.

1.2. Study Area

The study area is located in the Northern Beaches of Sydney, comprising parts of Belrose, Davidson, parts of Frenchs Forest, Forestville and Killarney Heights (Figure 1 and Figure 2). The study area comprises that part of the Northern Beaches LGA that drains to Middle Harbour Creek, which forms the boundary with Ku-ring-gai Council. This area is bounded by Mona Vale Road to the north, Forest Way and Wakehurst Parkway to the east, Middle Harbour and Middle Harbour Creek to the south and west. It covers an area of approximately 2,600 hectares (26 km^2). The entire study area drains to Middle Harbour Creek and Middle Harbour, which is the northern arm of Port Jackson (Sydney Harbour). Middle Harbour Creek is tidal up to approximately the “Stepping Stone Crossing”, at the intersection of the Bungaroo Track, Middle Harbour Creek Track and Governor Phillip Track. There are several tributaries on Middle Harbour Creek covered by the study area, including Bare Creek, Fireclay Gully, Frenchs Creek, Carroll Creek, Bate Creek and Main Creek, as well as several smaller unnamed tributaries (Figure 3). This study is the first flood study undertaken for the majority of the study area, with the exception of those within the Frenchs Creek catchment, which was subject to the Frenchs Forest Flood Study in 2010 (Reference 3). That study is outdated and the current study includes the Frenchs Creek catchment.

The land use in the upper part of the study area catchment is mostly low-density residential properties, with small areas of commercial and industrial development and open space (such as parks and sporting fields). The lower part of the catchment is largely forested with a large portion

of this being within Garigal National Park, which covers Middle Harbour Creek and adjacent natural areas. The topography in the study area is composed of steep hills, cliffs, and steep roads (slopes of up to 14% in some areas), with well-defined gullies for watercourses in the lower reaches. The highest elevation is almost 200 mAHD in the north-eastern corner of the catchment (Belrose) with the lowest urbanised area at approximately 70 mAHD in the southern portion of the catchment (Killarney Heights). The elevation of the study area is shown in Figure 4 and Figure 5.

The upstream urbanised parts of the catchment drain into well-defined concrete channels or informal overland flow paths that discharge into the forested areas downstream. The urban development in the area has occurred with little consideration of flooding, and as such, properties have been constructed on overland flow paths with stormwater infrastructure having minimal capacity. In large rainfall events where the capacity of the pit and pipe system is exceeded, these overland flow paths are activated and can cause inundation and damage to property. Some roads are also prone to flooding and present a risk to motorists.

There have been numerous reports of flooding within the catchment, the most recent being February and March 2022. The 1998 event is regarded as the largest event within the catchment in recent history. Frenchs Creek was observed to overtop its banks, with residents describing floodwater reaching the front of their properties.

2. AVAILABLE DATA

2.1. Previous Studies

2.1.1. Frenchs Creek, Belrose – Compendium of Flood and Drainage Information, Webb McKeown & Associates, 2001

This study was completed in June 2001 by Webb, McKeown and Associates (now WMAwater) for Frenchs Creek at Belrose (Reference 4). The study reviewed all data available within the Frenchs Creek catchment at Belrose, including rainfall records, Council reports and database records. A questionnaire was also sent out to over 150 residents. It provided a summary of the flooding and drainage issues experienced in the catchment and a basis for further investigations including the proposed re-development of the former St Ives/Dee Why Road corridor and upgrade of culverts at Elm Avenue.

2.1.2. Frenchs Creek, Belrose – Investigation of Flood Problem – Elm Avenue to Calool Crescent, Webb McKeown & Associates, 2001

This study (Reference 5) followed the previous compendium of flood and drainage information (Reference 4). It provided a series of flood mitigation measures aimed at reducing the flood risk to properties on Elm Avenue and Calool Crescent in particular. A WBNM hydrologic model and HEC-RAS hydraulic model was established to determine catchment flows and the flood height profile along the channel from Elm Avenue to Calool Crescent. The hydraulic model was based on survey information that was obtained for the study, and included in the report. This is referred to as the 2001 Elm Avenue Survey. The series of measures were evaluated based on their flood benefits as well as their economic and environmental impacts.

2.1.3. Frenchs Creek Flood Study, DHI Water & Environment, 2010

The Frenchs Creek Flood Study (Reference 3) was completed in 2010 by DHI. The study defined the existing flood behaviour in the Frenchs Creek catchment. A coupled 1D/2D model using the MIKE Storm modelling software was developed. The hydrologic modelling consisted of utilising a direct rainfall approach, with a 2D surface representing the topography and linked 1D elements for the subsurface pipe network. The model was calibrated using two historical events - April 1998 and March 2003. A range of design flood events from the 20% Annual Exceedance Probability (AEP) to the Probable Maximum Flood (PMF) was modelled, adopting Australian Rainfall and Runoff (ARR) 1987 guidelines (Reference 6).

The current study supersedes the DHI study and the flood results are expected to be different due to the following factors:

- Improved computing technology that allows for more detailed flood modelling.
- Availability of higher resolution and more accurate terrain data.

- Updates to the national design flood estimation guidelines (ARR) including updates to design rainfalls and methodologies for estimating design flood events.
- Consideration of recent flood events such as occurred in 2022.
- Major augmentation of the drainage system downstream of the Glenrose Village Shopping Centre that has reduced the flood affectation in this area.

2.1.4. Frenchs Creek Property Survey Report, DHI Water & Environment, 2010

Following the Frenchs Creek Flood Study (Reference 3), a number of properties were surveyed in January 2006 to identify floor levels of properties affected by either the Flood Planning Level (FPL, taken as the 1% AEP flood level + 0.5 m) or the PMF. The building floor levels were estimated from the street frontage by using visual estimation techniques (such as counting bricks and comparing distances to standard-sized items like front doors). The study compiled a database of 502 properties and a report was produced (Reference 7).

2.1.5. Frenchs Creek Floodplain Risk Management Study, DHI Water & Environment, 2010

The Frenchs Creek Floodplain Risk Management Study (Reference 8) was completed in 2010 by DHI. The study utilised the MIKE Storm flood model developed as part of the Flood Study (Reference 3) to investigate a series of flood risk mitigation measures for the Frenchs Creek catchment. The options were selected in consultation with the community, Council and a working group. The range of options covers property modification, response modification and flood modification measures. They were evaluated based on a range of social, environmental, financial and technical criteria. A Floodplain Risk Management Plan was not produced.

2.2. Topographic Data

The Digital Elevation Model (DEM) is a representation of the ground topography and one of the primary inputs into a flood model. The study area DEM was developed using the Light Detection and Ranging (LiDAR) data. This is a form of aerial survey that uses a laser scanner mounted to an aircraft. This data produces a high-resolution model of the ground elevation over large areas. The DEM is derived from a series of points with a typical density of 4 points per square metre. A gridded DEM is produced from filtered ground return points. The NSW Government (Spatial Services) holds this data and it is publicly available through the Elevation Information System (ELVIS, https://elevation.fsdf.org.au/). The 1 m DEM was obtained for the study area, based on data captured in May/June 2020. The LiDAR has a reported vertical accuracy of 0.3 m in the vertical (95% confidence interval) and 0.8 m in the horizontal (95% confidence interval). The LiDAR-derived DEM has limitations in accuracy where there is dense vegetation or waterbodies.

2.3. Aerial Imagery

Aerial imagery was obtained from Council. This dataset consists of 10 cm resolution aerial imagery captured on 12 May 2019. Aerial imagery was also available on platforms such as Google Maps (www.maps.google.com.au), Nearmap (www.nearmap.com) and SIX Maps (six.maps.nsw.gov.au).

2.4. Land Use Zoning

The Warringah Local Environmental Plan (LEP) 2011 (Reference 9) applies to the study area. The LEP zoning was provided by Council for the study area as well as cadastral boundaries. This information identifies lot boundaries and the zoning (such as residential, commercial, industrial and recreational areas). The road corridor Geographic Information System (GIS) layer was obtained from NSW Spatial Information Exchange (SIX, https://six.nsw.gov.au/). This layer identifies the boundary between the road corridor and private properties and aligns with the cadastral boundaries.

2.5. Hydraulic Structures

2.5.1. Pit and Pipe Network

Council provided their stormwater asset database for the study area as a GIS file. A total of 4,445 pipes and 4,599 pits are located within the study area. The dimension of the pits and pit lintel were available for the majority of pits, as well as the pit depth and grate level. This information however, was not available for junction or buried pits. The dimension of pipes and box culverts were available in the dataset. Where no invert elevation was available, an estimate was made based on the upstream/downstream invert, the size of the pipe and the LiDAR elevation.

2.5.2. Culverts

Following a review of the stormwater database and preliminary hydraulic modelling, the major culvert structures crossing under roads and embankment were located. These structures are considered critical for determining the flood behaviour at these crossings, and as such were subject to a field survey. A total of 16 culverts were identified to be surveyed by WMAwater. Details such as the location, alignment, culvert dimensions, number of barrels and depth of cover were recorded. This information is considered accurate enough to estimate an invert level (based on LiDAR level of the road, depth of cover and culvert height) for the purposes of hydraulic modelling. Table 1 shows the details of the culverts surveyed, with the locations shown on Figure 6 and Figure 7. Although some of the structures were inaccessible, a visual inspection was undertaken to estimate the number of cells and size.

Table 1: Structures Surveyed

Structure ID[1] and Location	Council Database ID	Council Database Dimensions				Accessible?[2]	Surveyed Dimensions				Action[3]
		#	Diameter (m)	Width (m)	Height (m)		#	Diameter (m)	Width (m)	Height (m)	
1 – Linden Ave, Belrose	SPC00241	1	-	0.9	0.45	Yes	1	-	1.8	0.6	Use surveyed size and modify database alignment
2 – Pringle Ave, Belrose	SPI00601, SPI00614	2	1.35	-	-	Yes	2	1.35	-	-	Use Council size and modify database alignment
3 – Elm Ave, Belrose	SPC00044	1	-	3.7	1.4	Yes	1	-	3.7	1.4	Use 2001 Elm Avenue Survey size
4 – Pringle Ave, Belrose	SPI00222, SPI00209	2	1.05	-	-	Yes	2	1.05	-	-	Use Council size and lower upstream DEM
5 – Calool Cres, Belrose	SPC00066, SPC00052, SPC00065	3	-	Various	Various	No	3	-	-	-	Use 2001 Elm Avenue Survey size and modify alignment (2 x 2.1 m x 1.8 m & 1 x 3.95 m x 1.55 m)
6 – Haigh Ave, Belrose	SPI00469, SPI00489	2	1.2	-	-	Yes	2	1.2	-	-	Use council size, revise alignment, lower the creek downstream and add in small rock weir downstream
7 – Prahran Ave, Frenchs Forest	SPI00597	1	1.35	-	-	No	1	-	-	-	Use Council size and modify database alignment add trash racks downstream
8 – access road, Frenchs Forest	SPI12765	1	0.75	-	-	Yes	1	0.75	-	-	Use Council size and modify database alignment
9 – Tyalla Ave, Frenchs Forest	SPI13810, SPI13487	2	0.9	-	-	No	2	-	-	-	Use Council size and modify database alignment
10 – Starkey St, Forestville	SPI00341	1	1.2	-	-	No	3	-	-	-	Use Council size with three barrels instead of one, add trash racks downstream
11 – Waterfall Ave, Forestville	SPI12744, SPI12762	2	0.75	-	-	No	2	-	-	-	Use council size, add trash racks

Structure ID[1] and Location	Council Database ID	Council Database Dimensions				Accessible?[2]	Surveyed Dimensions				Action[3]
		#	Diameter (m)	Width (m)	Height (m)		#	Diameter (m)	Width (m)	Height (m)	
12 – Merilee Cres, Frenchs Forest	SPI05156, SPI00445	1	1.2-0.375	-	-	No	1	-	-	-	Use upstream size and modify alignment to match creek location
13 – Borgnis St, Davidson	SPI00780	1	1.8	-	-	No	1	-	-	-	Keep council size but revise alignment, use survey size for missing pipes upstream of it
14 – Darley St, Forestville	SPI13176, SPI12760	1	0.75	-	-	Yes	2	0.75	-	-	Council size with surveyed number of barrels
15 – Currie Rd, Forestville	SPI00548, SPI00616	2	1.35	-	-	Yes	2	1.35	-	-	Use Council size, modify database alignment, add trash racks downstream
16 – Lyndale Pl, Belrose	Missing	-	-	-	-	Yes	1	-	4.5	0.7	Add missing culvert

As shown in Figure 6

1 For those culverts that were inaccessible, dimensions were estimated where possible

2 Action to be taken to modify the Council data in the flood model

2.5.3. Gross Pollutant Traps

During the culvert survey, several trash racks were observed within the study area, which coincided with the water quality devices layer obtained from Council. These are typically located immediately downstream of the urban areas and were observed to impede flows due to the build-up of debris, essentially creating an artificial weir across the creek (Photo 1).

Photo 1: Examples of water quality devices in the study area

2.6. Buildings

Buildings are major hydraulic features on the floodplain. Within overland flow paths they can cause flow constrictions and/or divert floodwater. Council provided a building footprint layer. These appear to have been derived from LiDAR data captured in May 2019, commissioned by Council. A review of the building extents was undertaken with recent aerial imagery, indicating some discrepancies. In particular, some adjacent buildings had been digitised as a single extent. This would block flow paths between buildings in the hydraulic model and required manual adjustment.

2.7. Historic Rainfall Data

2.7.1. Overview

Rainfall data is recorded either daily (24-hour rainfall totals to 9:00 am) or continuously (pluviometers measuring rainfall in small increments – less than 1 mm). Daily rainfall data has been recorded for over 100 years at many locations within the Sydney basin. However, pluviometers have generally only been installed for widespread use since the 1970s. Together these records provide a picture of when and how often large rainfall events have occurred in the past.

Care must be taken when interpreting historical rainfall measurements. Rainfall records may not provide an accurate representation of past flooding due to a combination of factors including local site conditions, human error or limitations inherent to the type of recording instrument used.

Examples of limitations that may impact the quality of data used for the present study are

highlighted in the following:

- Rainfall gauges frequently fail to accurately record the total amount of rainfall. This can occur for a range of reasons including operator error, instrument failure, overtopping and vandalism. In particular, many gauges fail during periods of heavy rainfall and records of large events are often lost or misrepresented.
- Daily read information is usually obtained at 9:00 am in the morning. Thus, if a single storm is experienced both before and after 9:00 am, then the rainfall is "split" between two days of record and a large single day total cannot be identified.
- In the past, rainfall over weekends was often erroneously accumulated and recorded as a combined Monday 9:00 am reading.
- The duration of intense rainfall required to produce overland flooding in the study area is typically less than 6 hours (though this rainfall may be contained within a longer period of rainfall). This is termed the "critical storm duration". For a larger catchment (such as the Parramatta River) the critical storm duration may be greater (say 9 hours). For the study area a short intense period of rainfall can produce flooding but if the rain starts and stops quickly, the daily rainfall total may not necessarily reflect the magnitude of the intensity and subsequent flooding. Alternatively, the rainfall may be relatively consistent throughout the day, producing a large total but only minor flooding.
- Rainfall records can frequently have "gaps" ranging from a few days to several weeks or even years.
- Pluviometer (continuous) records provide a much greater insight into the intensity (depth vs. time) of rainfall events and have the advantage that the data can generally be analysed electronically. This data has much fewer limitations than daily read data. Pluviometers, however, can also fail during storm events due to the extreme weather conditions.

Intense rainfall events which cause overland flooding in highly urbanised catchments are usually localised and as such are only accurately represented by a nearby gauge, preferably within the catchment. Gauges sited even only a kilometre away can show very different intensities and total rainfall depths.

The rainfall data described in the following sections pertains to information that was used in model calibration.

2.7.2. Daily Rainfall Stations

The daily rainfall gauges available in the vicinity of the catchment operated by the Bureau of Meteorology (BoM) is provided in Table 2. The location of these daily rainfall stations is shown in Figure 8.

Table 2: Daily Rainfall Stations within and around the Catchment

Station Number	Station Name	Latitude	Longitude	Operating Authority	Year Opened	Year Closed
66182	Frenchs Forest (Frenchs Forest Rd)	33.75	151.23	BoM	1957	2018
66183	Ingleside (Animal Welfare League Nsw)	33.67	151.27	BoM	1984	2013
66080	Castle Cove (Rosebridge Ave)	33.78	151.2	BoM	1958	current
66188	Belrose (Evelyn Place)	33.74	151.22	BoM	1991	current
66126	Collaroy (Long Reef Golf Club)	33.74	151.31	BoM	1965	current
66141	Mona Vale Golf Club	33.68	151.31	BoM	1969	current
66011	Chatswood Bowling Club	33.8	151.18	BoM	1951	current
66214	Sydney (Observatory Hill)	33.86	151.2	BoM	2017	current
66059	Terrey Hills AWS	33.69	151.23	BoM	2004	current
66098	Rose Bay (Royal Sydney Golf Club)	33.88	151.27	BoM	1928	current
66209	Dover Heights (Portland St)	33.87	151.28	BoM	2007	current

2.7.3. Sub-Daily Rainfall Stations

A number of continuous rainfall stations that record data at a sub-daily level are available around the study area. These include stations operated by BoM, Sydney Water and Manly Hydraulics Laboratory (MHL). Both Automatic Weather Stations (AWS) that provide rainfall data at a minute resolution and traditional pluviograph stations that provide data at a 6-minute resolution are available from the BoM. Sydney Water (SW) operates a number of tipping bucket stations that were also obtained for this study. Council owns several tipping bucket stations across the LGA that are operated by MHL. The gauges within and surrounding the study area are summarised in Table 3 and shown in Figure 8.

Table 3: Sub-daily rainfall stations within and around the catchment

Station Number	Station Name	Latitude	Longitude	Operating Authority	Year Opened[1]	Year Closed
566017	Chatswood Bowling Club	33.80	151.18	SW	1980	current
566071	Belrose Bowling Club	33.73	151.22	SW	1990	current
566073	Pymble Bowling Club	33.74	151.14	SW	1987	current
566084	Police Driving School, North St Ives	33.71	151.19	SW	1990	current
566085	East Lindfield Bowling Club	33.76	151.19	SW	1990	current
66059	Terrey Hills AWS	33.69	151.23	BoM	2008	current

Station Number	Station Name	Latitude	Longitude	Operating Authority	Year Opened[1]	Year Closed
66062	Sydney (Observatory Hill)	33.86	151.21	BoM	1998	2020
66214	Sydney (Observatory Hill)	33.86	151.20	BoM	2017	current
66063	Wahroonga Reservoir	33.72	151.11	BoM	1949	1973
66142	Duffys Forest (Namba Rd)	33.68	151.18	BoM	1987	2017
66184	Mosman Council	33.83	151.25	BoM	1984	2015
566080	Forestville	33.76	151.21	MHL	2013	current
566091	Spit Bridge	33.80	151.25	MHL	2013	current
566149	Belrose	33.74	151.21	MHL	1994	current
566152	Allambie Heights	33.76	151.25	MHL	1999	current

1 Year for which high resolution sub-daily rainfall is available

The Belrose Bowling Club station (566071) was selected to analyse the major rainfall events that occurred in the study area (Table 4). This is one of two sub-daily rainfall stations within the catchment (the other being the MHL Belrose gauge (566149)), and the one with the longest record.

Table 4: 10 Largest Events recorded at the Belrose Bowling Club station (566071)

Date	Depth of rainfall for 24 hrs (mm)
10/02/1992	287.5
10/02/2020	266
11/06/1991	230.5
6/06/2016	220.5
8/03/2022 and 9/03/2022	219.5
11/04/1998	207.5
8/08/1998	166
7/02/2010	164.5
3/04/1992	162.5
7/08/1998	147.5
21/03/2021	143.5

As expected, the 1998 and 2022 events are part of the 10 wettest days on record. The 1991, 1992 and 2020 events are the top three events in terms of daily rainfall totals.

2.7.4. Calibration Events

The April 1998, February 2020 and the March 2022 storm events were selected for the calibration phase. All three storms were mentioned by the community and Council provided some photography relating to the 1998 event, in addition to some information being available in previous reports. A summary of daily rainfall depths for each event is provided in Table 5.

Table 5: Daily rainfall depths (24-hour to 9am) for the Calibration Events

Station Number	Station Name	11 April 1998	10 February 2020	8 & 9 March 2022
66182	Frenchs Forest (Frenchs Forest Rd)	227.8	-	-
66183	Ingleside (Animal Welfare League Nsw)	250	-	-
66080	Castle Cove (Rosebridge Ave)	279	240	263
66188	Belrose (Evelyn Place)	263	157.4	204.8
66126	Collaroy (Long Reef Golf Club)	200	138.2	315
66141	Mona Vale Golf Club	120.2	-	231
66011	Chatswood Bowling Club	-	206	194
66214	Sydney (Observatory Hill)	-	164.8	146.2
66059	Terrey Hills AWS	-	164.8	221.2
66098	Rose Bay (Royal Sydney Golf Club)	99	162.4	171.2
66209	Dover Heights (Portland St)	-	153.6	173.8
566071	Belrose Bowling Club	221	186	219.5
566084	Police Driving School, North St Ives	147	186	189.5
566085	East Lindfield Bowling Club	230.5	201	261
566080	Forestville	-	191	235
566091	Spit Bridge	-	128.5	224.5
566149	Belrose	222	139	228.5
566152	Allambie Heights	-	120	223

2.8. Flood Photographs

Council provided photographs of flooding along Frenchs Creek in the 1998 and the 2003 flood events. Examples are shown in Photo 2.

Photo 2: 1998 flood event at Elm Avenue (left) and at 4 Curragundi Avenue (right)

The community consultation allowed the residents to upload a series of photography and video relating to flood events. Those photos and videos were analysed to obtain a series of flood marks. Community consultation is discussed further in Section 3.

