

Department of Planning and Environment

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# Fairfield


Flood Planning Advice Report

Anthea Sargeant (Chair)

Chris Wilson

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22 June 2023



# Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land, and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally, and economically.

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Fairfield

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# Defined terms

Term	Definition
AEP	Annual Exceedance Probability
Amendment 46	<i>Fairfield Stage 2 Planning Proposal (LEP Amendment 46), Flood considerations &amp; consistency with Section 117 Ministerial Direction 4.3</i> (prepared by Fairfield City Council, 2022)
ARR	Australian Rainfall and Runoff Guidelines
Council	Fairfield City Council
DCP	Fairfield Development Control Plan 2013
Department	Department of Planning and Environment
EHG	Environment and Heritage Group
Flood Inquiry	NSW Flood Inquiry (July 2022)
FPA	Flood Planning Area (land below the flood planning level)
FPL	Flood Planning Level (1% AEP + 500 mm freeboard)
FSR	Floor Space Ratio
Georges River FRMS&P	<i>Georges River Floodplain Risk Management Study &amp; Plan</i> (prepared by Bewsher Consulting, 2004)
HOB	Height of Buildings
INSW	Infrastructure NSW
LGA	Local Government Area
LEP	Fairfield Local Environmental Plan 2013
LSPS	Local Strategic Planning Statement
Panel	Fairfield Flood Advisory Panel
PLUS	Department's Planning and Land Use Strategy division
PLUS Request	PLUS request to the Panel, dated 10 January 2023 – see Section 1.1.
Proposal	<i>The Accelerated LEP Review Program – Planning Proposal (Stage 2), Amendments to Fairfield Local Environmental Plan 2013</i>
PMF	Probable Maximum Flood
SES	NSW State Emergency Service
TAG	Flood Technical Advisory Group
TAR	Technical Advice Report
TfNSW	Transport for NSW

# 1 Introduction

1. The Department of Planning and Environment (**Department**) has established Flood Advisory Panels to provide advice regarding the flood risk associated with certain 'high risk' planning proposals and other planning-related matters, in light of the recommendations of the NSW Flood Inquiry 2022 (**Flood Inquiry**).
2. A Technical Advisory Group (**TAG**) was also established by the Department to deliver expert technical advice to the panels in accordance with the TAG terms of reference (dated 12 December 2022). The advice of the TAG is not binding on the panels nor on the Department's Planning and Land Use Strategy (**PLUS**) division, which remains the delegated decision maker for the planning proposals referred to the panels.
3. In May 2021, the Department issued the gateway determination for planning proposal, PP-2022-1968 *Accelerated LEP Review Program – Planning Proposal (Stage 2), Amendments to Fairfield Local Environmental Plan 2013* (**Proposal**) with minor amendments, including for Fairfield City Council (**Council**) to finalise supporting studies prior to exhibition.
4. The Proposal was exhibited between June and July 2022, and subsequently returned to the Department for finalisation. The Proposal seeks to amend Fairfield Local Environmental Plan 2013 (**LEP**) in relation to town centres, medium density, heritage and flooding provisions.
5. On 12 January 2023 the Fairfield Flood Advisory Panel (**Panel**) received a request for advice from PLUS (**PLUS Request**) in relation to the Planning Proposal, which is detailed in Section 1.1 below.
6. The Executive Director within the Department Anthea Sargeant (Chair), and independent members Peter Williams and Chris Wilson were appointed to constitute the Panel with respect to this request.

## 1.1 Advice Request

7. PLUS requested advice from the Panel with respect to the Proposal on 12 January 2023. The PLUS Request sought the Panel's recommendations on how to proceed with this rezoning in relation to flood and evacuation matters, with possible options being:
  - Proceed to finalisation of the Planning Proposal without amendment.
  - Proceed to finalisation only in certain areas of the Planning Proposal.
  - Not finalise the Planning Proposal and require Council to undertake further work and resubmit the proposal for a fresh Gateway Determination and potential re-exhibition prior to finalisation.
8. PLUS also requested the Panel provide advice on the following matters:
  - Whether flood risk, including evacuation could be adequately managed in light of the Flood Inquiry recommendations.
  - Whether the Planning Proposal adopts a tolerable, risk-based flood planning level, considering a range of flood scenarios, existing and approved development, evacuation routes, and only permitting new development in line with cumulative evacuation capacity.
9. The PLUS Request notes that the Department has existing concerns with the approach taken to flood risk management in the Proposal on the basis that:
  - Detailed flood mapping was not included in public exhibition documents.

- The Planning Proposal did not demonstrate consistency with Ministerial Direction 4.3 Flood Prone Land.
- Following the Flood Inquiry, the Planning Proposal should demonstrate risk-based assessment of flood prone land and consideration of evacuation routes.

## 1.2 Material considered by the Panel

10. In this review, the Panel considered a range of material detailed in Appendix A.
11. The Panel requested the TAG provide technical advice on specific flood-related risks of the Proposal, having regard to the Flood Inquiry and its recommendations as accepted by the NSW Government (either absolutely or in principle). This included advice as to whether the Proposal adopts a tolerable, risk-based flood planning level considering the material listed in Appendix A.
12. The TAG's advice is summarised in the Technical Advice Report (**TAR**) dated 6 June 2023. The TAG advice is a compilation from several independent experts.
13. The Panel additionally sought advice from relevant agencies including the NSW State Emergency Service (**SES**), Infrastructure NSW (**INSW**) and Transport for NSW (**TfNSW**).

## 1.3 The Panel's meetings

14. As part of its advice, the Panel met with various stakeholders as set out in Table 1.

Table 1: Panel's Key Stakeholder Meetings

Meeting	Date
Site Inspection	05 May 2023
PLUS	12 May 2023
Environment and Heritage Group (EHG)	12 May 2023
Council	12 May 2023

# 2 Planning Proposal

## 2.1 Site and locality

15. The Proposal applies to a series of town centres throughout the Fairfield Local Government Area (LGA) including, Fairfield, Canley Vale, Carramar, and Cabramatta (see Figure 1).
16. Additionally, the Proposal seeks to increase medium density housing supply throughout the Fairfield LGA in Canley Heights, Canley Vale, Fairfield East, Villawood, Fairfield Heights, and Smithfield.
17. The Proposal has been projected to provide an additional 9,820 dwellings in total and facilitate 1,074 new jobs in the LGA.
18. The Fairfield LGA sits broadly in the Georges River Catchment. Other minor tributaries which impact the sites included in the Proposal are:
  - Prospect Creek.
  - Orphan School Creek.



- Green Valley Creek.
- Clear Paddock Creek.