Photo 3: Example of photographs received as part of the community consultation from the March 2022 flood event

2.9. Flood Marks

Surveyed flood marks were available from the previous flood study (Reference 3). This included 7 flood marks in the vicinity of Calool Crescent, Belrose (6 originally from Reference 5) for the April 1998 event, 1 flood mark for the February 1992 event (from Reference 5) and 10 flood marks for the March 2003 event. Due to issues with the surveyed levels reported in the flood study document (Reference 3), including incorrectly attributing the 1992 level to the 1998 event, flood levels were obtained from the original survey data (Reference 5), shown in Diagram 1.

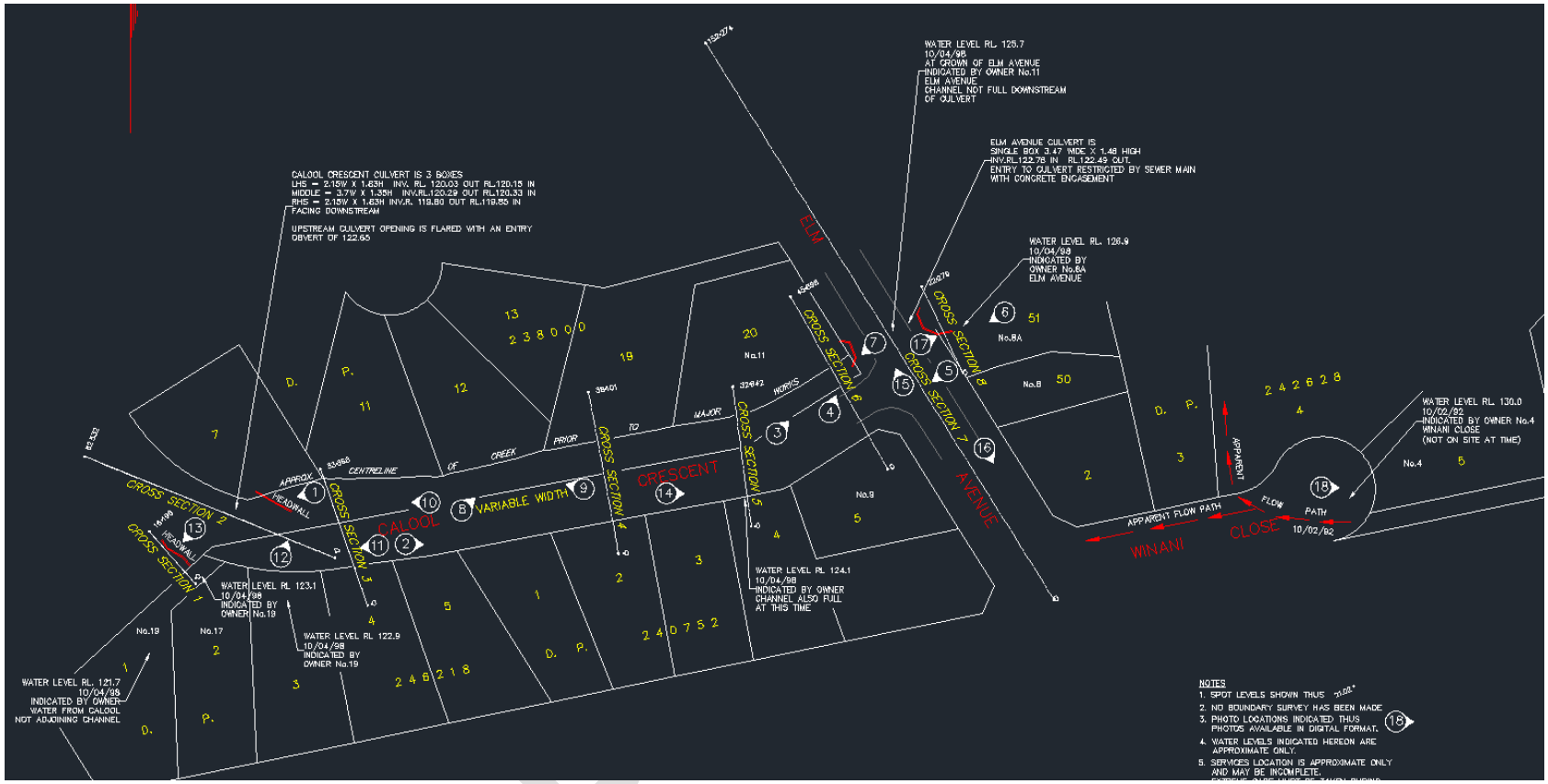


Diagram 1: Surveyed flood marks in the vicinity of Calool Crescent (Reference 5)

3. COMMUNITY CONSULTATION

At the commencement of the project, the community were informed of the study and provided the opportunity to contribute their observations of flooding within the catchment. A 'Your Say' webpage was set up on Council's website with information about the study and a questionnaire could be accessed to share experiences of flooding as well as upload photos and videos. The questionnaire was available between 4 February 2022 and 27 March 2022. The questionnaire was kept open longer than planned due to the March storm events across Sydney, which impacted the study area. 645 responses were lodged with 193 residents indicating they had experienced flooding in the past. Figure 9 shows a graphical summary of the responses received. Noting that a large number of the questionnaires were not completed (approximately 50% were incomplete, and hence no response was recorded for those questions not answered), the responses indicated that:

- The respondents are typically residents of the study area, with a large proportion having resided in the area for more than 10 years (65% of respondents).
- Almost half of the respondents experienced some flooding on their properties ('no response' answers excluded).
- Of those that experienced flooding, approximately 40% only had their land affected, with the remaining 60% having their land and building affected.
- Of those that had experienced flooding, over half had experienced flooding in their backyard, with approximately 40% experiencing flooding of the front yard, garage/shed and/or main building below the floor level. 15% (29 respondents) had experienced above floor flooding.
- Only 5 respondents had been isolated or evacuated due to flooding, likely attributed to the dominant flood mechanism being overland flow.
- Approximately half of respondents had observed flooding in other areas of the Middle Harbour catchment (such as streets and parks).
- Over half of the respondents that had experienced flooding, indicated that it occurred less than one year ago. This suggests that the March 2022 storm affected a large portion of those who had experienced flooding and was most likely in the forefront of people's minds.

A large majority of comments related to flooding were attributed to the March 2022 storms that occurred within the study area. As such, the storm event of 8th-9th March 2022 has been included in the list of calibration events. There were 209 responses considered useful for the calibration process where the respondent provided a description of flooding or photographs. Of these, 114 were used in the calibration process (discussed further in Section 6.4). These key responses are mapped in Figure 10 and Figure 11. There were 33 comments specifically relating to March 2022, 4 relating to February 2022 and 1 relating to February 2020. All other events, including 1998, had just one response. In some cases, the respondent may have incorrectly identified the date of the event. In addition to these, some respondents indicated a timeframe, with 19 indicating events within the last year (assumed to primarily be attributed to the March 2022 storm), 15 indicating events in the last 5 years (assumed to be February 2020 and March 2022 events), 5 indicating events in the last 10 years and 13 indicating events more than 10 years ago (assumed to primarily be referring to the 1998 event). Several residents were contacted directly to obtain further information, such as photographs and videos of flooding that they were unable to upload.

4. HYDROLOGIC MODEL

4.1. Background

A hydrological model is a computer-based software tool for estimating the amount of runoff that flows from a catchment for a given amount of rainfall, and the timing of this runoff flow. Stream gauges (which measure water level in a stream) are a way of directly measuring this information, but they are expensive to set up and maintain. They also require a long record (several decades) to be of most use for flood estimation. Most of the smaller creeks in NSW are not gauged, and there are no suitable stream gauges within the Middle Harbour catchment. In this case, using a computer-based hydrologic model is the best practice method for determining how much flow occurs from rainfall information (which is more widely available from rain gauges). This type of hydrologic model is referred to as a runoff-routing model.

A range of runoff-routing hydrologic models is available as described in ARR 2019 (Reference 11). These models allow the rainfall to vary in both space and time over the catchment and will calculate the runoff generated by each sub-catchment. The generated flow hydrographs then serve as inputs at the boundaries of the hydraulic model, which provides details about flood levels and velocities.

The WBNM package was selected for this study and is widely used throughout Australia to estimate runoff from both rural and urban areas. The WBNM model has a relatively simple but well supported method, where the routing behaviour of the catchment is primarily assumed to be correlated with the catchment area. If flow data are available at a stream gauge, then the WBNM model can be calibrated to this data through adjustment of various model parameters including the stream lag factor, catchment lag factor, and/or rainfall losses. Further details regarding the WBNM software can be found in the WBNM User Guide (Reference 12).

WMAwater developed a WBNM model covering the entire study area catchment, with details of this process provided in the following sections.

4.2. Sub-catchment Delineation

The study area was divided into 859 sub-catchments (shown in Figure 4 and Figure 5) by using the available LiDAR data (see Section 2.2). The discretisation of sub-catchments within the study area has a direct influence on the scale of flooding to be simulated in the hydraulic model. For this study the sub-catchments were delineated for the stormwater pits and other key hydraulic controls such as culverts and channels. The LiDAR data was used to determine the upper catchment boundary and the gutter and stormwater network locations were used to determine the location of flow paths.

The total catchment area contained in the WBNM model is approximately 23.1 km^2, resulting in an average sub-catchment size of 2.7 hectares. There are generally smaller, more detailed sub-catchments within the urbanised parts of the catchment, with coarser sub-catchments within the

downstream forested areas. The largest sub-catchment is 46 hectares and the smallest is 0.02 hectares. This relatively fine-resolution sub-catchment delineation, particularly within the urban areas, ensures that where significant overland flow paths exist in the catchment, they are accounted for and incorporated into the TUFLOW hydraulic model.

4.3. Adopted Hydrologic Model Parameters

The model input parameters to represent each sub-catchment are:

- A catchment lag factor (termed 'C'), which can be used to accelerate or delay the runoff response to rainfall;
- A stream lag factor, which can accelerate or decelerate in-channel flows occurring through each sub-catchment;
- An impervious area lag factor;
- Catchment area; and
- The percentage of catchment area with a pervious/impervious surface.

WBNM requires a catchment lag parameter and a stream lag factor to be selected which describes the average travel time for runoff from the catchment surface. The catchment lag parameter is applied to pervious surfaces and adjusted to apply to impervious surfaces by multiplication by an impervious lag factor. A catchment lag factor ('C') of 1.6 was adopted. This is the recommended default value for an ungauged catchment in NSW. There was insufficient quantitative data to warrant deviating from this value. Likewise, a stream lag factor of 1.0 was adopted, representing a natural channel. The default impervious lag factor of 0.1 was adopted for the routing of flows from impervious areas. Catchment areas were calculated based on sub-catchment boundaries in a GIS program. The impervious fractions within the catchment are discussed in Section 4.5 below.

4.4. Rainfall Losses

Methods for modelling the proportion of rainfall that is "lost" to infiltration are outlined in ARR 2019 (Reference 11). The methods are of varying degrees of complexity, with the more complex options only suitable if sufficient data is available. The method most typically used for design flood estimation and adopted in this study is to apply an initial and continuing loss to the rainfall. The initial loss represents the wetting of the catchment prior to runoff starting to occur, including interception, infiltration and the filling of localised depressions. The continuing loss represents the ongoing infiltration of water into the saturated soils while rainfall continues.

4.5. Impervious Fraction

Runoff from connected impervious surfaces such as roads, gutters, roofs or concrete surfaces occurs significantly faster than from vegetated surfaces. There is proportionally a greater volume of runoff as there is reduced infiltration into the ground from these surfaces. This results in a faster concentration of flow within the downstream area of the catchment, and increased peak flow in some situations compared to the pre-developed state. ARR 2019 (Reference 11) identifies three

types of surfaces for the purpose of estimating urban storm losses and routing:

- Directly connected impervious areas which are impervious areas directly connected to the drainage system;
- Pervious areas consisting of parks and bushland areas; and
- Indirectly connected areas which consist of impervious areas which are not directly connected to the drainage system and the pervious areas which interact with indirectly connected impervious areas.

These three surface types were categorised for each sub-catchment and derived from land use within each sub-catchment. The assumed proportion of each of the above categories for each land use type is outlined in Table 6.

Table 6: Land use categories and adopted fraction of each surface type for the WBNM model

Land Use	Directly connected impervious fraction (%)	Pervious fraction (%)	Indirectly connected fraction[1] (%)
Grass and bushland	0	100	0
Residential	60	13	27
Road corridor[2]	80	7	13
Commercial and industrial	80	7	13
Water body	100	0	0

1. This is only applied when the directly connected impervious fraction of the entire sub-catchment is greater than 40%. If it is less, this area is assumed to be part of the pervious fraction.
2. This accounts for the road and the grassed verges within the road corridor (cadastre parcel).

WBNM, however, only accounts for pervious and impervious components of each sub-catchment. As such, the surface types defined above were implemented in the WBNM model as follows:

- Directly connected impervious areas: This is applied as the impervious fraction of each sub-catchment. These impervious areas have impervious losses applied and are routed through the impervious fraction of the sub-catchment.
- Pervious areas: This is applied as part of the pervious fraction of each sub-catchment. These pervious areas have pervious losses applied and are routed through the pervious fraction of the sub-catchment.
- Indirectly connected areas: This area is triggered where the overall directly connected impervious area of a sub-catchment is greater than 40%. This is applied as part of the pervious fraction of each sub-catchment, being routed through the pervious portion of the sub-catchment. The losses for the pervious area of the sub-catchment, however, are factored to account for the impervious surfaces within the indirectly connected areas. It has been assumed that the initial loss over the indirectly connected areas is approximately 70% of that over a purely pervious area (i.e. approximately 30% of the indirectly connected area contains impervious surfaces). Similarly, the continuing losses are also adjusted by

the same factor to account for the indirectly connected areas.

The proportion of each land use type within each sub-catchment was determined, and an overall percentage of each surface type was calculated. An example is provided in Diagram 2.

Diagram 2: Land types within subcatchment MidH664

For sub-catchment MidH664, the proportion of each land use type is shown in Table 7.

Table 7: Land use categories and percentages for MidH664

Land Use	Percentage of sub-catchment area (%)
Grass and bushland	14
Residential	63
Road corridor	23
Commercial and industrial	0
Water body	0

Using the adopted percentage of each surface type for each land use category (Table 6), an overall fraction for each surface type was then computed. The overall fraction of each surface type for MidH664 is as follows:

- Directly connected impervious area = 57%
- Pervious area = 15%
- Indirectly connected area = 28%

5. HYDRAULIC MODEL

5.1. Background

Hydraulic modelling is the simulation of how flow moves across the terrain. A hydraulic model can estimate the flood levels, depths, velocities and extents across the floodplain. It can also provide information about how the flooding changes over time. The hydraulic model can simulate floodwater both within the creek banks, and when it breaks out and flows overland, including flows through structures (such as bridges and culverts), over roads and around buildings.

Two-dimensional (2D) hydraulic modelling is currently the best practice standard for flood modelling. It requires high resolution information about the topography, which is available for this study from the LiDAR aerial survey (Section 2.2). Various 2D software packages are available (SOBEK, TUFLOW, RMA-2, MIKE FLOOD). The TUFLOW package was adopted as it meets requirements for best practice and is currently the most widely used model of this type in Australia for flood modelling.

The TUFLOW modelling package includes a finite difference or finite volume numerical model for the solution of the depth averaged shallow water equations in two dimensions. The TUFLOW software has been widely used for a range of similar floodplain projects both internationally and within Australia and is capable of dynamically simulating complex overland flow regimes. The TUFLOW model version used in this study was 2020-10-AC-w64 (using the finite volume HPC solver in single precision mode). The TUFLOW Heavily Parallelised Compute (HPC) solver has the ability to run on a Graphics Processor Unit (GPU). The new HPC GPU models are significantly faster than TUFLOW Classic models, which rely on a Central Processing Unit (CPU). HPC models have the ability to be run across thousands of cores within a GPU. This scheme is also more robust, being a finite volume scheme. Further details regarding TUFLOW software can be found in the User Manual (Reference 13).

In TUFLOW the ground topography is represented as a uniform grid with ground elevations and Mannings ‘n’ roughness value assigned to each grid cell. The size of grid is determined as a balance between the model result definition required and the computer processing time needed to run the simulations. The greater the definition (i.e. the smaller the grid size) the greater the processing time need to run the simulation. TUFLOW also has the ability to dynamically link to the 1D ESTRY engine, making it useful for simulating both overland flow in the 2D domain, and flows through underground pipes and culverts in the 1D domain.

5.2. Hydraulic Model Extent and Resolution

The hydraulic model covers the majority of the study area including the suburbs of Belrose, Davidson, Frenchs Forest, Forestville and Killarney Heights (see Figure 12 and Figure 13). Parts of the study area upstream of the highest stormwater pits are not modelled in the hydraulic model. The downstream end of the hydraulic model is located at Middle Harbour Creek. Middle Harbour Creek and Middle Harbour itself are not contained in the model, although a portion of Bantry Bay

is included at the downstream extent of the model. The model adopts a 1 m by 1 m grid resolution. This resolution provides an appropriate balance between providing sufficient detail for roads and overland flow paths (fully utilising the underlying 1 m LiDAR DEM) and workable computational run-times. Due to model run times, the model has been split into two domains – a northern half covering Bare Creek, Fireclay Gully and Frenchs Creek, and southern half covering Carroll Creek, Bate Creek, Main Creek in addition to several minor tributaries. The model setup is the same across both domains, and as such the description of the model setup in the subsequent sections covers both domains. It is noted that the model can also be run with a 2 m grid that covers the entire study area in one model. This was adopted for the critical duration assessment (Section 7.8). The 2 m model facilitates a shorter run time that is required to run all the durations, temporal patterns and AEPs for the critical duration assessment. Sensitivity to cell size is discussed in Section 6.5.4.

5.3. Model Topography

The hydraulic model reliability is heavily dependent on the underlying terrain data. The 2D topography for the TUFLOW model was based on the 1 m DEM derived from LiDAR data, captured in May/June 2020 (see Section 2.2 for details, shown in Figure 4 and Figure 5). The LiDAR data is most accurate on hard surfaces exposed to the sky (for example roads). The data is less accurate where there is dense vegetation covering the ground (such as within vegetated creek channels). Flow paths within urban areas are typically along streets, and the vegetated creeks within the study area are typically located downstream of the urban areas. Therefore, where accuracy is required within the urban areas, the LiDAR data is considered reliable. In addition to the LiDAR data, there were several modifications made to the terrain to ensure topographic features were represented correctly. These modifications include:

- Representation of channel inverts with breaklines sampled from the lowest elevations of the LiDAR data. This was done for all major natural creek channels in the study area. Two man-made open channels are specifically discussed in Section 5.4.5.
- Breaklines to represent the gutters of urban roads. This ensures that the gutters and their conveyance of local runoff are sufficiently represented. This is discussed further in Section 5.4.2.
- Local hydraulic features such as the low concrete walls found around the Glenrose Village Shopping Centre.
- Local terrain modifications at culvert inlets and outlets to ensure transfer of water between the 2D domain and 1D culverts.

5.4. Hydraulic Structures

5.4.1. Fencing and Obstructions

Smaller localised obstructions (such as fences) can be represented in TUFLOW in several ways including as impermeable obstructions, a percentage blockage or as an energy loss. The obstructions may also be approximated generally by increasing Mannings roughness for certain land use areas (such as residential) to represent the typical type of fencing used in such areas.

Individual fences in the catchment were not explicitly modelled, as they are difficult to identify and relatively impermanent. Fences in urbanised areas were therefore accounted for by applying a slightly higher Mannings roughness for the residential land-use type to simulate the obstruction to flow.

The exception to the above was the representation of the Gross Pollutant Traps (GPT) found in the study area, and these are discussed further in Section 5.4.7.

5.4.2. Road Kerbs and Gutters

The road gutter network plays a key role for overland flow in the urbanised parts of the study area. Roadways typically capture the runoff from properties and convey flow within the gutter. Representation of the kerb and gutter system in the model is an important feature to accurately simulate overland flows.

LiDAR typically does not have sufficient resolution to adequately define the kerb and gutter system within roadways. The kerb/gutter feature is of a scale that is smaller than the underlying 1 m LiDAR grid used in the model, and even use of the LiDAR return points does not pick up a continuous line of low points defining the drainage line along the edge of the kerb. Project 15 of ARR 2019 – *Two Dimensional Modelling in Urban and Rural Floodplains* (Reference 14) provides the following guidance:

> *"Stamping a preferred flow path into a model grid/mesh (at the location of the physical kerb/gutter system) may produce more realistic model results, particularly with respect to smaller flood events that are of similar magnitude to the design capacity of the kerb and gutter. Stamping of the kerb/gutter alignment begins by digitising the kerb and gutter interval in a GIS environment. This interval is then used to select the model grid/mesh elements that it overlays in such a way that a connected flow path is selected (i.e. element linkage is orthogonal). These selected elements may then be lowered relative to the remaining grid/mesh."*

The road gutter network plays a key role for overland flow in the urbanised parts of the study area. In order to model the system effectively, the gutters were stamped into the mesh using the method described above. The road layer provided by Council was used to create a gutter line which was reviewed using aerial imagery and modified where required to ensure a reasonable alignment. A

total of 232 km of gutter lines were included in the model.

The method used was to inspect the LiDAR by automatically generating points every 2 metres along the gutter lines and sampling the lowest elevation value within a 1 metre radius of the point. The elevation of those points was lowered by 0.1 m to simulate a continuous flow path in the gutter.

5.4.3. Pits and Pipes

Urban areas that are developed over natural watercourses typically have a drainage system that consists of pit inlets to capture surface water and a pipe system to convey that water underground to a downstream outlet location, such as a natural creek. The hydraulic model incorporates this stormwater, or 'pit and pipe' network.

The stormwater drainage network was modelled in TUFLOW as a 1D network dynamically linked to the 2D overland flow domain. This stormwater network includes conduits such as pipes and box culverts (Table 8), and stormwater pits including inlet pits and junction manholes. The schematisation of the stormwater network was undertaken using the stormwater GIS layers supplied by Council. Pipe sizes were obtained from the GIS layer, along with pit inlet sizes. The majority of pits contained information about the invert level (such as a grate level and pit depth), however, where no invert elevation was available, an estimate was made based on the upstream/downstream invert, the size of the pipe and the LiDAR elevation. The alignment of the pipes and location of the stormwater pits were reviewed against the provided aerial imagery and no discrepancies were found. The location of pits and pipes included as 1D elements in the hydraulic model are shown in Figure 14 and Figure 15.

Only pipes with a minimum dimension of 375 mm or greater were included in the model. Some smaller pipes connecting localised trapped low points were included in the model, however, generally these smaller pipes are unlikely to have a significant influence on flood behaviour during major overland flow events.

Table 8: Stormwater pipes included in TUFLOW

Pipe Size (mm)	Number of pipes in model
< 375	14
375	2124
450	612
525	285
600	241
675	138
750	131
825	53
900	113
> 900	160
Total	3871

5.4.4. Buildings

Buildings in overland flow paths can have a significant influence on surrounding flood levels and can redirect floodwater. Buildings and other significant features likely to obstruct flow were incorporated into the model based on a building footprint layer that was provided by Council. The building footprints were reviewed using aerial imagery and Google Street View in key overland flow areas, and modified where required. A total of 5,534 buildings were included in the model. These are shown in Figure 16 and Figure 17).

5.4.5. Open Channels

There are two major man-made open channel drains within the study area. The Frenchs Creek concrete open channel (see Photo 4 and Photo 5) and the relocated elevated channel behind houses along Kapunda Place, Belrose (see Photo 6 and Photo 7). Both of these drains are poorly defined in the LiDAR due to the vegetation covering part of the drain and the gridding approach of the TUFLOW model.

The Frenchs Creek open channel was modelled as a 1D open channel using cross section data from the 2001 Elm Avenue Survey (Reference 5). The 1D open channel extends from 20 m upstream of the Elm Avenue crossing to 50 m downstream of the Calool Crescent crossing, a total length of approximately 250 m. This 1D section also includes the culvert crossings of Elm Avenue and Calool Crescent (discussed in Section 5.4.6).

The Kapunda Place drain was modelled as a 2D breakline with a width of 2 m. The elevations along the breakline were determined from the LiDAR low points. The breakline ensures a continuous flowpath along the perched drain. The two drains are shown on Figure 14 and Figure 15.

Photo 4: Frenchs Creek concrete channel section east of Calool Crescent

Photo 5: Frenchs Creek concrete channel section parallel to Calool Crescent

Photo 6: Grassed easement between properties (left) and Kapunda Place drain (right)

Photo 7: Kapunda Place drain and vegetation

5.4.6. Culverts

The main culverts crossing roads were identified in the Council stormwater database and subject to a site inspection (see Section 2.5.2). They were added to the hydraulic model as 1D elements. The alignment, size and structure invert were reviewed against the available aerial imagery and LiDAR data. These culverts are summarised in Table 1 and are shown in Figure 14 and Figure 15. A selection of photographs of these culverts taken during the site inspection are provided in Photo 8 to Photo 13.

Photo 8: Stucture 16, Lyndale Place, Belrose

Photo 9: Structure 4, Elm Avenue, Belrose

Photo 10: Structure 11, Starkey Street, Frenchs Forest

Photo 11: Structure 12, Merilee crescent, Frenchs Forest

Photo 12: Structure 13, Borgnis Street, Davidson

Photo 13: Structure 15, Currie Road, Forestville

5.4.7. Gross Pollutant Traps

Gross Pollutant Traps (GPTs) capture debris and rubbish that can be washed into the stormwater system and/or creeks from urban areas, and transported downstream to the ocean. They have an important role in capturing litter and protecting downstream ecosystems. A layer with water quality devices, primarily GPTs was provided by Council. During the site inspection, a number of these were inspected to gain an appreciation of the hydraulic obstruction that these structures cause. These devices are primarily trash racks, with a weir and grate structure across the waterway. These structures were observed to be partially blocked during the site visit, with the propensity to be further blocked during a flood event. These structures were represented in the model by estimating the height of the structures, and applying a blockage factor, as outlined in Table 9. Examples of these structures are shown in Photo 14 to Photo 17. The locations of the GPTs are shown in Figure 14 and Figure 15.

Table 9: GPTs included in the TUFLOW model

Location	Creek	Photo	Blockage
Starkey Street	Bate creek	Photo 14	75%
Waterfall Avenue	Bate Creek	Photo 15	50%
Currie Road	Middle Harbour Main Creek	Photo 16	75%
Prahran Avenue	Carroll Creek	Photo 17	50%

Photo 14: Starkey Street GPT

Photo 15: Waterfall Avenue GPT

Photo 16: Currie Road GPT

Photo 17: Prahran Avenue GPT

5.5. Hydraulic Roughness

Roughness, represented by the Mannings ‘n’ coefficient, is a key parameter in hydraulic modelling. It models the resistance that floodwaters experience when flowing over a surface. For example, floodwater flows more easily over a concrete carpark surface than through dense vegetation in a natural creek channel. As part of the calibration process, roughness values are adjusted within the ranges defined in the literature so that the model better matches observed peak flood levels at a variety of locations. The typical ranges of the Mannings ‘n’ coefficient for different surface types are discussed in Project 15 of ARR 2019 – *Two Dimensional Modelling Urban and Rural Floodplains* (Reference 14). Chow (Reference 15) also provides some

information with regards to the setting of the roughness values for hydraulic calculations.

The Mannings 'n' values adopted for the study area are shown in Table 10. These values have been adopted based on the site inspection, past experience in similar floodplain environments (including those adopted for the adjacent catchment in Reference 10), consideration of the above references and the model calibration process. The spatial variation in Mannings 'n' is shown in Figure 16 and Figure 17. Council's land use planning layer was used to determine the land use type across the study area. The layer was reviewed against the 2019 aerial imagery. The creek channel extents were derived using preliminary TUFLOW modelling results, which indicated the areas of conveyance and relatively deep floodwaters (over a metre) that are associated with creek channels.

Table 10: Mannings 'n' values adopted in the TUFLOW model

Land Type	Mannings 'n'
Grass and open space	0.04
Dense vegetation and bushland	0.08
Creek channel	0.02
Road corridor	0.02
Residential areas	0.05
Commercial and Industrial	0.08

5.6. Boundary Conditions

5.6.1. Inflows

The WBNM hydrologic model (Section 4) simulates the runoff that occurs for a particular rainfall event, producing runoff hydrographs for each sub-catchment area. These hydrographs are applied at the downstream end of each sub-catchment, within the TUFLOW 2D domain (see Figure 12 and Figure 13). These inflow locations correspond with gutters, stormwater inlet pits, drainage reserves or open watercourses features which have typically been constructed to receive inter-allotment drainage and sheet or unconfined runoff from the upstream catchment.

5.6.2. Downstream Boundary Condition

The western edge of the study area is located along Middle Harbour Creek and Middle Harbour itself, within the Garigal National Park. The southern and western boundary condition are a constant water level set at 1.4 mAHD. This level is used in different studies across the LGA and represents the 5% AEP ocean level. As discussed in Section 1.2, the urban areas of interest within the catchment are well above Middle Harbour Creek and Middle Harbour, with the lowest elevation being approximately 70 mAHD and not subject to ocean inundation. Therefore, this boundary has been applied to simply let the creek flows out of the model and this tailwater boundary does not influence the flood levels within the study area (see Section 9.6).

The upstream part of the catchment can drain out of the study area to the north and east, into the Cowan Creek, Narrabeen Lagoon and Manly Dam catchments. These boundaries are located near Rangers Retreat Road, Adams Street, Forest Way and Mona Vale Road. These are minor cross-catchment flows and for those locations, a stage-discharge curve was applied based on the overland flow path geometry and indicative slope of 10%. Again, this allows water to flow out of the model domain. The downstream boundaries are shown in Figure 12 and Figure 13.

6. MODEL CALIBRATION

6.1. Approach

The aim of the calibration process is to ensure the modelling system can replicate historical flood behaviour. There are assumptions in the modelling inputs, such as the effect of vegetation on flow and the amount of infiltration into the soil, which can be adjusted to improve the match between observed and modelled flood levels. A good match to historical flood behaviour provides confidence that the modelling methodology and schematisation can accurately represent the important flood processes in the catchment.

The choice of calibration events for flood modelling depends on a combination of the severity of the flood event and the quality of the data available. Ideally, data would be available from streamflow and rainfall gauges in addition to records of flood marks or inundation extents. Typically, in urban catchments both gauge records and reliable calibration information are absent. The following limitations prevent a comprehensive calibration of the hydrologic and hydraulic models for this study:

- There is only a limited amount of historical flood information available for the study area. There are no stream flow gauges and much of the flood information is based on flood observations and estimates of flood depths, etc. rather than surveyed flood marks. The nature of flooding in the catchment is typically shallow overland flows over reasonably steep terrain and as such it is difficult to obtain accurate flood heights that can be used to compare with the flood model and would facilitate a comprehensive calibration exercise.
- Rainfall records and particularly pluviometer records for past floods within the catchment are limited. Rain gauges are sparsely distributed and may not accurately capture the spatial and temporal distribution of rainfall during the storm event. Due to the quick response of urban catchments, accurate rainfall data across the entire catchment would be required to fully understand and model the runoff response accurately enough that would facilitate a comprehensive calibration exercise.
- Changes to the catchment over time due to urban development (and re-development) may result in significant changes to land uses and drainage structures. The models have been developed for current conditions, and the simulation of historic events too far into the past may not be accurate due to changes in the catchment.

These limitations are typical of the majority of urban catchments and the calibration exercise undertaken here constitutes recommended practice as outlined in Reference 14. This involves a ‘validation’ of the models based on what data is available, rather than a detailed ‘calibration’. In lieu of this, a detailed sensitivity analysis is undertaken to understand how variations to the adopted model parameters influence the modelled flood behaviour.

6.2. Summary of Historical Event Rainfall Data

6.2.1. 10th April 1998 Event

A spatial analysis of the daily rainfall gauges was undertaken, using daily rainfall recorded at 9am on the 11th of April 1998 and is shown in Figure 18. This indicates that the storm was more intense near Belrose and Roseville Chase with over 250 mm of rain recorded within a 24-hour period, while the northern part of the study area saw less than 200 mm of rain. An analysis of the available sub-daily rainfall data was also undertaken, and indicated that 60% to 70% of the storm occurred within a 4-hour period, as shown in Figure 19. The sub-daily rainfall records were compared to the ARR 2019 design Intensity Frequency Durations (IFD) at the study area centroid. Figure 20 shows this comparison of burst of rainfall intensities with the design IFD data. The peak burst intensity for the North St Ives gauge was between a 10% AEP and 5% AEP event for durations between 1 and 8 hours. The recorded rainfall at the Belrose Bowling Club and MHL Belrose gauges had an estimated AEP of approximately 1 in 200 (0.5%) for the same durations. The East Lindfield Bowling Club gauge had a peak rainfall intensity for a 6 hour burst, with the probability estimated to be approximately 1 in 500 (0.2%) AEP. The rainfall data indicates that this was a very large and rare storm event.

6.2.2. 9th February 2020 Event

An analysis of the community consultation responses (see Section 3), shows that the February 2020 storm affected numerous residents across the study area. The 24-hour rainfall totals for the 2020 event (recorded at 9am on 10th of February) were lowest at Belrose and Frenchs Forest, being less than 160 mm in a 24-hour period, as shown in Figure 21. Rainfall depths were slightly higher in the northern portion of the study area (reaching 186 mm), and substantially higher at Roseville Chase to the south-west of the study area (240 mm). The sub-daily rainfall records show a similar temporal pattern for all seven nearby gauges, with the MHL gauges recording between 120 mm and 140 mm, while the remaining gauges recorded between 180 mm and 200 mm, as shown in Figure 22. A comparison of the sub-daily rainfall records with ARR 2019 IFD shows a peak burst intensity between 6 and 12 hour durations of approximately a 20% AEP event for the MHL gauges (except for the Forestville gauge), while the remaining gauges (including the MHL Forestville gauge) indicated an event between the 5% AEP and 2% AEP, as shown in Figure 23.

6.2.3. 8th and 9th March 2022 Event

During the community consultation phase, the 8th of March 2022 storm occurred, leading to a substantial number of flood issues being reported by the community through the questionnaire on Council's online portal. The questionnaire closure date was extended in order to obtain flood data useful for model calibration. The rainfall totals over 48-hours (to 9am on 9th March 2022) from daily rainfall gauges were used to analyse the spatial distribution of the rainfall event, with the results shown in Figure 24. The rainfall varied across the study area, with the southern portion of the study area receiving the most rainfall, up to 260 mm, and the northern edge of the study area receiving less than 200 mm. The distribution of this rainfall over time was consistent across the

nearby sub-daily rainfall gauges, with a similar temporal pattern exhibited at the gauges, as shown in Figure 25. A comparison of the sub-daily rainfall records and the ARR 2019 IFD indicates a peak intensity at approximately a 6 hour duration, with the North St Ives gauge being estimated at approximately a 20% AEP event and the East Lindfield Bowling Club gauge being approximately a 1% AEP event, with the remaining gauges sitting in between these two estimates. This is shown in Figure 26.

6.3. Recorded Flood Observations

As part of the community consultation phase of this project (see Section 3), residents shared their knowledge and photos of flooding in the study area. Of the 645 responses, 209 were useful for the purposes of calibration, with descriptions of flood behaviour and/or photographs. A total of 114 responses were selected for the purpose of calibration of the model, with the remaining 95 either located outside of the study area, were additional responses for the same property (for example, some residents who made a submission prior to the March 2022 storm made another submission following the storm event with additional information), or were referring to localised stormwater inundation and drainage issues which are outside the scope of this flood study. Examples of responses that referred to local stormwater issues are contained in Photo 18 to Photo 21. In addition to this, many respondents mentioned flooded roads outside the study area, such as Roseville Bridge, Wakehurst Parkway, Mona Vale Road and Oxford Falls Road.

The responses selected for the calibration process contained information related to flooding that could be verified in the TUFLOW model. This information related to flood behaviour observations such as depths, extents and the source of the water. These observations are not considered to be of an accuracy that would warrant detailed model calibration, however, can be used to validate the modelled flood behaviour. Figure 10 and Figure 11 show the location of these responses. Residents were also able to upload photographs of flooding in their questionnaire response, and these were also used to validate the model.

Photo 18: Local stormwater inundation (MH_228)

Photo 19: Local stormwater inundation (MH_238)

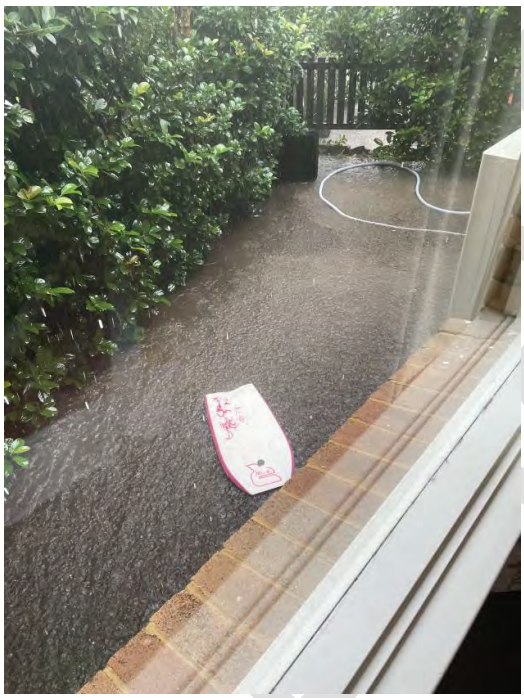


Photo 20: Local stormwater inundation (MH_520)

Photo 21: Local stormwater inundation (MH_569)

6.4. Hydraulic Model Validation

The historic rainfall events were simulated in the WBNM hydrologic model using the spatial distributions of rainfall presented in Figure 18, Figure 21 and Figure 24 for the April 1998, February 2020 and March 2022 storm events, respectively. The rainfall total for each of the WBNM sub-catchments was sampled from the rainfall grid produced. This rainfall depth was distributed temporally using the available sub-daily rainfall data, with the Belrose Bowling Club being adopted for the 1998 and 2020 events, and the East Lindfield Bowling Club being adopted for the 2022 event. There was insufficient data to calibrate the hydrologic model or rainfall losses. As such, along with the parameters outlined in Section 4.3, the following rainfall losses were adopted for all events:

- Initial loss of 5 mm. This is a nominal amount due to the substantial rainfall that preceded each event. At the Belrose (Evelyn Place) daily gauge, there was 30 mm in the 24 hours prior to the 1998 rainfall burst modelled, 215 mm in the 3 days prior to the 2020 rainfall burst modelled, and 105 mm in the 2 days prior to the 2022 rainfall burst modelled. This rainfall would saturate soils such that initial losses would be low.
- Continuing loss of 0.8 mm/hr. This is within the range of design continuing losses (discussed in Section 7.4) and is an appropriate value.

The resultant runoff hydrographs produced by the WBNM model were then applied to the TUFLOW hydraulic model to simulate the flood behaviour for the duration of each event. In the TUFLOW model, it was assumed that stormwater pits were blocked by 20% for on-grade pits and 50% for sag pits. Culverts with headwalls were assumed to be blocked by 50%. Due to the high proportion of residents reporting blocked drains, a scenario was also modelled with 99% blocked drains for the 2022 event (see Section 6.5 for details). The model results were then compared to the flood marks, respondents' photographs and comments in order to validate the model. The modelled flood depths for the 1998, 2020 and 2022 events can be seen in Figure B1 to Figure B6.

6.4.1. Validation to Photographs

The photographs received as part of the community consultation were compared to the model results. The modelled depth and flood extent (Image 1 to Image 13) from the TUFLOW model match the observed flood behaviour shown in Photo 22 to Photo 34. The colour scale used for the modelled depth is shown in Diagram 3.

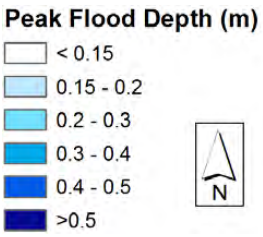


Diagram 3: Colour scale used for flood depth images

Photo 22: Street flooding at 4 Curragundi Avenue, Belrose in 1998 event

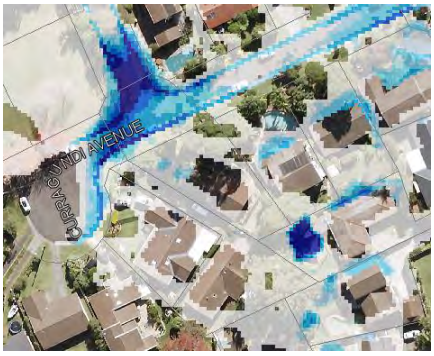


Image 1: Hydraulic model results at 4 Curragundi Avenue, Belrose in 1998 event

Photo 23: Elm Avenue, Belrose flooding in 1998 event

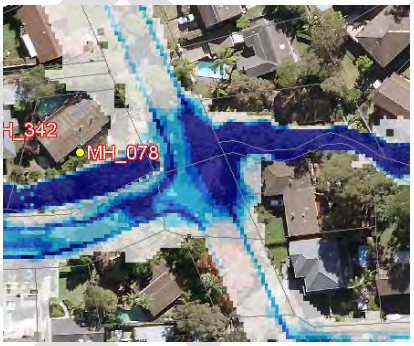


Image 2: Hydraulic model results at Elm Avenue, Belrose in 1998 event

Photo 24: Street flooding at Aldinga Place, Forestville in the 2022 event (MH_067)

Image 3: Hydraulic model results at Aldinga Place, Forestville in the 2022 event

Photo 25: Street flooding at cnr Coleraine Avenue and Starkey Street, Killarney Heights, date unknown (MH_296)

Image 4: Hydraulic model results at cnr Coleraine Avenue and Starkey Street, Killarney Heights in the 2022 event

Photo 26: Overland flow breaking out of Belrose channel at Kapunda Place, Belrose in the 2022 event (MH_387)

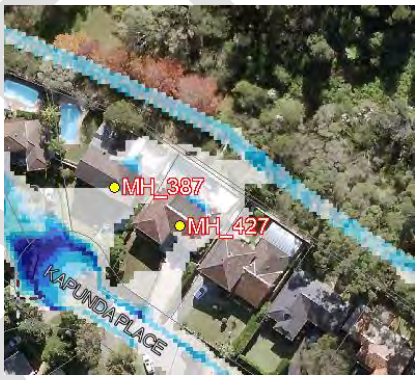


Image 5: Hydraulic model results at Kapunda Place, Belrose in the 2022 event

Photo 27: Overland flow through fence at Merelyn Road, Belrose in the 2022 event (MH_428)

Image 6: Hydraulic model results at Merelyn Road, Belrose in the 2022 event

Photo 28: Overland flooding at Bangalla Place, Killarney Heights in the 2022 event (MH_429)

Image 7: Hydraulic model results at Bangalla Place, Killarney Heights in the 2022 event

Photo 29: Flooding at Cullen Street, Forestville in the 2022 event (MH_501)

Image 8: Hydraulic model results at Cullen Street, Forestville in the 2022 event

Photo 30: Flooding at Pringle Avenue, Belrose in the 2022 event (MH_512)

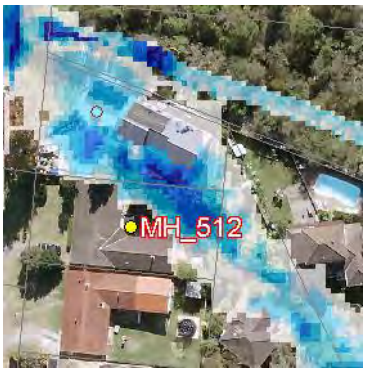


Image 9: Hydraulic model results at Pringle Avenue, Belrose in the 2022 event

Photo 31: Flooding at Merrilee Crescent, Frenchs Forest in the 2022 event (MH_554)

Image 10: Hydraulic model results at Merrilee Crescent, Frenchs Forest in the 2022 event

Photo 32: Street flooding at Roscommon Crescent, Killarney Heights in the 2022 event (MH_567)

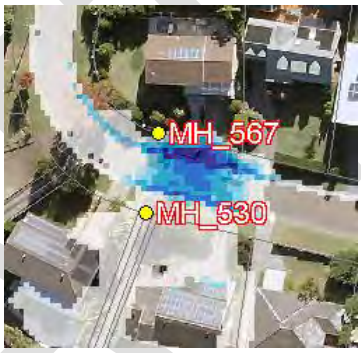


Image 11: Hydraulic model results at Roscommon Crescent, Killarney Heights in the 2022 event

Photo 33: Flooding at Melwood Avenue, Killarney Heights in the 2022 event (MH_576)

Image 12: Hydraulic model results at Melwood Avenue, Killarney Heights in the 2022 event

Photo 34: Street flooding at Starkey Street, Killarney Heights in the 2022 event (MH_586)

Image 13: Hydraulic model results at Starkey Street, Killarney Heights in the 2022 event

The comparison with these photographs is considered good. The estimated flood depths (by looking at features such as car tyres) aligns well with what was modelled. In addition, the flood extents are reproduced. Further discussion is provided in Section 6.4.2.

6.4.2. Validation to Observations

A comparison between flood observations reported by the community and the modelled flood behaviour is shown in Table B1 in Appendix B. The modelled peak flood depth on the property (or road, if the road is the subject of the response) is provided for each of the historic events, with a comparison to the modelled flood behaviour. In most cases, the modelled peak flood depth occurs adjacent to the building. This is due to the steep terrain and the shallow overland flow paths that affect many of the properties where flooding was observed. As shown in Photo 35, fast moving, shallow overland flow affects the house, but typically builds up on the upstream side of the house. This can be exacerbated in the model due to trapped locations and low points adjacent to the buildings where large flood depths are typically estimated. Where this is the case, it was noted in the comments as the modelled peak flood depths across the property may be more representative of the observed flood depths than immediately adjacent to the building.

Photo 35: Example of water ponding against a building (MH_576)

The modelled flood behaviour's match to the observed flood behaviour is given along with a comment. The following categories are used to indicate how good the match is:

- No: This indicates that no match was obtained. This is primarily due to the observations relating to local catchment runoff that has not been modelled, and hence a match is not possible. In some cases, judgement has been used to assess whether the observed flooding is local runoff or not.
- Poor: This indicates that a poor match to observations (typically flood depths or extents) was obtained. The difference between the modelled and observed flood depths may be ±0.3 m or more, or flooding on the property may not be modelled at all. Possible reasons for the poor match are provided.
- Fair: This indicates that the flood behaviour was generally replicated, however, the modelled flood depths may not match the observed depths (although typically within ±0.2 m), or the flow path may only be activated when considering the blocked drain scenario, for example.
- Good: This indicates that the modelled flood behaviour matches the observation well, with flood depths typically within ±0.1 m of the observed depths and the area of affectation replicated.

Overall, the comparisons indicate that generally a good match was achieved. In some cases, where a fair match was obtained, the flood behaviour was matched with the assumption of blocked drains in the 2022 event, which was a typical observation of the community. There were very few observations that had a poor match. In some cases, the local runoff that was observed to affect properties was not modelled. The depths, however, are typically shallow and these local drainage issues are not the focus of this study.

The major overland flow paths that impacted properties have been modelled, with key features such as the overtopping of gutters and channels, represented well. Both the hydrologic and hydraulic models produce a good representation of the observed flood behaviour, providing a validation that the models are suitable for simulating design flood events.

6.4.3. Validation to Flood Marks

Flood marks were available for the April 1998 event as described in Section 2.9. A comparison of the surveyed flood mark and modelled flood level at each of these locations is provided in Table 11 below. Modelled flood levels were rounded to 1 decimal place, as the survey data also appears to be rounded to 1 decimal place (except for FM_07, part of a different survey data set and provided to 2 decimal places).

Table 11: Comparison of surveyed flood marks and modelled flood levels for the April 1998 flood event

ID[1]	Location	Surveyed Level (mAHD)	Modelled Level (mAHD)	Difference (m)
FM_01	11 Elm Ave. At Elm Avenue crest.	125.7	125.7	0.0
FM_02	8A Elm Ave. Assumed at rear of property based on level (1.2 m higher than Elm Ave level), although survey points to front of property.	126.9	126.9	0.0
FM_03	3 Calool Cres Owner indicated at front of property at boundary.	124.1	124.1	0.0
FM_04	15 Calool Cres. Observed by 19 Calool Cres at front of property.	122.9	123.2	0.3
FM_05	19 Calool Cres. Owner indicated at front of driveway.	123.1	122.6	-0.5
FM_06	19 Calool Cres. Owner indicated at front of house. Water from road not channel.	121.7	122.1	0.4
FM_07	81 Pringle Ave. Water level 40mm above floor.	133.77	133.77	0.00

1. As shown in Figure B1

The match to the upstream flood marks near Elm Avenue (FM_01, FM_02 and FM_03) are very good, being within ±0.1 m (the precision of the survey data), as is the flood mark at Pringle Avenue (FM_07, within ±0.01 m). The flood marks downstream at the Calool Avenue bend are typically overestimated by 0.3 m to 0.5 m. Each of these are discussed as follows:

- FM_04: The surveyed level of 122.9 mAHD was marked in the centre of the front lawn. The modelled flood level at this location is 0.3 m higher than this. It is noted, however, that this block slopes down to the west, following the slope of Calool Crescent. At the western boundary the modelled flood level is in the range of 122.7 – 122.9 mAHD. The level was noted to be observed by No. 19, located to the west of the flood mark such that they may have observed a flood level closer to the western side of the block, where the modelled flood level is closer to the surveyed level.

- FM_05: The surveyed level of 123.1 mAHD was marked at the driveway entrance of No. 19. The modelled flood level at this location is 0.5 m below this. The observation from No. 19 was that the flow originated from Calool Crescent, rather than the adjacent channel. As such, the modelled flood level on Calool Crescent (before it overtops and flows down the driveway) is approximately 122.9 mAHD, only 0.2 m below the observed level. This may have been the observed level rather than part-way down the sloping driveway as marked.
- FM_06: The surveyed level of 121.7 mAHD was marked at approximately the building location at No. 19. The modelled flood level at this location is 0.4 m higher than this. The observed flood behaviour is replicated, with water originating from Calool Crescent rather than the adjacent channel. The flood level, however, is overestimated. It is noted that the land slopes from front to back such that the modelled flood level at the front door (rather than the garage) is 121.9 mAHD, which is closer to the surveyed level.

It is difficult to reconcile the surveyed flood levels, given that FM_05 is higher than the upstream flood level at FM_04. The flood level also varies by 1.2 m between FM_04 and FM_06, over a distance of just 30 m. It is hard to know exactly where these levels were observed, what the accuracy of the survey was and if there were local features (retaining walls, etc) that may have influenced flood behaviour of these overland flows. The average difference across these three points is less than 0.1 m and reasons are provided above as to why this may be even closer than stated difference. The model replicates the flood levels at the upstream end of Calool Crescent, and while there are some discrepancies at the downstream end, the flood behaviour in general is replicated. This further reinforces that the hydrologic and hydraulic models are suitable for simulating design flood events.

6.5. Hydraulic Model Sensitivity

The March 2022 storm event was used to investigate the sensitivity of the model on selected parameters. The model sensitivity assessment included the following:

- temporal pattern
- rainfall losses
- blockage
- cell size

Each of these is discussed in the following sections.

6.5.1. Temporal Pattern Sensitivity

For the calibration to the 2022 event, the East Lindfield Bowling Club was the adopted temporal pattern. For this sensitivity analysis, the North St Ives (Police Driving School) temporal pattern was selected. The temporal patterns are similar, although the North St Ives gauge has a larger proportion of the rainfall occurring in the first 24 hours of the storm, prior to the main burst, whereas the East Lindfield Bowling Club had a larger proportion occurring within the main storm burst on the 8th of March. Approximately 60% of the rainfall occurs within the main burst at the East Lindfield gauge, whereas only 45% occurs at the North St Ives gauge. This tests the

sensitivity of the intensity of short duration rainfall bursts.

The change in peak flood level with the North St Ives temporal pattern is shown in Figure B7 and Figure B8. As expected, with a smaller proportion of rainfall within the main burst, there are widespread decreases in flood levels across the study area. These reductions are typically less than 0.1 m on shallow overland flow paths, although there are some overland flows paths that are not activated, with the runoff being conveyed in the stormwater network. At sag locations, the reduction can be significant (up to 0.5 m), where the North St Ives temporal pattern, representing a more 'spread out' storm over two days, results in runoff that can be conveyed by the stormwater network, resulting in less ponding. In the case of the East Lindfield temporal pattern, the substantial rainfall burst results in the stormwater network being overwhelmed and ponding occurring at sag locations. Within the downstream natural creeks, the reduction in peak flood level can be up to 1 m.

This demonstrates the model is relatively sensitive to the adopted temporal pattern for the calibration event. The East Lindfield temporal pattern was selected for the 2022 calibration event as it better reproduced the observed flood behaviour. However, it is noted that the actual storm temporal pattern at any point in the catchment may have been different, and could result in different flood levels and flow paths. This uncertainty in the rainfall is one of the key reasons why a detailed 'calibration' was not undertaken.

6.5.2. Rainfall Losses Sensitivity

For the calibration events, an initial loss of 5 mm and continuing loss of 0.8 mm/h was adopted. For this sensitivity analysis, an initial loss of 0 mm and continuing loss of 0 mm/h was adopted. Assuming no rainfall losses would increase the runoff from pervious areas.

The change in peak flood level for the 2022 event with zero rainfall losses is shown in Figure B9 and Figure B10. The results indicate that there is negligible change in peak flood levels across the study area. The modelled peak flood levels are therefore insensitive to the adopted rainfall losses. This is due to the reasonably long storm duration modelled, where initial losses only influence the rainfall prior to the main burst, in addition to the intensity of the main burst, where continuing losses do not have a significant influence.

6.5.3. Blockage Sensitivity

For the calibration events, a 20% blockage of on-grade stormwater pits and 50% blockage of sag pits and culverts were adopted. For this sensitivity analysis, a blockage factor of 99% was applied to all hydraulic structures. A large proportion of the community responses noted blocked drains as a major contributor to the observed flooding, and as such a high blockage was tested for the stormwater network. It is not anticipated that all structures in the catchment would ever simultaneously be blocked to this degree, but rather the impact of blocked structures at individual locations can be investigated.

The change in peak flood level for the 2022 event with a blocked stormwater network is shown in Figure B11 and Figure B12. The results indicate that the majority of areas experience an increase in flood level of less than 0.1 m, although several new overland flow paths are formed. This occurs when water overtops the gutter and begins to flow downhill through properties. This is a common occurrence given the 'hilly' nature of the study area. The most significantly affected area is the flow path running parallel to Pringle Avenue, between Ralston Avenue and Hews Parade. The flood level increase is in the order of 0.2 m, with a maximum increase of 0.4 m at the Knightsbridge Avenue sag point.

6.5.4. Cell Size Sensitivity Analysis

Cell size sensitivity was investigated by altering the TUFLOW model to run with a 2 m grid. A 2 m grid is still considered adequate for urban flood modelling. With a 2 m grid, the entire study area is able to be simulated in a single model. The change in peak flood level for the 2022 event with a 2 m grid is shown in Figure B13 and Figure B14. The results contain some 'noise' due to the resampling of grids in order to obtain a comparison, however, the levels are typically within ±0.05 m. The main difference is that with the 2 m model some overland flow paths are widened or newly formed, while there are some flow paths that no longer exist. This difference can be attributed to the representation of local hydraulic features such as the kerb and gutter system.

The 2 m model setup was adopted for the critical duration assessment (Section 7.8). This is appropriate since the critical duration assessment is concerned with a comparative flood level along major flow paths (rather than absolute levels or extents). The 1 m model was retained for the simulation of the calibration events and the design flood events and should be adopted for all future uses of the model (such as flood impact assessments).

7. DESIGN FLOOD EVENT MODELLING

7.1. Overview

ARR 2019 guidelines (Reference 11) for design flood modelling were adopted for this study. The new guidelines were first published in 2016 and finalised in 2019, and present a significant update on the previous version published in 1987 (Reference 6). Since 1987, there have been numerous advances in the understanding of rainfall-runoff processes, technological advances and a larger set of recorded rainfall data available. This additional 30 years of data (from approximately 1985 to 2015), particularly for continuously recorded rainfall (pluviometers), allows for Australia-specific techniques and regionalised information to be used across the country. Specifically related to design flood modelling there is updated IFD rainfall information, design temporal patterns, ARFs and rainfall losses to consider.

ARR 2019 guidelines were used to estimate the 50%, 20%, 10%, 5%, 2%, 1%, 0.5%, 0.2%, 0.1%, 0.05% AEP events. The PMF flows were derived using the BoM's Generalised Short Duration Method (GSDM, Reference 17) to estimate the probable maximum precipitation (PMP). A detailed critical duration analysis was undertaken to determine the most representative duration and temporal pattern across the catchment. The selected storm for each design event was then used to simulate the design flood behaviour.

This section outlines the design flood inputs and parameters that were used and the critical duration analysis.

7.2. Intensity Frequency Duration

IFD information was obtained from the BoM using 2016 data. It was noted that the IFD varies slightly across the Middle Harbour study area, with higher design rainfalls occurring along the eastern boundary (ridge line) and lower rainfalls occurring along the western boundary (Middle Harbour Creek). The difference between the maximum and minimum rainfall depths is approximately 5% across a range of AEPs and durations inspected. A summary of rainfall depths at the catchment centroid (near Belrose, representing a reasonably high rainfall for the catchment) is provided in Table 12, noting that the adopted IFD for any sub-catchment may vary within ±5% of this.

Table 12: Design rainfall depths (mm) at the centroid of the Middle Harbour study area

Duration (min)	AEP									
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	0.1%	0.05%
10	14.7	19.9	23.7	27.5	32.8	37	39.7	44.9	48.9	52.9
20	21.1	28.6	34	39.4	47	52.9	57	64.5	70.2	76.1
30	25.1	33.9	40.2	46.6	55.5	62.6	67.6	76.5	83.3	90.3
45	29.3	39.3	46.5	53.9	64.2	72.5	78.5	88.9	96.6	105
60	32.5	43.4	51.3	59.4	70.8	80.1	86.8	98.2	107	116
90	37.4	49.8	58.8	68.1	81.2	92	99.6	113	123	133
120	41.4	55.1	65	75.3	89.9	102	110	125	136	147
180	48.1	63.9	75.5	87.6	105	119	128	145	158	171
270	56.4	75.1	89	104	124	141	151	171	186	201
360	63.5	85	101	118	141	161	172	194	211	228

The design rainfalls for the PMP were derived using the BoM's GSDM approach (Reference 17). The catchment terrain was estimated to be 'rough' with an elevation adjustment factor of 1 and a moisture adjustment factor of 0.7. The GSDM requires rainfall to be distributed spatially using ellipses. Ellipse 'A', at the centre, has an area of 2.6 km^2 and represents the region of highest rainfall. Given the nature of the study area and the focus on overland flow paths through urban areas, it was assumed that all the flow paths and creeks of interest would have an upstream catchment area less than this, and as such the ellipse 'A' rainfall was applied to all sub-catchments. It would only be in the downstream forested reaches of the major creeks that this approach may overestimate the rainfall runoff using this approach.

7.3. Temporal Patterns

Temporal patterns are a hydrologic tool that describe how rain falls over time. Previously, with ARR 1987 guidelines (Reference 6), a single temporal pattern was adopted for each rainfall event duration. However, ARR 2019 (Reference 11) discusses the potential inaccuracies with adopting a single temporal pattern and recommends an approach where an ensemble of different temporal patterns is investigated.

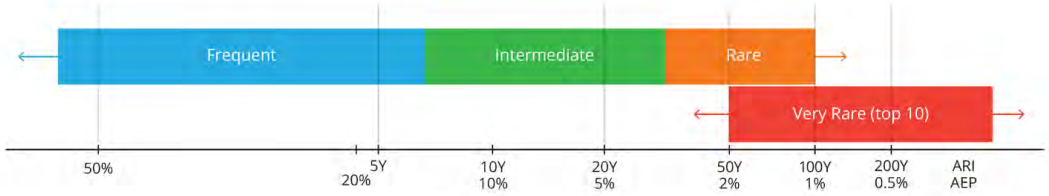
Temporal patterns for this study were obtained from the ARR 2019 data hub (Reference 16, http://data.arr-software.org/). A summary of the data hub information at the catchment centroid is presented in Attachment A. The revised 2019 temporal patterns attempt to address the key concerns practitioners found with the ARR 1987 temporal patterns. It is widely accepted that there are a large variety of temporal patterns possible for rainfall events of similar magnitude. This variation in temporal pattern can result in significant effects on the estimated peak flow. As such, the revised temporal patterns have adopted an ensemble of ten different temporal patterns for a particular design rainfall event and duration. Given the rainfall-runoff response can be quite catchment specific, using an ensemble of temporal patterns attempts to produce the median catchment response.

As hydrologic modelling has advanced, it is becoming increasingly important to use realistic

temporal patterns. The ARR 1987 temporal patterns only provided a pattern of the most intense burst within a storm, whereas the ARR 2019 temporal patterns look at the entirety of the storm including pre-burst rainfall, the burst and post-burst rainfall. There can be significant variability in the burst loading distribution (i.e. depending on where 50% of the burst rainfall occurs an event can be defined as front, middle or back loaded). The ARR 2019 method divides Australia into 12 temporal pattern regions, with the Middle Harbour catchment falling within the East Coast South region.

ARR 2019 provides 30 temporal patterns for each duration which are sub-divided into three temporal pattern bins based on the frequency of the events. Diagram 4 shows the three categories of bins (frequent, intermediate and rare) and corresponding AEP groups. The “very rare” bin is in the experimental stage and was not used in this flood study. There are ten temporal patterns for each AEP/duration in ARR 2019 that have been utilised in this study for the 50% AEP to 0.05% AEP events. The rare temporal pattern bin was adopted for events rarer than the 1% AEP.

Diagram 4: Temporal Pattern Bins



The method employed to estimate the PMP utilises a single temporal pattern (Reference 17).

7.4. Rainfall Losses

The adopted pervious area rainfall losses for the calibration events were 5 mm initial loss and 0.8 mm/h continuing loss. These losses are not considered to be ‘calibrated’ due to the lack of streamflow gauges within the study area. For design flood modelling, the probability neutral burst initial losses from the ARR datahub (Reference 16, http://data.arr-software.org/) were adopted, in line with recent advice from the NSW Government (Reference 18). These initial losses were sourced from the ARR datahub at the centroid of each individual sub-catchment. The losses vary with storm duration and AEP, however are generally in the range of 5 mm to 15 mm for the durations of interest. The probability neutral burst initial losses at the study area centroid are shown in Table 13.

Table 13: ARR datahub probability neutral burst initial losses (mm) at the study area centroid

Duration (min)	AEP					
	50%	20%	10%	5%	2%	1%
60	12.3	8.1	9	8.7	8.6	6.6
90	11.8	8.1	9.5	9.7	9.5	7
120	13.4	9	10.2	10	10.1	6
180	13.8	9.3	10.6	10.1	8.9	4.3
360	13.2	8.6	8.8	8.1	9.1	3.7

Note 1: For AEPs rarer than 1% (i.e. 0.5%, 0.2%, 0.1% and 0.05%), the 1% AEP losses have been adopted
Note 2: For durations not listed in this table, losses were interpolated, or for durations less than 60 minutes, the 60 minute losses were applied

For continuing losses, the Middle Harbour study area is covered by four ARR data hub loss grid cells, with continuing losses ranging from 1.6 mm/h to 2.0 mm/h. Recent advice provided by the NSW Government (Reference 18) indicates that these losses should be factored by 0.4 for NSW catchments. This results in continuing losses of 0.64 mm/h to 0.8 mm/h across the study area. Again, continuing losses were sourced from the ARR datahub at the centroid of each individual sub-catchment.

The PMP event adopted an initial loss of 1 mm and continuing loss of 0 mm/h.

7.5. Areal Reduction Factors

The design rainfall estimates are based on point rainfalls and in reality, the catchment-average rainfall depth will be less. ARFs allow for the fact that larger catchments are less likely than smaller catchments to experience high intensity storms simultaneously over the whole catchment area. Given the nature of the study area and the focus on overland flow paths through urban areas, ARFs were not applied in the WBNM model. In accordance with ARR 2019 (Reference 11), catchments with an area up to 1 km^2 should not apply ARFs, and there is limited research on the applicability of ARFs to catchments that are less than 10 km^2. The largest catchment to an urban area is Frenchs Creek to Calool Crescent. The area of this catchment was estimated to be approximately 1.5 km^2 and hence the adoption of no ARFs is reasonable.

7.6. Downstream Boundary and Initial Conditions

A static downstream boundary of 1.4 mAHD was set, primarily to allow water flowing to Middle Harbour Creek to flow out of the model. This water level represents approximately a 2% AEP design still water ocean level. The focus of this study is not on inundation from Middle Harbour Creek, due to either tidal inundation or rainfall driven flooding from the wider Middle Harbour Creek catchment. Both of these mechanisms of flooding would only affect the very downstream forested parts of the study area, noting that the lowest urbanised area of interest is at approximately 70 mAHD in the southern portion of the catchment (Killarney Heights). Thus, coincident flooding from Middle Harbour Creek was not simulated as part of this study.

The study area was assumed to be dry at the start of the storm, except for areas subject to tidal inundation.

7.7. Blockage

ARR 2019 (Reference 11) recommends applying blockage to hydraulic structures, and outlines a methodology to determine inlet blockage factors by considering debris availability, debris mobility, debris transportability and waterway opening of the structure. This assessment was undertaken for key culvert structures within the study area (Table 1). These structures fell into two categories, for which AEP dependent blockages were estimated in accordance with ARR 2019 procedures. The blockage factors from this analysis are shown in Table 14.

Table 14: Blockage assessment results of key hydraulic structures

AEP	Blockage of small[1] structures	Blockage of large[2] structures
More frequent than 5%	25%	10%
5% to 0.5%	50%	20%
Rarer than 0.5%	100%	20%

[1] Generally smaller structures with a diameter or width less than 1.2 m (the assumed L_{10}), with typically a medium 1% AEP debris potential

[2] Generally larger structures with a diameter or width greater than or equal to 1.2 m (the assumed L_{10}), with typically a high 1% AEP debris potential

A single blockage factor was considered appropriate across the range of design flood events, with the adopted blockage factors outlined in Table 15. This includes culverts discussed above, in addition to pit inlets and GPTs.

Table 15: Adopted Blockage Factors

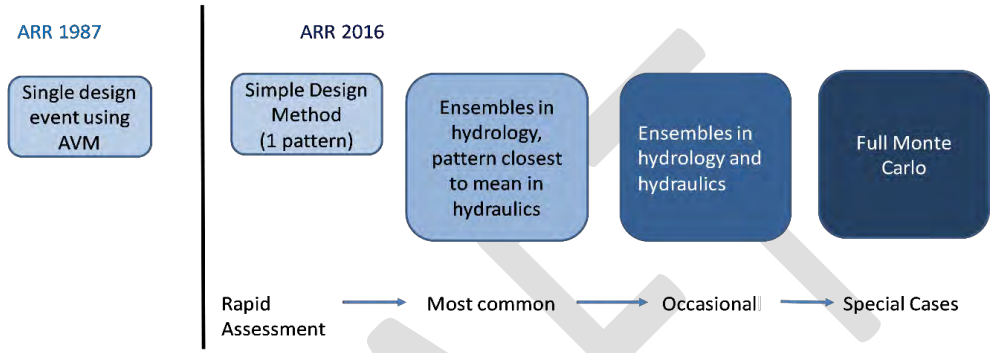
Structure	Type	Design Blockage (%)
Small Culverts (Dia/Width < 1.2 m)	Culvert	50%
Large Culverts (Dia/Width ≥ 1.2 m)	Culvert	20%
Sag Pit	Pit	50%
On-grade Pit	Pit	20%
Waterfall Avenue GPT	GPT	50%
Prahran Avenue GPT	GPT	50%
Starkey Street GPT	GPT	75%
Currie Road GPT	GPT	75%

7.8. Critical Duration Assessment

7.8.1. Approach

ARR 2019 requires an ensemble of temporal patterns to be run for each AEP and duration combination, and the 'occasional' approach was adopted for Middle Harbour, as shown in Diagram 5.

Diagram 5: Design modelling techniques for an ensemble of temporal patterns (Reference 11)



This approach requires the ensemble of temporal patterns to be run in both the hydrologic and hydraulic models. This approach was adopted due to the complex nature of the shallow overland flow paths through the urban areas, which are of interest in the study. Total flows at key locations cannot readily be extracted from the WBNM hydrologic model due to the nature of these flow paths.

7.8.2. Critical Duration

The critical duration is the storm duration that best represents the flood behaviour (e.g. flow or level) for a specific design magnitude at a particular location. It is generally related to the catchment size, as flow takes longer to concentrate at the outlet from a larger catchment, as well as other considerations such as land use, shape stream characteristics, etc.

With ARR 2019 methodology, the mean flow (or level) is computed from the ensemble of temporal patterns for each duration. The critical storm duration for a location of interest is then the design storm duration that produces the highest mean flow (or level). Where there are multiple locations of interest with different contributing catchment sizes, there can be multiple critical durations that need to be considered.

7.8.3. Representative Storm Burst

Once the critical duration is established, it is usually desirable to select a representative design storm temporal pattern that reproduces this behaviour for all points of interest. This representative storm can then be used for determining design flood behaviour and for future modelling to inform

floodplain management decisions. This is typically the storm that produces the next highest flow (or level) above the average (from the ensemble of temporal patterns) for the critical duration. In most cases, however, a representative storm does not necessarily need to be of the same duration as the critical duration, and there may be a number of storms that can represent the critical duration behaviour, potentially at multiple locations and even where the critical duration varies.

Adopting a range of critical durations across a catchment can complicate future analysis and the use of modelling tools if multiple storms need to be simulated to obtain the design flood behaviour for a particular event. Thus, it is preferable to adopt a single representative storm that is similar to the critical duration behaviour for each event where possible.

7.8.4. Representative Storm Selection

To select the representative storm for each AEP for the Middle Harbour study area, the WBNM hydrologic model was run for durations from 10 minutes to 3 hours, with the ensemble of temporal patterns for the 20% AEP, 5% AEP and 1% AEP events (representative of each temporal pattern bin). Each of these storms was then simulated in the TUFLOW model. The 2 m grid TUFLOW model was adopted, as described in Section 6.5.4. This enabled a quicker runtime than the 1 m models, with the results considered to be adequate for the purpose of the critical duration assessment. The results also cover the entire study area, removing the need for assessing the northern and southern portions of the study area separately. For each duration, a grid of the mean peak level at each grid cell was calculated. A maximum envelope grid was then calculated taking the highest mean peak level for each grid cell. This shows the critical duration mean peak level at all flooded cells across the study area. The source of the peak mean level for each grid cell was mapped to show the variation in critical duration across the catchment. This critical duration map is shown in Figure 27 and Figure 28. A histogram of the frequency of cells for each duration is shown in Diagram 6 for each of the events. This indicates that the majority of the study area is dominated by the 10 minute, 15 minute and 20 minute duration storms.

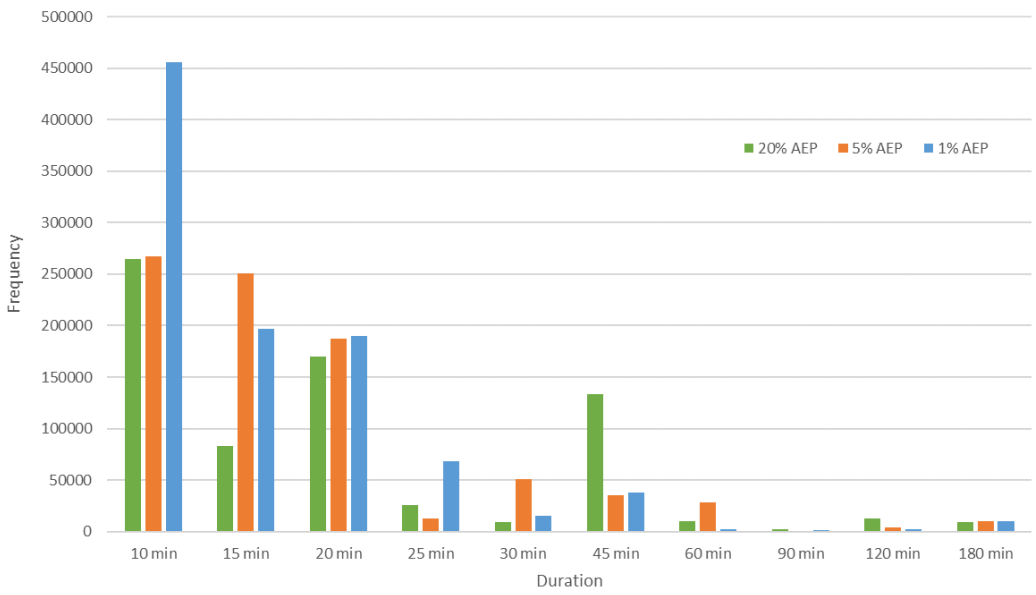


Diagram 6: Histogram of critical durations across the study area

Through a comparison of the peak flood level grid for each storm with the critical duration mean peak level across the entire study area, a representative storm was selected for each AEP event simulated. This was a particular temporal pattern from the 20 minute storm duration. The selected storms result in minimal variation in peak water level from the critical duration mean peak level. The selected storm typically results in slightly higher levels by up to 0.05 m. This difference is shown in Figure 29 and Figure 30 for the 1% AEP event.

A similar, but simplified approach was undertaken for the PMF event, whereby a single storm was run for durations from 15 minutes to 2 hours. The results indicated that the 15 minute storm was critical across the majority of the urbanised study area, with the 30 minute storm dominating in the downstream forested creek areas. For the purpose of this study, the 15 minute PMP storm was selected.

The selected storms were considered representative for all design events within that temporal pattern bin (Diagram 4). The selected storms were adopted for modelling of the design flood events and processing of flood results (as described in Section 8). The adopted representative design storms are summarised in Table 16.

Table 16: Adopted Representative Design Storms

Temporal Pattern Bin	Events	Duration (mins)	Temporal Pattern ID (Ensemble No.)
Frequent	50% AEP 20% AEP	20	4452 (7)
Intermediate	10% AEP 5% AEP	20	4444 (10)
Rare (2% AEP to 0.05% AEP)	2% AEP 1% AEP 0.5% AEP 0.2% AEP	20	4359 (1)
N/A	PMP	15	GSDM

8. DESIGN FLOOD EVENT RESULTS

8.1. Overview

The 50%, 20%, 10%, 5%, 2%, 1%, 0.5%, 0.2%, 0.1% and 0.05% AEP events were simulated using the adopted representative 20 minute design storms. The PMF event was also simulated using the 15 minute PMP storm. The storms were run in the WBNM model and the resulting flows were input into the TUFLOW model to simulate flood behaviour across the study area. The results for the design flood events are presented in the following maps:

- Peak flood depths in Figure C1 to Figure C22;
- Peak flood levels in Figure C23 to Figure C44;
- Peak flood velocities in Figure C45 to Figure C66;
- Hydraulic hazard in Figure C67 to Figure C76;
- Hydraulic categories in Figure C77 to Figure C86;
- Properties at risk analysis in Figure C87 to Figure C90;
- Flood emergency response classification of communities in Figure C91 and Figure C92, and
- Flood planning area in Figure C93 and Figure C94.

These results are available in electronic GIS and tabular format. The digital data should be used in preference to the figures in this report as they provide more detail. The maps are intended to provide an overview of the results and should not be relied upon for detailed information at individual properties.

Additional results are presented in the following tables and graphs:

- Stage hydrographs at road crossings in Figure D1 to Figure D19; and
- Peak flood levels, depths and flows at road crossings and key locations in Table D1, Table D2 and Table D3, respectively.

A discussion of these results is provided in the following sections.

8.2. Summary of Results

The flood behaviour across the Middle Harbour study area can be seen in the peak flood depth maps (Figure C1 to Figure C22), peak flood level maps (Figure C23 to Figure C44) and peak velocity maps (Figure C45 to Figure C66). These results are presented for the range of design flood events modelled from the 50% AEP to the PMF event. A tabulated summary of peak flood levels, depths and flows at selected locations, as shown in Figure 31 and Figure 32, are detailed in Table D1, Table D2 and Table D3, respectively.

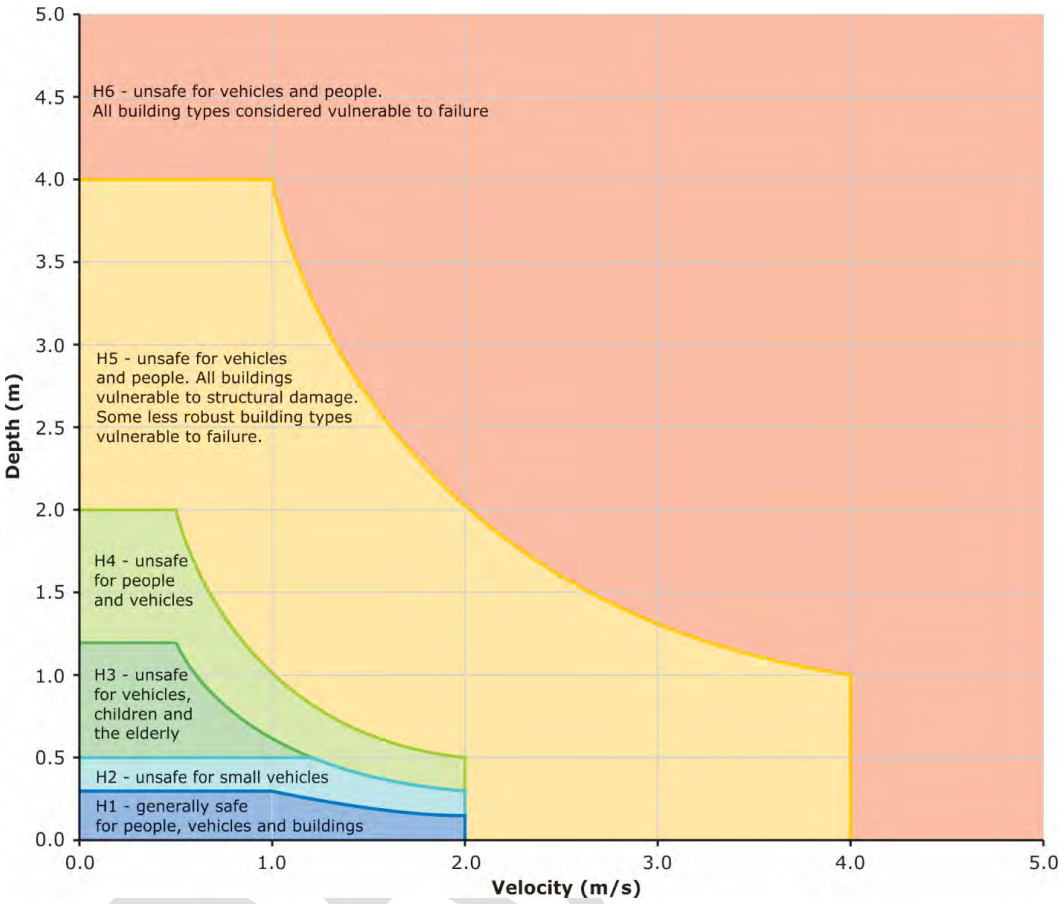
In frequent events, the flow is generally shallow (<0.15 m) and contained within the gutters and dedicated drainage reserves in the urban areas. There are some areas, however, where shallow overland flow paths form through properties. Within the major creeks, flow is typically contained within the channel. In rarer events, more of the overland flow paths form through urban areas as

the stormwater network and kerb and gutter system reach capacity. Given the steep nature of the study area, many of these flow paths remain shallow. Ponding at sag points becomes more prominent in these events as well as creeks overtopping road crossings, with key locations including Knightsbridge Avenue, Elm Avenue, Calool Crescent and Haigh Avenue in Belrose; Borgnis Street in Davidson; Peacock Parade, Hakea Avenue and Prahran Avenue in Frenchs Forest; Yallumba Close and Starkey Street in Forestville. In the PMF event a large portion of the study area is inundated, although much of this is still shallow overland flow, with deeper areas restricted to channels, concentrated flow paths and sag points.

8.3. Hydraulic Hazard Categorisation

Hydraulic hazard is a measure of potential risk to life and property damage from flooding. Hydraulic hazard is typically determined by considering the depth and velocity of floodwaters. In recent years, there have been a number of developments in the classification of hazards. Research has been undertaken to assess the hazard to people, vehicles and buildings based on flood depth, velocity and velocity depth product. ARR 2019 (Reference 11) contains updated recommendations regarding the categorisation of flood hazard. A summary of this categorisation is provided in Diagram 7. This categorisation is based on an extensive literature review and laboratory testing. It considers hazard to people, vehicles and buildings to develop 6 categories of flood hazard based on flood depth, velocity and depth-velocity product.

Diagram 7: General flood hazard vulnerability curves (Source: Reference 11)



The following 6 classes of hazard are defined:

- H1 – Generally safe for vehicles, people and buildings;
- H2 – Unsafe for small vehicles;
- H3 – Unsafe for vehicles, children and the elderly;
- H4 – Unsafe for vehicles and people;
- H5 – Unsafe for vehicles and people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure; and
- H6 – Unsafe for vehicles and people. All building types considered vulnerable to failure.

The hazard categories using the ARR 2019 classification are mapped in Figure C67 to Figure C76 for the 5% AEP, 1% AEP, 0.2% and PMF events. In the 5% AEP event, much of the urban area is affected by H1 hazard, with areas of higher hazard (H3 and above) is generally restricted to creek channels. There are some areas of higher hazard where creeks overtop roads or where high velocity water flows down streets. In the 1% and 0.2% AEP events the higher hazard areas increase within the creeks and major flow paths. In the PMF event many of the roads and flow paths conveying a substantial amount of water are classified as H5 and H6.

8.4. Hydraulic Categorisation

Hydraulic categorisation involves mapping the floodplain to indicate which areas are most important for the conveyance of floodwaters and the temporary storage of floodwaters. This can help in planning decisions about which parts of the floodplain are suitable for development, and which areas are not restricted to ensure that flooding impacts are not worsened compared to existing conditions.

The Flood Risk Management Manual (Reference 1) defines three hydraulic categories which can be applied to different areas of the floodplain depending on the flood function:

- Floodways;
- Flood Storage; and
- Flood Fringe.

Floodways are generally areas which convey a significant portion of water during floods and are particularly sensitive to changes that impact flow conveyance. They often align with naturally defined channels. Flood storage areas are located outside of floodways and generally store a significant proportion of the volume of water. Flood behaviour in these areas is sensitive to changes that impact on the storage of water during a flood. Flood fringe areas are within the extent of flooding for a particular event but are outside floodway and flood storage areas. The flood fringe is less sensitive to changes in either flow conveyance or storage.

Guidance on the definition of hydraulic categories is found in the Flood Risk Management Guideline FB01: Flood Function (Reference 19). Techniques for identifying floodways include indicator techniques (typically reliant on depth, velocity and depth-velocity product), encroachment techniques (where the flood extent is progressively encroached until the limit of an acceptable increase in flood level is reached) and conveyance techniques (where a suitable proportion of the total flow on a flowpath). Flood storage areas can be identified using indicator or encroachment techniques. The guideline recognises that “defining flood function in overland flooding areas is complex. Due to the complexity of flowpaths in overland flow, the conveyance or encroachment techniques are difficult to use. The indicator technique is likely to be the most appropriate technique for identifying floodways and flood storage areas in overland flooding areas.” (p.16, Reference 19). The indicator technique has been adopted for this study given the complex overland flow behaviour, following the process developed by Howells *et al* (Reference 20).

For this study, hydraulic categories were defined by the following criteria and is a reasonable representation of the flood function of this catchment:

- Floodway is defined as areas where:
  - the peak value of velocity multiplied by depth (V x D) > 0.25 m^2/s, **AND** peak velocity > 0.25 m/s, **OR**
  - peak velocity > 1.0 m/s **AND** peak depth > 0.2 m;

  The remainder of the floodplain is either Flood Storage or Flood Fringe;
- Flood Storage comprises areas outside the Floodway where peak depth > 0.2 m; and

- Flood Fringe comprises areas outside the Floodway where peak depth < 0.2 m.

The hydraulic categories have been mapped in Figure C77 to Figure C86 for the 5% AEP, 1% AEP, 0.2% AEP and PMF events. As expected, the creeks and major flow paths are classified as floodways in the 5% AEP, 1% AEP and 0.2% AEP events, with flood storage areas where there is ponding on road sag points, on the upstream side of buildings and other isolated areas. In the PMF event, the majority of flow paths have floodways in them with only shallow overland flow remaining as flood fringe.

8.5. Flood Emergency Response Planning

8.5.1. Properties at Risk Analysis

A properties at risk analysis was undertaken for the study area. This analysis investigated the flood hazard on lots and at buildings, to identify areas at higher risk. The ARR classification of hazards (Reference 11, see Section 8.3) was used to categorise the risk to lots and buildings. The maximum hydraulic hazard at each building (as identified in the buildings layer used in the TUFLOW model) for the 1% AEP event was obtained via a GIS analysis, considering the peak flood hazard within 2 m of the building footprint. The results are shown in Figure C87 and Figure C88, for the north and south regions of the study area. This is representative of the hazard that the building may be subject to in the 1% AEP event. The maximum hydraulic hazard for the 1% AEP event within each cadastre lot was also obtained, with the results presented in Figure C89 and Figure C90.

While the lot-based approach provides a broad overview of key areas of concern, it is the buildings approach that provides the best information for site-specific flood risk to buildings where people may be located during storm events. Some of the key locations with high flood risk (H5 and H6, where buildings are vulnerable to structural damage and/or failure) include the following:

- On two flow paths between Ralston Avenue and Hews Parade, Belrose,
- Calool Crescent, Belrose,
- Around Coora Avenue, Belrose,
- On a flow path between Malbara Crescent and Prahran Avenue, Frenchs Forest,
- On a flow path between Blackbutts Road and Merrilee Crescent, Frenchs Forest,
- On a flow path between Keldie Street and Yallumba Close, Forestville.

8.5.2. Road Inundation

There are numerous local roads throughout the study area that are subject to inundation. The inundation is typically shallow as overland flows are conveyed along road corridors. In some areas, where major flow paths cross roads, however, the depth of flow can be significant. At some of the major road crossings, water level hydrographs (for critical storm durations only) have been provided in Figure D1 to Figure D19 of Appendix D. It is acknowledged that the critical storm durations are associated with peak flood levels and there may also be longer duration storms that cause roads to be inundated for longer periods (albeit to a shallower depth). However, given the

generally short duration of flooding in the study area, it was not considered warranted to show a wider range of storm durations. Peak flood levels, depths and flows at key locations are also provided in Table D1, Table D2 and Table D3, respectively. The locations of these road crossings are shown in Figure 31 and Figure 32.

Some of the deepest flooding experienced is in the upper catchment of Frenchs Creek, on a flow path that crosses Knightsbridge Avenue and Lynette Place. The 1% AEP flood depth is over 1 m on these roads. Flood depths on other roads throughout the study area range between 0.3 m and 1 m in the 1% AEP event. While there are some road crossings not inundated in the 50% AEP event, all road crossings analysed were inundated in the 20% AEP event.
The rate of rise at each of the road crossings is very quick, typically within 10 to 20 minutes of the onset of rainfall. This is driven by the quick catchment response and the selected critical duration storms (20 minutes). It also means, however, that the duration of inundation is also short, with flooding typically lasting less than 30 to 40 minutes.

8.5.3. Flood Emergency Response Classification

The Flood Risk Management Manual (Reference 1) requires flood studies to address the management of continuing flood risk to both existing and future development areas. As continuing flood risk varies across the floodplain, so does the type and scale of the emergency response problem and therefore the information necessary for effective Emergency Response Planning (ERP). Classification provides an indication of the vulnerability of the community in flood emergency response and identifies the type and scale of information needed by the NSW State Emergency Service (SES) to assist in ERP as well as information to support flood risk management, land use planning and infrastructure planning.

The Flood Emergency Response Classification (FERC) for the study area was undertaken in accordance with the Flood Risk Management Guideline EM01: Support for Emergency Management Planning (Reference 21). FERC considers flood affected communities as those in which the normal functioning of services is altered, either directly or indirectly, and results in the need for external assistance. This impact relates directly to the operational issues of evacuation, resupply and rescue, which is coordinated by the SES.

The FERC is undertaken using 3 key considerations:

- Is the area flooded?
- Is the area isolated?
- What are the consequences of flooding?

Based on these considerations, 6 FERC categories are identified, as summarised in Table 17. For the purposes of this study, categories with the same consequences were grouped together. That is, the high flood island and high trapped perimeter areas, and the low flood island and low trapped perimeter areas. This is the ‘general approach’ identified in Reference 21, and shown visually in a flow chart in Diagram 8.

Table 17: Flood Emergency Response Classification of Communities

Classification	Description	Flooded?	Isolated?	ERP Consequences		
				Evacuation?	Resupply?	Rescue?
High flood island	Area not flooded, but surrounded by floodwaters (cut off).	No	Yes (access via boat or aircraft only)	Unlikely (only prior to access cut off)	Yes	Possibly for emergencies
Low flood island	Area first surrounded by floodwaters (limiting evacuation) and is then inundated.	Yes	Yes	Unlikely (only prior to access cut off)	No	Required to save lives
High trapped perimeter	Area not flooded, but is cut off by floodwaters and impassable terrain/structures.	No	Yes (access via boat or aircraft only)	Unlikely (only prior to access cut off)	Yes	Possibly for emergencies
Low trapped perimeter	Area first cut off by floodwaters and impassable terrain/structures, and is then inundated.	Yes	Yes	Unlikely (only prior to access cut off)	No	Required to save lives
Area with rising road access	Areas affected by flooding, but where roads are accessible to vehicles, rising away from floodwaters.	Yes	No (road access as floodwaters rise)	Likely (as floodwaters rise)	Not required	Possibly (if evacuation is delayed)
Area with overland escape route	Areas affected by flooding and where vehicle access is cut off, but evacuation on foot is possible.	Yes	No (pedestrian access as floodwaters rise)	Likely (as floodwaters rise)	Not required	Possibly (for those not able to walk)
Indirectly affected areas	Areas not inundated, but may be subject to disruptions to utility supply, transport links or communications.	No	No	Yes	Yes	Not required

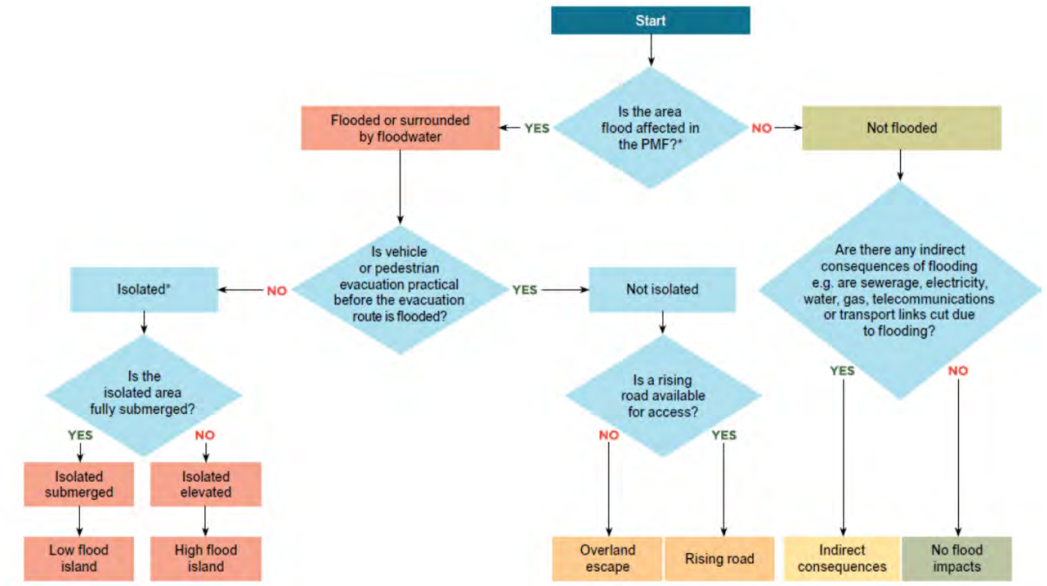


Diagram 8: Flow Chart for Determining Flood Emergency Response Classification of Communities (Reference 21)

The FERC for urban regions within the hydraulic model extent have been defined using the PMF flood event, and can be seen in Figure C91 and Figure C92. The classification has been undertaken on a precinct basis rather than lot-by-lot and is targeted at highlighting those areas which may require evacuation or assistance during a flood event. However, these classifications may vary depending on local flood characteristics and resultant flood behaviour, i.e. in flash flooding or overland flood areas.

Some of the key areas with evacuation difficulties (flood islands and trapped perimeter areas) include the following:

- Knightsbridge Avenue and St Annes Close, Belrose,
- Lynette Place, Belrose,
- Elm Avenue and Calool Crescent, Belrose,
- Kapunda Place, Belrose,
- Borgnis Street, Davidson,
- Yallumba Close, Forestville,
- Hyde Avenue, Boru Place and Starkey Street, Killarney Heights.

8.6. Flood Planning Area

8.6.1. Background

Land use planning is an effective means of minimising flood risk and damages from flooding. Land use planning for flooding can be achieved through the use of:

- A Flood Planning Area (FPA), which identifies land that is subject to flood related development controls; and
- A Flood Planning Level (FPL), which identifies the minimum floor level applied to development proposals within the FPA.

The FPA is defined as the area of land below the FPL. Defining FPAs and FPLs in urban areas can be complicated by the variability of flow conditions between mainstream and local overland flow. Traditional approaches developed for riverine or "mainstream" flow areas often cannot be applied in steeper urban overland flow areas. Additionally, defining the area of flood affectation due to overland flow (which by its nature includes shallow flow) involves determining at which point flow is significant enough to be classified as "flooding" rather than just a drainage or local runoff issue. In some areas of overland flow, the difference in peak flood level between events of varying magnitude can be so minor that applying the typical freeboard can result in an FPL greater than the PMF level.

The FPA should include properties where development would result in impacts on flood behaviour in the surrounding area and in areas of high hazard where there is a risk to safety or life. The FPL is determined in addition to this with the purpose of decreasing the likelihood of over-floor flooding of buildings.

The Flood Risk Management Manual (Reference 1) identifies that the FPL generally be based on the 1% AEP event plus an appropriate freeboard (typically 0.5 m). However, it also recognises that different freeboards may be deemed appropriate due to local conditions provided adequate justification is provided. The adopted approach is consistent with this.

Further consideration of FPAs and levels is typically undertaken as part of the Flood Risk Management Study to determine what should be adopted in the Flood Risk Management Plan.

8.6.2. Methodology

The methodology used for defining the FPA is consistent with that adopted in similar studies throughout the Sydney metropolitan area. It divides the flood area between "mainstream" and "overland" flooding areas using the following criteria:

- Mainstream flooding: Areas along the main creeks or trunk drainage alignment, where flow is sufficiently deep and there is sufficient relief that freeboard can be added to the flood surface and the extent then "stretched" to include adjacent land. The mainstream part of the study was defined as those creeks downstream of the urban areas plus the following water courses in the Frenchs Creek catchment:
    - Flow path from Knightsbridge Avenue, adjacent to Pringle Avenue. This crosses Pringle Avenue and becomes a creek. It is then conveyed in an open concrete-lined channel that crosses Elm Avenue and Calool Cresent. Downstream of Calool Crescent it becomes Frenchs Creek.
    - Flow path from Kapunda Place, crossing Pringle Avenue and discharging into the creek described above upstream of Elm Avenue.

- Flow path downstream of Glenrose Village Shopping Mall. Flow is conveyed through a reserve before crossing Haigh Avenue and joins Frenchs Creek just downstream of Calool Crescent.
- Flow path downstream of Hakea Avenue, through the Frenchs Forest Bushland Cemetery and crossing Borgnis Street.

The FPA in the mainstream area was defined as the 1% AEP peak flood level plus 0.5 m freeboard, with the level extended perpendicular to the flow direction either side of the flow path.

- Overland flooding: For overland flow areas, addition of freeboard and stretching generally produces an over-estimate of the land subject to flood risk, because the stretching extends across land in a way that would not actually occur even with significant additional flow from a much larger storm, and may even extend beyond the modelled PMF extent. It is therefore appropriate to use a modelled design flood event larger than the 1% AEP event to account for the uncertainty in the results, instead of adding freeboard and stretching. The advantage of this approach is that it includes consideration of flow momentum from actual model results. In overland flow areas, it was considered appropriate to use the filtered 0.2% AEP extent as the definition of the FPA. The following filters were applied to the 0.2% AEP event:
  - **Depth Filter** – Exclude results below 150 mm depth;
  - **Velocity-Depth Filter** – Include results if the Velocity x Depth product > 0.3 m^2/s (even if previously excluded by the Depth Filter); and
  - **Small Pond Filter** – Remove isolated 'puddles' or 'orphans' smaller than 100 m^2.

The resultant extent was then intersected with the cadastre to find lots with only minimal affectation. Lots with a total FPA extent within the lot of less than 15 m^2 were removed from the extent. These were typically lots adjacent to flooding within the road reserve, however, the modelled extent just touched the boundary of the lot, and it was not considered necessary to identify those lots as flood affected. This was subject to a manual review and ground-truthing process with consideration of the flood behaviour, flow path formation and the extents within adjacent properties. The modelling results show flow around buildings and for the purpose of the FPA, the 'holes' left by buildings were filled in to create a continuous extent where appropriate. The FPA was also trimmed to the PMF extent. Figure C93 and Figure C94 identify the extent of the FPA (combined mainstream and overland) developed using the methodology above.

8.7. Flood Risk Precincts

Flood Risk Precincts are used by Council to determine the application of flood-related development controls to land affected by flooding. Each flood risk precinct (low, medium and high) has different flood planning controls applied for floor levels, building components, flood affectation, emergency management, etc. depending on the type of development. For the purpose of this study, the following was adopted to define the provisional flood risk precincts:

- High Flood Risk Precinct – includes areas subject to H3 hydraulic hazard and above in the 1% AEP event (see Section 8.3) and all floodway areas in the 1% AEP event (see Section 8.4). The extent was trimmed to the FPA.

- Medium Flood Risk Precinct – includes all areas within the FPA (see Section 8.6).
- Low Flood Risk Precinct – includes all areas within the PMF extent where the PMF depth is greater than or equal to 150 mm, with isolated 'puddles' smaller than 100 m^2 removed. Areas were also removed where the flood extent intersected with lots producing a flooded area less than 30 m^2, in a similar manner to the FPA derivation.

The flood risk precincts are shown in Figure C95 and Figure C96.

8.8. Flooding Hotspots

The design flood behaviour across the Middle Harbour catchment was reviewed and 8 flood hotspots were identified which were exposed to a higher flood risk. These hotspots were generally locations which had high flood hazard over roads or locations where several properties were subject to high flood hazard. The focus of this assessment was on the 1% AEP event where there was flood risk to people, vehicles and property. Each of the hotspot areas are described in the following sections.

8.8.1. Ralston Avenue to Hews Parade, Belrose

The flow path from Ralston Avenue to Hews Parade in Belrose runs parallel to Pringle Avenue, through properties and crossing several side streets. The peak flood depths and hazard for the 1% AEP event can be seen in Figure C97. It commences at a sag point on Ralston Avenue and then flows as a reasonably concentrated flow path through private properties and crosses Lyndale Place and St Annes Close. At Knightsbridge Avenue, there is a large sag point (Photo 36) where the 1% AEP flood depth reaches almost 1.4 m deep. Downstream of Knightsbridge Avenue, the flow path traverses properties on Pringle Avenue, with dwellings located directly within this flow path. The hazard within this section is typically H3 and H4 in the 1% AEP event. There is ponding on Lynette Place within this section as well. Downstream of Hews Parade, the flow path is largely contained within a channel. There is a 1500 mm diameter pipe that conveys flow under this flow path, however it is 'full' in even the 50% AEP event, with overland flows occurring in frequent events.

Photo 36: Knightsbridge Avenue Sag Point, looking east (*Source: Google Street View*)

8.8.2. Elm Avenue and Calool Crescent, Belrose

Downstream of Hews Parade, the above flow path is joined by another tributary and reaches Elm Avenue. At Elm Avenue, flow is conveyed under the road via a 3700 mm (W) x 1400 mm (H) box culvert, which discharges into a concrete open channel downstream of Elm Avenue. The open channel runs parallel to Calool Crescent before crossing Calool Avenue via a triple cell box culvert (3950 mm (W) x 1550 mm (H) and twin 2100 mm (W) x 1800 mm (H)). Downstream of this, Frenchs Creek officially commences through a concrete open channel before transitioning into a natural creek downstream of the urban area. Flow is fully conveyed through the Elm Avenue culvert in the 50% AEP event, however, in larger events the capacity of the culvert is exceeded and flow overtops Elm Avenue. Flood behaviour in the 1% AEP event is provided in Figure C98. Overtopping flows are primarily then conveyed along Calool Crescent (Photo 37), down to a sag point where the channel crosses the Calool Crescent. Peak flood depths on Elm Avenue and Calool Crescent reach 0.4 m and 0.5 m in the 1% AEP event, respectively. The primary concern at this location is the large and highly hazardous (H5) flows conveyed by Calool Crescent, with affectation of properties being minor in events up to the 1% AEP event, with the exception of low-lying properties at the Calool Crescent sag point.

Photo 37: Elm Avenue and Calool Crescent Intersection (*Source: Google Street View*)

8.8.3. Kapunda Place, Belrose

Kapunda Place in Belrose acts as a flow path, with flows in excess of the stormwater network being conveyed down the steep road. With 1% AEP event velocities of approximately 3 m/s, the hazard reaches H5 along the road (Figure C99). The stormwater network consists of a 1050 mm diameter pipe under the road, however, this is full in frequent events. Flow ponds at the western end of the road, at the cul-de-sac (Photo 38), with flood depths reaching 1 m in the 1% AEP event. Overland flows are then conveyed through private property toward the Pringle Avenue sag point, with the hazard being H4 in the 1% AEP event. On the northern side of Kapunda Place, at the rear of the properties, the Kapunda Place channel conveys flow toward the Pringle Avenue sag point as well. The flood model, in agreement with resident experiences, indicates that water can spill out of the perched channel and shallow overland flows can affect properties on the northern side of Kapunda Place. Although this affectation is shallow, it has caused damage to properties in recent flood events.

Photo 38: Kapunda Place Cul-de-sac, looking west (*Source: Google Street View*)

Photo 39: Kapunda Place Channel (*Source: WMAwater*)

8.8.4. Lowanna Street, Coora Avenue and Marina Place, Belrose

This flow path is located adjacent to and at the rear of the Glenrose Village Shopping Centre in Belrose. It commences at the Glen Street sag point, with water flowing to the west of the shopping centre toward the Lowanna Street cul-de-sac. From here it traverses private property to the Coora Avenue cul-de-sac. It then continues through properties located on Marina Place before discharging into Wingara Reserve and a dedicated drainage easement (Photo 40) that contains the 1% AEP flow down to the Haigh Avenue crossing. There is a 1650 mm diameter pipe underneath the reserve, with surface pits to capture overland flows. The 1% AEP flood behaviour is seen in Figure C100. The hazard along the flow path is largely H2, although some areas with high velocities (> 2 m/s) reach H5 hazard. Between Lowanna Street and the reserve, there are a number of properties located within the flow path.

Photo 40: Wingara Reserve and dedicated drainage easement (*Source: WMAwater*)

8.8.5. Blackbutts Road to Merrilee Crescent, Frenchs Forest

There is a largely unconfined flow path between Blackbutts Road and Merrilee Crescent in Frenchs Forest. It commences near Mount Pleasant Avenue with a wide low point on Blackbutts Road. Overflows from the road are typically shallow, flowing through private property. The dispersed flows cross Dakara Drive, Springvale Avenue and Sorlie Road (Photo 41). While there are low points on these roads, they are typically wide and contribute to the spreading of flows.

Between Sorlie Road and Merrilee Crescent, the flow path becomes concentrated, discharging into a channel downstream of Merrilee Crescent (Photo 42). The 1% AEP flood behaviour is shown in Figure C101. While flows are typically shallow (< 0.3 m deep) along this flow path in the 1% AEP event, the hazard reaches H2, particularly downstream of Springvale Avenue, with H5 being triggered in areas with high velocity (> 2 m/s).

Photo 41: Sorlie Road sag point (*Source: Google Street View*)

Photo 42: Merrilee Crescent sag point (*Source: Google Street View*)

8.8.6. Borgnis Street, Davidson

There is a channel that conveys flow through the Frenchs Forest Bushland Cemetery and at the end of the channel, flow is conveyed through an 1800 mm diameter pipe that then crosses under Borgnis Street in Davidson (Photo 43). Downstream of properties on Borgnis Street the culvert discharges into a natural channel. In the 20% AEP event, the capacity of the culvert is exceeded and overtopping of Borgnis Street occurs. Flood behaviour for the 1% AEP event can be seen in Figure C102. Overland flows between the two channels are H3 to H5 hazard, with flood depths reaching 0.6 m at the Borgnis Street sag point in the 1% AEP event. Properties located at the sag point of Borgnis Street are affected by this flow.

Photo 43: Borgnis Street sag point (*Source: Google Street View*)

8.8.7. Keldie Street and Yallumba Close, Forestville

The overland flow arriving at Keldie Street in Forestville is primarily from the upstream Epacris Reserve No. 2. This reserve acts as a small detention basin, with a small bund and inlet pit within the reserve (Photo 44). From this location, a 1200 mm diameter pipe conveys flow underground to downstream of Keldie Street, with overland flows traversing private properties to Keldie Street. This overland flow occurs in events as frequent as the 50% AEP. Downstream of Keldie Street, flow is conveyed through private properties by a series of pipes (twin 1200 mm diameter pipes or a single 1500 mm diameter pipe) and open channels. At Yallumba Close (Photo 45) a 1500 mm diameter pipe conveys flow under the road, with overtopping of the road occurring in events as frequent as the 50% AEP. Downstream of properties on Yallumba Close, flow enters a natural channel.

The 1% AEP flood behaviour can be seen in Figure C103. At Keldie Street, peak flood depths

reach 0.3 m in the 1% AEP event. Between Keldie Street and Yallumba Close, the hazard is typically H5, with open channels running adjacent to dwellings. At Yallumba Close, the peak flood depth reaches 0.8 m. There are several properties affected by this flow path.

Photo 44: Epacris Reserve No. 2 (*Source: WMAwater*)

Photo 45: Yallumba Close sag point (*Source: Google Street View*)

8.8.8. Starkey Street, Hyde Avenue and Boru Place, Killarney Heights

Starkey Street acts as a flow path, conveying flow toward Middle Harbour down the steep road. To the east of the intersection with Connemara Avenue, the grade of the street flattens (Photo 46) and overland flows on the road overtop the gutter and proceed downhill through private property. This also affects Hyde Avenue and Boru Place as water flows in a south east direction toward Flat Rock Beach.

The 1% AEP flood behaviour can be seen in Figure C104. Peak flood depths remain relatively shallow (< 0.3 m) along the flow path, although a number of properties are impacted. The hazard also remains low in the 1% AEP event, typically H1, although H2 hazard is triggered in some locations.

Photo 46: Starkey Street looking east (*Source: Google Street View*)

8.9. Advice on Land-Use Planning Considering Flooding

It is considered good practice to permit land use and development that is compatible with the nature of flooding in a particular area. For example, it is wise to limit use and development of land that is classified as floodway, since these are areas of conveyance and not only pose significant risks to occupiers, but any development in these areas can shift flood risks to other areas.

8.9.1. Existing Flood Planning Controls

Council implements flood-related planning controls in the study area via the Warringah Local Environment Plan 2011 (LEP, Reference 9) and Warringah Development Control Plan 2011 (DCP, Reference 23). The LEP specifies that land is subject to flood-related restrictions if it is:

- Within the flood planning area for any type of development (Clause 5.21), or
- Between the flood planning area and the probable maximum flood for sensitive and hazardous development, or where a flood may cause a particular risk to life or require the evacuation of people or other safety considerations (Clause 5.22).

The LEP outlines the overall objectives and nature of these restrictions, with more detailed requirements specified in the DCP. The DCP (Part E11) specifies flood-related development controls that apply to land affected by flooding. A matrix approach is adopted, with controls and

performance criteria varying based on the type of development (such as residential, commercial and recreational uses) and the flood risk precinct (high, medium or low, as outlined in Section 8.7). This approach, which aligns controls with the level of hazard and inherent vulnerabilities of different development types, is considered consistent with current best practice (Reference 24) and supports development that is compatible with the flood behaviour, constraints and risk of a site.

The current study identifies overland flood risk in addition to mainstream flood risk. The areas where the risk of overland flooding is considered to warrant the application of development controls (i.e. where the 1% AEP flood depth exceeds 150 mm (the floor height above ground that is specified in the Building Code of Australia) and there is a continuous flow path), are defined in the FPA and hence are subject to flood-related development controls.

The flood-related development controls specified in the DCP cover flood impacts (not making flooding worse for neighbouring properties), building components and structural soundness (to ensure buildings can withstand flood forces), floor levels and carparking (to reduce the frequency and exposure of the building and occupants to flooding), emergency response (including evacuation and shelter-in-place responses), fencing (to allow flow through fencing, which is an important consideration for overland flow situations), storage of hazardous goods and pools. These controls are considered suitable for both mainstream and overland flow applications.

8.9.2. Flood Categories

Council is updating the flood clause in the DCP to align with the recently released Flood Risk Management Manual (Reference 24). Part of this work involves the investigation of a more definitive approach to the categorisation of flood prone land, based on the flood planning constraint category (FPCC) approach outlined in the Flood Risk Management Manual. FPCCs provide for a wide range of considerations and constraints for specific application to strategic land use planning, breaking down the floodplain into 4 categories based on flood hazard, flood function and isolation across several events.

Council is proposing to replace the existing flood risk precincts with ‘Flood Categories’. The proposed breakdown draws on the existing flood risk precinct approach, however, expands this to incorporate features of the FPCC approach. A summary of the comparison between these two categorisations is provided in Table 18. The FPCC approach, as defined in Reference 24, relies on the defined flood event (DFE), typically the 1% AEP event, an event greater than the DFE, and the PMF event. The FPCC approach utilises both flood function and hydraulic hazard to consider risk to development and potential impacts, as well as considering events larger than the DFE where additional risks may be present that should be considered for planning purposes.

Table 18: Comparison of Flood Risk Precincts, Flood Planning Constraint Categories and Council Flood Categories

Flood Risk Precincts		**Flood Planning Constraint Categories**		**Council Flood Categories**	
Category	**Description[1]**	**Category**	**Description[2]**	**Category**	**Description[3]**
High	1% AEP floodway 1% AEP H3 hazard and above	**1**	DFE floodway DFE key storage areas DFE H6 hazard	**1**	1% AEP floodway 1% AEP H6 hazard 0.2% AEP floodway 1% AEP H5 hazard PMF H6 hazard
		2	>DFE floodway DFE H5 hazard >DFE H6 hazard Flood islands (low and high)		
Medium	FPA	**3**	FPA	**2**	FPA
Low	PMF Extent	**4**	PMF Extent	**3**	PMF Extent

1. As adopted for this study, described in Section 8.7.
2. As described in *FB01 Understanding and managing flood risk*, Reference 24.
3. As proposed by Council.

It can be seen in Table 18 that the medium and low flood risk precincts align with FPCC 3 and FPCC 4, while the high flood risk precinct is split into two categories – FPCC 1 and 2. The FPCCs expand on the flood risk precincts by considering flood storage areas, flood islands and events larger than the DFE.

The 'Flood Categories' that Council is proposing to introduce are also summarised in Table 18. The following categories are proposed:

- Flood category 1 – an area of high flood risk where development is heavily restricted.
- Flood category 2 – an area of medium flood risk where standard development controls apply.
- Flood category 3 – an area of low flood risk where development controls apply to critical and vulnerable development.

While Flood Categories 2 and 3 are as per the existing medium and low flood risk precincts (and FPCC 3 and 4, respectively), Flood Category 1 updates the definition of the high flood risk area. Flood Category 1 draws on the FPCC 1 and FPCC 2 criteria, with the following amendments:

- Key flood storage areas that are part of FPCC 1 are not included as part of flood category 1. It is difficult to meaningfully define flood storage areas for the purpose of applying development controls – that is, areas where any development would cause adverse impacts and should be restricted. The flood storage areas defined in Section 8.4 would result in a large number of areas with heavy development restrictions. The nature of flooding in the Middle Harbour catchment means that there are no areas that would be considered 'key flood storage' areas. Floodplain filling controls also ensure that floodplain storage is not reduced.

- Emergency response considerations that are part of FPCC 2 are not included as part of Flood Category 1. It is difficult to meaningfully define isolated areas for the purpose of applying development controls. The flood islands defined in Section 8.5.3 would result in a large number of areas with heavy development restrictions. In flash-flooding catchments such as Middle Harbour, areas that are isolated likely do not warrant restricted development, due to the short duration of isolation. Emergency response controls also ensure that emergency management is considered for developments.
- The consideration of H6 hazard in FPCC 2 is for an event greater than the DFE. The PMF has been selected as appropriate for Flood Category 1. It does not significantly increase the extent of flood category 1 and it is appropriate to consider where hazards may cause failure of buildings, even in an extreme event.

The following methodology was applied to derive Flood Category 1 for the Middle Harbour catchment:

1. Depths less than 150 mm were removed. This was applied to the relevant flood layer based on the depth results for the same event (for example, the 1% AEP floodway was filtered based on the 1% AEP flood depth, or the PMF H6 hazard was filtered based on the PMF depth). This removes shallow overland flows that should not warrant the application of flood planning controls. For example, with the H1 to H6 criteria, there is no depth threshold for H5 and H6, such that any depth of flow with a velocity greater than 2 m/s will be H5 hazard (or 4 m/s for H6 hazard). This can mean very shallow gutter flows in steep areas can be identified as H5 or H6 hazard.
2. 'Holes' in the flood layers up to 300 m^2 were removed. This is important where buildings have been blocked out. This was applied to the flood layer of interest after depth filtering.
3. Isolated areas of ponding up to 100 m^2 were removed. This removes isolated areas not associated with a major flow path. For example, with the criteria adopted, a 'floodway' can be triggered in areas removed from a major flow path (for example where velocities are locally high). These areas are not considered to be a true 'floodway' and these isolated areas were removed through this area filtering process.
4. Trimming to the FPA extent (Flood Category 2). This ensures that Flood Category 1 does not extend beyond Flood Category 2.

Flood category 2 is the same as the medium flood risk precinct, or the FPA, derived by the process described in Section 8.6.2. Flood category 3 is the same as the low flood risk precinct, derived by the process described in Section 8.7.

The flood categories can be seen in Figure C105 and Figure C106. Overall, the flood category 1 extent is similar to the high flood risk precinct. The filtering applied for flood category 1 removes some areas of shallow flow within gutters and small isolated areas in addition to removal of some areas subject to H3 and H4 hazard in the 1% AEP event. In some areas, particularly on key flow paths, the extent is more continuous and slightly larger due to the inclusion of the 0.2% AEP

floodway. The proposed Council flood categories are an appropriate breakdown of the floodplain for the purpose of land use planning and application of development controls, particularly for the Middle Harbour catchment which is dominated by overland flooding.

9. SENSITIVITY ANALYSIS

9.1. Overview

A number of sensitivity analyses were undertaken to establish the variation in design flood levels and flows that may occur if different parameter assumptions were made. These sensitivity scenarios are summarised in Table 19.

Table 19: Overview of Sensitivity Analyses

Scenario	Description
Catchment Lag Factor, 'C'	The catchment lag factor value was increased and decreased by 20%
Rainfall Losses	The initial and continuing rainfall losses were increased and decreased by 20%
Mannings 'n'	The hydraulic roughness values were increased and decreased by 20%
Hydraulic Structure Blockage	Sensitivity to blockage of hydraulic structures including pits and culverts was assessed for both a low blockage and high blockage scenario.
Tailwater Level	The tailwater level was increased by 0.5 m.

The sensitivity scenarios were simulated for the 5% AEP and 1% AEP events. The change in flood level across the study area for each scenario compared to the adopted design 5% AEP or 1% AEP flood events are provided in Appendix E.

9.2. Catchment Lag Parameter

The catchment lag factor (termed 'C' in the WBNM model) can be used to accelerate or delay the runoff response to rainfall. The adopted C parameter of 1.6 was decreased and increased by 20% (1.28 and 1.92, respectively). The decrease in the lag factor generally slightly increases and speeds up the peak catchment flows, while an increase in the lag factor results in a slight decrease and delay in peak flows.

The results of the catchment lag parameter sensitivity analysis are provided in
Figure E1 to Figure E8. The results indicate 5% AEP and 1% AEP peak flood levels typically increase by up to 0.05 m within the urban areas and 0.1 m within the downstream creeks with decreasing the catchment lag factor. The converse applies with increasing the catchment lag factor, with typical decreases of up to 0.05 m in the urban areas and 0.1 m within the downstream creeks.

9.3. Rainfall Losses

Rainfall losses were adopted from the ARR 2019 data hub (see Section 7.4). A sensitivity analysis was undertaken for both initial loss and continuing loss. Initial losses were taken from the data hub's probability neutral burst initial losses, which vary based on the AEP and duration of the storm. The continuing loss adopted was 1.6 mm/hr – 2.0 mm/hr, based on the factored data hub loss values. Rainfall losses were decreased and increased by 20% for the sensitivity analysis,

with a summary presented in Table 20 for losses at the catchment centroid.

Table 20: Rainfall Loss Sensitivity Analysis

Scenario	Description	5% AEP Event		1% AEP Event	
		IL	CL	IL	CL
Design	Adopted design event losses	8.7	0.64	6.6	0.64
Losses - 20%	Sensitivity decreasing losses	6.96	0.51	5.28	0.51
Losses + 20%	Sensitivity increasing losses	10.44	0.77	7.92	0.77

The change in peak flood level for the decrease and increase in rainfall losses are provided in Figure E9 to Figure E16. The decrease in rainfall losses has minimal impact throughout the urban areas (typically within 0.02 m) and only minor increases within the downstream creeks (approximately 0.03 m). Similarly, the increase in rainfall losses has minimal impact throughout the urban areas and minor decreases within the downstream creeks. This was also demonstrated in Section 6.5.2 for the calibration events.

9.4. Roughness Variations

The Mannings ‘n’ parameter in the TUFLOW model represents the surface roughness, and the adopted values are outlined in Table 10. A sensitivity analysis was conducted with both an increase and decrease in these values by 20%. The change in peak flood level for the decrease and increase Mannings ‘n’ are provided in Figure E17 to Figure E24. Decreasing the Mannings ‘n’ results in a decrease in peak flood levels of up to approximately 0.03 m within the urban areas. Increasing the Mannings ‘n’ results in an increase in peak flood levels of a similar magnitude.

9.5. Blockage Variations

A sensitivity analysis was undertaken for the blockage of structures in the TUFLOW model. For the design events, blockage was applied in accordance with ARR 2019, as described in Section 7.7. A sensitivity analysis was undertaken by adopting a high and low blockage factor for the 5% AEP and 1% AEP events, as detailed in Table 21.

Table 21: Blockage Sensitivity Analysis

Structure	Design Blockage	Low Blockage	High Blockage
Small Culverts (Dia/Width < 1.2 m)	50%	20%	80%
Large Culverts (Dia/Width ≥ 1.2 m)	20%	0%	50%
Sag Pit	50%	20%	80%
On-grade Pit	20%	0%	50%

The results of this assessment are provided in Figure E25 to Figure E32. The results indicate that

blockage has only a minor impact on impacts on water levels. The low blockage scenario results in negligible changes to peak flood levels across the catchment. The largest change is seen at Elm Avenue and Calool Crescent, Belrose, with localised decreases of less than 0.1 m. For the high blockage scenario, there is a larger impact, with some newly formed overland flow paths. The increase in peak flood levels is typically up to 0.05 m. On Calool Crescent, peak flood levels increase by up to 1 m in the 1% AEP event. This is the most sensitive area to the blockage assumptions adopted.

9.6. Tailwater Level Variations

For all the design flood events, a static tailwater level of 1.4 mAHD (see Section 7.6). This tailwater assumption only affects the very downstream reaches of the creeks and tributaries modelled. These areas are typically steep and forested. The urban areas that are the focus of this study are located well away from these downstream areas. A sensitivity analysis was undertaken by increasing the tailwater level by 0.5 m for the 5% AEP and 1% AEP events.

The results of the sensitivity analysis are provided in Figure E33 to Figure E36. The results indicate that the assumed tailwater level only affects the very downstream portions of creek outlets, and does not extend more than 100 m upstream of the outlet. The largest area affected is Bantry Bay, however, urban development is still located at a much higher elevation and is not impacted by the assumed tailwater level.

10. FUTURE SCENARIOS

10.1. Climate Change

Climate change is expected to increase sea levels and also short duration rainfall intensities from east coast convective storm events. It is typical practice in catchment flood studies under the NSW flood program to model scenarios incorporating the effects of these impacts from climate change to understand the potential changes in flood behaviour.

Various projections of the likely increases to sea levels are available, however, the sensitivity of the model results to tailwater assumptions was tested and sea level rise will not affect any of the urban development within the study area. As such, sea level rise was not considered further for this study.

Any increase in design flood rainfall intensities will increase the frequency, depth and extent of inundation across the catchment. The design rainfall information currently provided by the BoM is based on historical climate data and does not currently include any allowance for likely increases to convective storm rainfall intensity in the future. ARR 2019 (Reference 11, Book 1 Chapter 6) provides some guidance about consideration of the impacts of climate change on design rainfall intensities. It suggests assuming that rainfall intensities can be assumed to scale up by about 5% per degree of average surface warming.

It has also been suggested that the cyclone belt may move further southwards. The possible impacts of this outcome on design rainfalls cannot be ascertained at this time as there is insufficient information about the mechanisms that determine the movement of cyclones under future climate scenarios.

Projected increases to evaporation are also an important consideration because increased evaporation would lead to generally drier catchment conditions, resulting in lower runoff from rainfall. Mean annual rainfall is projected to decrease, which will also result in generally dryer catchment conditions. This is likely to not be a significant factor for the Middle Harbour catchment.

The current NSW State Government's advice recommends sensitivity analysis on flood modelling should be undertaken to develop an understanding of the effect of various levels of change in the hydrologic regime on the project at hand (Reference 25). To understand potential changes to flood behaviour due to increased intensity of rainfall, the 0.5% AEP and 0.2% AEP events were compared with the 1% AEP event (per the relevant guideline, Reference 25). These events provide an indication of how 1% AEP flood levels would change if the rainfall intensity increases to the point that it matches either the current 0.5% AEP (an 8% increase in intensity for the 20 minute critical storm event) or 0.2% AEP (a 22% increase in intensity for the 20 minute critical storm event). Further to this, the 0.1% AEP and 0.05% AEP events were also compared with the 1% AEP event, representing rainfall intensity increases of 33% and 44%, respectively, for the 20 minutes critical storm event.

The results are shown in Figure F1 to Figure F8 and indicate that there would be widespread impact from changes to design rainfalls. There is generally minimal change (within ±0.01 m) for areas affected by shallow overland runoff that is unconfined. The largest changes occur where there is a concentration of flow, particularly in downstream areas where creeks form.

Comparing the 0.5% AEP event with the 1% AEP event (Figure F1 and Figure F2), flood levels are typically increased by up to 0.05 m throughout the urban areas, particularly on key overland flow paths where concentration of flow occurs. Peak flood levels increase by approximately 0.1 m to 0.2 m in the downstream creeks through forested areas. There are slight increases in the flood extent through the urban areas.

Comparing the 0.2% AEP event with the 1% AEP event (Figure F3 and Figure F4), flood levels are typically increased by approximately 0.1 m on key overland flow paths. In the downstream creeks, peak flood levels increase by approximately 0.2 m to 0.3 m. Wider flow paths and newly flooded areas are evident.

Comparing the 0.1% AEP event with the 1% AEP event (Figure F5 and Figure F6), flood levels are typically increased by approximately 0.1 m to 0.2 m on key overland flow paths. In the downstream creeks, peak flood levels increase by up to approximately 0.5 m. New overland flow paths form in several areas.

Comparing the 0.05% AEP event with the 1% AEP event (Figure F7 and Figure F8), flood levels are typically increased by approximately 0.2 m to 0.3 m on key overland flow paths. In the downstream creeks, peak flood levels increase by more than 0.5 m. New overland flow paths form in numerous locations.

10.2. Cumulative Development

A future cumulative development scenario was modelled to understand potential impacts of widespread development. Development on a single site is not likely to have an impact (and Council has flood-related development controls to ensure this is the case), however, as developments occur over time, there may incremental impacts that are not realised unless the developments are all considered together. The cumulative development scenario has considered four areas of development (shown in Figure F9 and Figure F10):

1. Frenchs Forest Precinct. The area surrounding the newly constructed Northern Beaches Hospital, located at the corner of Warringah Road, Wakehurst Parkway and Frenchs Forest Road West (outside the study area), has been identified as a strategic centre and health and education precinct (Reference 26). The Hospital Precinct Structure Plan was adopted by Council in 2017 and the Frenchs Forest 2041 Place Strategy was finalised in 2021 to help implement the first phase of the structure plan, including rezoning of the site. The area for redevelopment is referred to as the Frenchs Forest Precinct, which extends into the study area at the top of the catchment.
2. Ralston Avenue. It is understood that there was a planning proposal for Ralston Avenue, Belrose, which consisted of 17 hectares of bushland to be rezoned as low density

residential (Reference 27). This planning proposal, as of 2019, was not proceeded. Development of this area, however, has still been included in the cumulative development scenario as it may be developed in the future.

3. Glenrose Village Shopping Centre. Future development involving the intensification of land use typically occurs around shopping centres and transport hubs. Glenrose Village Shopping Centre, located in Belrose, is one of two shopping malls within the study area. The other is the Forestway Shopping Centre, in which future development has been considered within the Frenchs Forest Precinct. For the purpose of the cumulative development scenario, a 200 m buffer surrounding the Glenrose Village Shopping Centre was assumed to be subject to intensification of development. This is an indicative development area for a hypothetical development scenario and there is currently no proposal for widescale redevelopment this area.
4. Forest Way and Warringah Road. Future development involving the intensification of land use typically occurs around shopping centres and transport hubs. The two arterial roads that traverse the study area are Forest Way (running in a north-south direction close to the catchment boundary) and Warringah Road (running from the top of the catchment through Forestville and crossing Middle Harbour at Roseville Bridge. For the purpose of the cumulative development scenario, a 200 m buffer surrounding both roads was assumed to be subject to intensification of development. This is an indicative development area for a hypothetical development scenario and there is currently no proposal for widescale redevelopment these areas except for the Frenchs Forest Precinct discussed above.

For the cumulative development scenario, the following adjustments were made to simulate development:

- In the WBNM model, any ‘residential’ land use type within the future development areas was assumed to have an increase in impervious area to match the ‘commercial’ land use type. This is an increase in the directly connected impervious area from 60% to 80%.
- In the TUFLOW model, any ‘residential’ land use type within the future development areas was assumed to have an increase in surface roughness to match the ‘commercial’ land use type. This is an increase in Mannings ‘n’ from 0.05 to 0.08 to represent development features such as additional buildings, landscaping and other obstructions.

The cumulative development scenario was simulated for the 1% AEP design flood event. The change in peak flood level is provided in Figure F9 and Figure F10. The results indicate that there would only be minor increases in flood level across the urban areas, typically within 0.02 m, but up to 0.04 m within road corridors due to the increase in runoff. On lots subject to development, the increased surface roughness can locally raise flood levels by up to 0.1 m.

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Figures and Appendices

OFFICIAL

File Ref. No: FRN18/1746 – BFS25/3939 - 8000043222
TRIM Ref. No: D25/102993
Contact: [redacted]

15 September 2025

General Manager
Northern Beaches Council
PO Box 82
MANLY NSW 1655

Email: council@northernbeaches.nsw.gov.au

Attention: Manager Compliance/Fire Safety

Dear Sir / Madam

Re: INSPECTION REPORT
MIXED USE BUILDING
[redacted] SOUTH CREEK ROAD, WHEELER HEIGHTS ("the premises")

Fire and Rescue NSW (FRNSW) received correspondence on 13 June 2025 concerning the adequacy of the provision for fire safety in connection with 'the premises'.

The correspondence stated that:

- *Multiple deactivated areas on main fire panel that have been that way for months! Also seperate to that issue the Thai restaurant (chada thai) props the rear door of their kitchen open which is adjacent to the only emergency exit for 18 units with multiple young families, if there was a kitchen fire it would very quickly spread out through that door cutting off the only non mechanical exit to this side of the building.*

Pursuant to Section 9.32(1) of the *Environmental Planning and Assessment Act 1979* (EP&A Act), Authorised Fire Officers from the Fire Safety Compliance Unit of FRNSW inspected 'the premises' on 8 July 2025.

On behalf of the Commissioner of FRNSW, the comments in this report are provided under Section 9.32(4) and Schedule 5, Part 8, Section 17(1) of the EP&A Act.

The items listed in the comments of this report are based on the following limitations:

- A general overview of the building was obtained without using the development consent conditions or approved floor plans as a reference.
- Details of the Provisions for Fire Safety and Fire Fighting Equipment are limited to a visual inspection of the parts in the building accessed and the fire safety measures observed at the time.

COMMENTS

The following items were identified during the inspection:

Compartmentation and Separation

1. The fire-rated door providing access to the rear fire-isolated passageway on the ground floor did not self-latch, contrary to the requirements of Clause 2.1.3 of AS 1905.1-2015.

2. Service penetrations through the ground floor slab in the vicinity of the basement 1 vehicular entrance ramp and retail 4 car space were non-compliant with the requirements of Clause C4D15 of the National Construction Code Volume 1 2022 (NCC).

3. The fire-isolated stairs contain what appear to be stormwater or sewage pipes, contrary to the requirements of Clause C4D10 of the NCC.

Services and Equipment

4. Automatic Fire Detection and Alarm System

   4A. The Fire Brigade Panel (FBP) indicated a fault relating to the automatic fire detection and alarm system with regards to shop 6. Upon inspection of shop 6, FRNSW officers determined that a detector had been disconnected from its base.

   4B. The common areas located on the top floor of the building appeared to be provided with smoke detectors. FRNSW query whether these detectors are required considering that parts of the common areas are not enclosed to form public corridors as defined under the NCC. Concerns are also raised as to the appropriateness of smoke detectors in these areas in lieu of other detector types due to the probability of false alarms caused by contaminants in the outdoor air or exposure to insects / dirt etc.

5. Exit Signs

   5A. The exit sign located at the rear of shop 6 was not illuminated, contrary to the requirements of AS 2293.1-2018.

6. Fire Hose Reels

6A. The fire hose reel located on basement level 1 adjacent to the accessible car parking space was not correctly wound, hampering its use, contrary to the requirements of Section 12 of AS 2441-2005.

7. Fire Hydrant System

7A. The fire hydrant system block plan had become dislodged from the wall and was damaged such that it was illegible, contrary to the requirements of Clause 11.5 of AS 2419.1-2021.

7B. Signage indicating the test pressure was not located at the fire hydrant booster, contrary to the requirements of Clause 11.3.4.1 of AS 2419.1-2021.

7C. Signage indicating the boost pressure for the hydrant system was not provided at the fire hydrant booster assembly, contrary to the requirements of Clause 11.3.4.2 of AS 2419.1-2021.

8. Fire Sprinkler System

8A. Signage above the sprinkler booster enclosure incorrectly identifies the sprinkler booster connection as the sprinkler valve assembly and the sprinkler valve assembly as the sprinkler booster connection.

8B. The rear fire-isolated passageway located on the ground floor is sprinklered, however, this is not indicated on the block plan at the booster, contrary to the requirements of Clause 8.3 of AS 2118.1-1999.

General

9. An air conditioning compressor unit was noted as being installed within the retail 1 storage area in the basement. FRNSW are of the opinion that the location of this unit presents an undue fire risk and fire hazard, particularly if objects are stored within close proximity to the unit such that ventilation is restricted.

10. A current Annual Fire Safety Statement was not displayed in a prominent location within the building, contrary to the requirements of Section 89 of the Environmental Planning and Assessment (Development Certification and Fire Safety) Regulation 2021.

FRNSW believes that there are inadequate provisions for fire safety within the building.

FIRE SAFETY ORDER NO. 1

Authorised Fire Officers' of FRNSW issued a Fire Safety Order No. 1, dated 22 July 2025, under the provisions of Section 9.34 of the EP&A Act. In this regard, Council is not presently required to act on item no. 4A of this report.

Under Schedule 5, Part 6, Section 12 of the EP&A Act, a copy of the Notice is attached for your information.

FRNSW received correspondence on 31 July 2025 confirming that the order had been complied with.

RECOMMENDATIONS

FRNSW recommends that Council:

a. Review items 1 to 9 (excluding item 4A) of this report and conduct an inspection.

b. Address any other deficiencies identified on "the premises".

Please be advised that Schedule 5, Part 8, Section 17(2) requires any report or recommendation from the Commissioner of FRNSW to be tabled at a Council meeting. This matter is referred to Council as the appropriate regulatory authority. FRNSW awaits the Council's advice regarding its determination under Schedule 5, Part 8, Section 17 (4) of the EP&A Act.

Please do not hesitate to contact [redacted] of FRNSW's Fire Safety Compliance Unit at FireSafety@fire.nsw.gov.au or call (02) [redacted] if there are any questions or concerns about the above matters. Please refer to file reference FRN18/1746 – BFS25/3939 - 8000043222 regarding any correspondence concerning this matter.

Yours faithfully

[redacted]

Senior Building Surveyor
Fire Safety Compliance Unit

Attachment 1 – Fire Safety Order No. 1

Attachment 1 – Fire Safety Order No. 1

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File Ref. No: FRN18/1746 – BFS25/3939 - 8000043222
TRIM Ref. No: D25/82891
Contact: [redacted]

22 July 2025

The Owners – Strata Plan 95443
180 South Creek Road
WHEELER HEIGHTS NSW 2097

Dear Sir / Madam

Re: FIRE SAFETY ORDER – ORDER NO.1
MIXED USE BUILDING
[redacted]SOUTH CREEK ROAD, WHEELER HEIGHTS ("the premises")

Fire & Rescue NSW (FRNSW) has received your email dated 11 July 2025 in response to the Notice of Intention to give a Proposed Fire Safety Order – Order No.1 dated 11 July 2025.

FRNSW has determined to issue the **Fire Safety Order – Order No.1 ('Order No.1')**, in response to your representations, and consideration given under the provisions of Schedule 5, Part 7 (Section 14 and Section15) of the *Environmental Planning & Assessment Act 1979* (EP&A Act). Accordingly, I have attached a copy of the FRNSW **"Order No. 1"** dated 22 July 2025, issued under Section 9.34 of the EP&A Act.

A copy of the **"Order No.1"** will be forwarded to Northern Beaches Council, under Schedule 5, Part 6, Section 12 of the EP&A Act. Authorised Fire Officers will conduct inspections to assess compliance with the **"Order No.1"**.

Fire and Rescue NSW | ABN 12 593 473 110 | www.fire.nsw.gov.au
Community Safety Directorate
Fire Safety Compliance Unit
1 Amarina Ave
Greenacre NSW 2190
T (02) 9742 7434
F (02) 9742 7843
www.fire.nsw.gov.au

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Please do not hesitate to contact [redacted] of FRNSW's Fire Safety Compliance Unit at FireSafety@fire.nsw.gov.au or call on [redacted] if there are any questions or concerns about the above matters. Please ensure that you refer to file reference FRN18/1746 – BFS25/3939 - 8000043222 regarding any correspondence concerning this matter.

Yours faithfully,

[redacted]

Senior Building Surveyor
Fire Safety Compliance Unit

[redacted]

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NSW GOVERNMENT | FIRE + RESCUE

Fire Safety Order
ORDER No. 1

Under the *Environmental Planning and Assessment Act 1979 (EP&A Act)*
Part 9 Implementation and Enforcement – Division 9.3 Development Control Orders
Fire Safety Orders in accordance with the table to Part 2 - Schedule 5.
Give an Order in accordance with Section 9.34(1)(b)

I, **Ryan Maestri** (name) **Senior Building Surveyor** (rank) **909346** (number)

being an authorised Fire Officer within the meaning of Schedule 5, Part 8, Section 16 of the *Environmental Planning and Assessment Act 1979*, and duly authorised for the purpose, hereby order you

The Owners – Strata Plan No. 95443 (name of the person whom Order is served) **Owner** (position, i.e. owner, building manager)

with respect to the premise

MIXED USE BUILDING
SP 95443
180 SOUTH CREEK ROAD, WHEELER HEIGHTS ("the premises")
(name/address of premises to which Order is served)

to do the following things:

1. Undertake the works required to the Automatic Fire Detection and Alarm System to ensure that all faults indicated on the Fire Brigade Panel (FBP) are rectified.

The reasons for the issue of this Fire Safety Order - Order No.1 are:

1. At the time of the inspection on 8 July 2025, the safety of persons was not ensured or promoted in the event of a fire as a result of the following:
    a. The building was occupied.
    b. The FBP indicated a total of two (2) faults relating to the automatic fire detection and alarm system.

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c. Given the issue raised in point "1 b" above, the automatic fire detection and alarm system may not operate correctly in the event of a fire to provide the building's occupants with early warning of a fire.

d. If the automatic fire detection alarm system does not operate correctly to provide early warning of a fire to occupants, the safety of occupants will likely be compromised.

2. Ensuring the correct operation of the automatic fire detection and alarm system will likely safeguard occupants from injury by making the occupants aware of an emergency.

3. To ensure or promote the safety of persons in the event of fire by ensuring the correct operation of the automatic fire detection and alarm system.

The terms of this Fire Safety Order - Order No.1 are to be complied with:

By no later than **5 pm** on the **5 August 2025**.

Appeals

Pursuant to Section 8.18 of the Environmental Planning & Assessment Act 1979 (EP&A Act), there is no right of appeal to the Court against this Fire Safety Order - Order No.1 other than an order that prevents a person from using or entering premises.

Non-Compliance with Fire Safety Order – Order No.1

Failure to comply with this Fire Safety Order - Order No.1 may result in further Orders and/or fines being issued.

Substantial penalties may also be imposed under Section 9.37 of the EP&A Act for failure to comply with a Fire Safety Order - Order No.1.

[redacted]

Ryan Maestri
Senior Building Surveyor
Fire Safety Compliance Unit

This Fire Safety Order - **Order No. 1** was mailed on **22 July 2025**.

CC: Jarrod Ling
Strata Manager
jarrod@precise.property

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northern beaches council

23 October 2025

The Owners of Strata Plan 95443
C/- Precise Property Strata Management
Suite 48 117 Old Pittwater Road
BROOKVALE NSW 2100

To Whom It May Concern

Re: Notice of Intention to Give an Order (No. 1) (Fire Safety Audit)
Premises: 180 South Creek Road WHEELER HEIGHTS NSW 2097
Reference No: EPA2025/0190

It has been brought to the attention of Council that the abovementioned premises may be deficient in terms of fire safety provisions.

Once Council is aware that an existing building is deficient in certain aspects of fire safety, it has a duty of care to ensure that the building provides an acceptable level of fire safety to the occupants of the building.

Accordingly, please find attached *a* Notice of Intention to Issue a Fire Safety Order for the premises requiring that a Fire Safety Audit be conducted and items 1 to 10 from the Fire & Rescue NSW Inspection Report dated 15 September 2025 be addressed.

All owners and other interested persons must be advised of the Notice of Intention.

Should you require any further information in relation to this matter, please contact Council's Officer's Building Control Team Leader, [redacted] during business hours between 9.00am and 5:00pm, Monday to Friday or by email to council@northernbeaches.nsw.gov.au.

Yours sincerely

[redacted]
Team Leader
Building Control
Environmental Compliance

CC Precise Property Management
firesafety@precise.property
compliance@precise.property

Fire and Rescue NSW
firesafety@fire.nsw.gov.au

t 1300 434 434
e council@northernbeaches.nsw.gov.au
northernbeaches.nsw.gov.au
PO Box 82 Manly NSW 1655
ABN 57 284 295 198

Dee Why Office:
725 Pittwater Road
Dee Why NSW 2099

Mona Vale Office:
1 Park Street
Mona Vale NSW 2103

Manly Office:
1 Belgrave Street
Manly NSW 2095

NOTICE OF INTENTION TO GIVE A DEVELOPMENT CONTROL ORDER
(FIRE SAFETY ORDER)
Under The Environmental Planning and Assessment Act, 1979 (NSW)
Section 9.3, Schedule 5 PART 2 (FIRE SAFETY ORDER NO: 1)

DATE:	23 October 2025
TO WHOM:	The Owners of Strata Plan 95443
PREMISES:	Lot CP SP 95443, 180 South Creek Road WHEELER HEIGHTS NSW 2097

You are hereby given **Notice of intention** to issue an **Order No 1** pursuant to schedule 5, part 2 of the *Environmental Planning and Assessment Act,* 1979 (NSW) (the 'Act') that the Northern Beaches Council, as the appropriate authority under the Act, has been made aware that provisions for fire safety awareness are not adequate to prevent fire, suppress fire or prevent the spread of fire or ensure or promote the safety of persons in the event of fire on the above premises.

Prior to the Order being given you may make representations to Council on or before **23 November 2025.**

(1) why the Order should not be given;
(2) the terms of the Order;
(3) the period of compliance with the Order.

In making representations you may be represented by a barrister, solicitor or agent. Alternatively, you may ignore this Notice and an Order will be given either in the same terms as intended or with modified terms.

DESCRIPTION OF THE ORDER THE COUNCIL INTENDS TO GIVE:

ORDER NO. 1

TERMS OF THE ORDER (TO DO WHAT):

1. Engage an accredited practitioner (fire safety) (APFS) accredited by Fire Protection Authority Australia (FPAA) to inspect the provisions of fire safety and firefighting equipment of the premises to ensure that there is an acceptable level of fire safety. Specifically, address the following items outlined in the Fire & Rescue NSW (FRNSW) Inspection Report, dated 15 September 2025 found the following items of concern during their inspection:

   Compartmentation and Separation

   1. *The fire-rated door providing access to the rear fire-isolated passageway on the ground floor did not self-latch, contrary to the requirements of Clause 2.1.3 of AS 1905.1-2015.*

t 1300 434 434
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2. Service penetrations through the ground floor slab in the vicinity of the basement 1 vehicular entrance ramp and retail 4 car space were non-compliant with the requirements of Clause C4D15 of the National Construction Code Volume 1 2022 (NCC).

3. The fire-isolated stairs contain what appear to be stormwater or sewage pipes, contrary to the requirements of Clause C4D10 of the NCC.

Services and Equipment

4. Automatic Fire Detection and Alarm System

4A. The Fire Brigade Panel (FBP) indicated a fault relating to the automatic fire detection and alarm system with regards to shop 6. Upon inspection of shop 6, FRNSW officers determined that a detector had been disconnected from its base.

4B. The common areas located on the top floor of the building appeared to be provided with smoke detectors. FRNSW query whether these detectors are required considering that parts of the common areas are not enclosed to form public corridors as defined under the NCC. Concerns are also raised as to the appropriateness of smoke detectors in these areas in lieu of other detector types due to the probability of false alarms caused by contaminants in the outdoor air or exposure to insects / dirt etc.

5. Exit Signs

5A. The exit sign located at the rear of shop 6 was not illuminated, contrary to the requirements of AS 2293.1-2018.

6. Fire Hose Reels

6A. The fire hose reel located on basement level 1 adjacent to the accessible car parking space was not correctly wound, hampering its use, contrary to the requirements of Section 12 of AS 2441-2005.

7. Fire Hydrant System

7A. The fire hydrant system block plan had become dislodged from the wall and was damaged such that it was illegible, contrary to the requirements of Clause 11.5 of AS 2419.1-2021.

7B. Signage indicating the test pressure was not located at the fire hydrant booster, contrary to the requirements of Clause 11.3.4.1 of AS 2419.1-2021.

7C. Signage indicating the boost pressure for the hydrant system was not provided at the fire hydrant booster assembly, contrary to the requirements of Clause 11.3.4.2 of AS 2419.1-2021.

8. Fire Sprinkler System

8A. Signage above the sprinkler booster enclosure incorrectly identifies the sprinkler booster connection as the sprinkler valve assembly and the sprinkler valve assembly as the sprinkler booster connection.

8B. The rear fire-isolated passageway located on the ground floor is sprinklered, however, this is not indicated on the block plan at the booster, contrary to the requirements of Clause 8.3 of AS 2118.1-1999.

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General

9. An air conditioning compressor unit was noted as being installed within the retail 1 storage area in the basement. FRNSW are of the opinion that the location of this unit presents an undue fire risk and fire hazard, particularly if objects are stored within close proximity to the unit such that ventilation is restricted.

10. A current Annual Fire Safety Statement was not displayed in a prominent location within the building, contrary to the requirements of Section 89 of the Environmental Planning and Assessment (Development Certification and Fire Safety) Regulation 2021.

FRNSW believes that there are inadequate provisions for fire safety within the building.

2. Engage APFS accredited by FPAA to perform corrective action on the provisions of fire safety and firefighting equipment of the premises to ensure they meet the minimum standard of performance designed for the building. Specifically, address the following items outlined in the FRNSW report, identified in item 1 of this Order.

3. On completion of item 2, provide a statement by an APFS accredited by FPAA, confirming that all corrective action outlined in the FRNSW Inspection Report, have been completed. The statement is to also verify that the fire safety measures comply with the minimum standard of performance for the building.

4. Prominently display the 2025/26 Fire Safety Statement, dated 19 August 2025 within the building.

REASONS FOR THE ORDER: (Schedule 5, Part 4, clause 5 of the Act)

1. Council and FRNSW have been made aware that the existing provisions for fire safety or fire safety awareness are not adequate to prevent fire, suppress fire or prevent the spread of fire or ensure the safety of persons in the event of fire.
2. Council received an email dated, on 15 September 2025, accompanied with an Inspection Report by FRNSW, dated 15 September 2025 depicting fire safety concerns.
3. Council inspected the building premises at 180 South Creek Road, Dee Why and observed fire safety non-compliances and concur with the FRNSW Inspection Report, dated 15 September 2025.

PERIOD OF COMPLIANCE WITH THE ORDER

Within sixty (60) days from the date of this Order.

FAILURE TO COMPLY WITH THE ORDER

OFFENCE
It is an offence against the *Environmental Planning and Assessment Act 1979* (NSW) not to comply with any Order: see Part 9, of Division 9.3, Clause 9.37 of the *Environmental Planning and Assessment Act 1979* (NSW). In the event that an Order is issued and you do not comply, Council may issue penalty infringement(s) or commence Court Proceedings to compel compliance and / or undertake a criminal prosecution.

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Manly NSW 2095

PENALTY

The maximum penalty for non-compliance with this order is (a) in case of a corporation $5 million, and for a continuing offence a further $50,000 for each day the offence continues; or (b) in the case of an individual $1 million, and for a continuing offence a further $10,000 for each day the offence continues: see Part 9, Division 9.6, Clause 9.52 of the *Environmental Planning and Assessment Act 1979* (NSW).

EXECUTION OF ORDER BY COUNCIL

If you fail to comply with the terms of an Order Council may do all such things as are necessary or convenient to give effect to the terms of the Order, including the carrying out of any work required by the Order, and may, among other things, recover from you the costs incurred by Council in so doing: see Part 11, Clause 34 of Schedule 5 of the *Environmental Planning and Assessment Act 1979*.

COMPLIANCE COST NOTICE

Pursuant to clause 37, Schedule 5, Part 12 of the *Environmental Planning and Assessment Act 1979* and clauses 283 and 284 of the *Environmental Planning and Assessment Regulation 2001* Council may issue a compliance cost notice on you to pay all or any reasonable costs and expenses incurred by Council in connection with:

(a) monitoring action under the order, and
(b) ensuring that the order is complied with, and
(c) any costs or expenses relating to an investigation that leads to the giving of the order, and
(d) any costs or expenses relating to the preparation or serving of the notice of intention to give an order, and
(e) any other matters associated with the Order.

The maximum amount that may be required to be paid under a compliance cost notice for costs or expenses relating to the preparation or serving of the notice of the intention to give order is $750.

RIGHT OF APPEAL AGAINST ORDER

If you wish to appeal against an Order you must appeal to the **Land and Environment Court**, Level 4, 225 Macquarie Street, Sydney NSW 2000, within **28 days** after the service of the Order on you: see Part 8, Division 8.5, Clause 8.18 of the *Environmental Planning and Assessment Act 1979*.

OTHER ORDERS

This Order does not prejudice Council's entitlement to serve other Orders on the premises and this Order does not regularise any illegal building works or unauthorised Use of the premises.

[redacted]
Team Leader
Building Control
Environmental Compliance

t 1300 434 434
e council@northernbeaches.nsw.gov.au
northernbeaches.nsw.gov.au
PO Box 82 Manly NSW 1655
ABN 57 284 295 198

Dee Why Office:
725 Pittwater Road
Dee Why NSW 2099

Mona Vale Office:
1 Park Street
Mona Vale NSW 2103

Manly Office:
1 Belgrave Street
Manly NSW 2095

Proposed Road Reserve Closure

adjoining 23 Maas Street,
Cromer NSW 2099

Legend

Proposed Closure Area

Land Parcel Boundary

northern beaches council

Scale (A4) - 1:350
GDA 94 MGA Zone 56

N

Date Printed: 15/08/2025
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Public Notice Summary Report

Project name	Proposed Road Reserve Closure – adjoining 23 Maas Street, Cromer.
Public notice period	3 September to 5 October 2025
Background	Notice is hereby given that Council proposes to close the council public road reserve adjoining 23 Maas Street, Cromer. The purpose of the proposed road reserve closure is to enable the sale of the subject land to the adjoining owner. Any person is entitled to make submissions concerning the proposal within 28 days of the date of this public notice. You can make a submission in one of the following ways: • Complete Submission Form below. • Email: council@northernbeaches.nsw.gov.au. • In writing: Northern Beaches Council, PO Box 82, Manly NSW, 1655. Once the submission period is completed, Council will consider all duly made submissions before deciding whether to continue with the road reserve closure proposal. This public notice is in accordance with Section 38B of the *Roads Act 1993*.
Total number of submissions	1
Summary of findings	1 submission of objection was received. Please note, the same submission was submitted twice, by website and by email. Therefore, the submission is considered one. The comments were regarding impact on neighbouring properties.
Notification approach	This public notice was implemented and reported in accordance with Section 38B of the *Roads Act 1993*. The notice was promoted through letters to adjoining owners, on-site signage and a public notice page published on Council's website. Contact details were provided should people have questions.

How we notified	
Properties notified by letter	14 letters

Signage installed onsite	1 sign
Council website	https://www.northernbeaches.nsw.gov.au/council/news/proposed-road-reserve-closure-adjoining-23-maas-street-cromer

Document administration	
TRIM	2025/644661
Version	1.0
Date	9 October 2025
Approval	Content provided and approved by Property Commercial & Tourist Assets Team
Status	Final
Notes	Community and stakeholder views contained in this report do not necessarily reflect the views of the Northern Beaches Council or indicate a commitment to a particular course of action.

Findings		
Theme	**What we heard**	**Council comment**
Further development	Concerns about further impediment of sunlight, privacy concerns and general aesthetic.	Any future development of a property will be assessed by Council's Development Assessment team
Building works	Current building works occurred with no consultation.	Certain types of building works can be undertaken without seeking Council approval or notifying neighbours (known as exempt development and complying development). Suggested talking to neighbour on whether the works are exempt development. Works without approval or not complying with an approval can be reported to Council.
Traffic and Safety	Concern surrounding increase in traffic and noise	Not related to a road reserve closure. Any general issue regarding traffic (such as

		illegal parking) can be reported to Council.

APPENDIX 1 Verbatim Community & Stakeholder Responses

Website Submission

1	We object to the closure of the road reserve as we feel the future sale of the 'subject land to the adjoining owner' will greatly impact our use and enjoyment of our adjoining property for several reasons, some of which are: > Future building onto the 'new space' will likely further impede our access to the winter sun as they currently have two sheds on our north facing boundary (see photos) > Since the current owner undertook renovation works (approx 3 yrs ago) which increased 'hard surfaces', we have been subject to excess water run off on our northern boundary. We were not consulted regarding these building works and are unsure if these are compliant. A section of the wall was also damaged in the process. (photo attached - video available also showing water entering our property) > The noise and traffic in the street will increase. Safety concerns already with boats and trailers constantly parked at the street entrance. > We are concerned with the aesthetic appeal as we share a stone wall boundary fence. The appearance, design and functionality will devalue our site and make ours look ugly if building occurs. > Privacy concerns re the impact of any potential building works near the boundary line. (see photos) If you have any questions, we would be happy to discuss them further. Regards XXXX & XXXXXXX XXXXXXX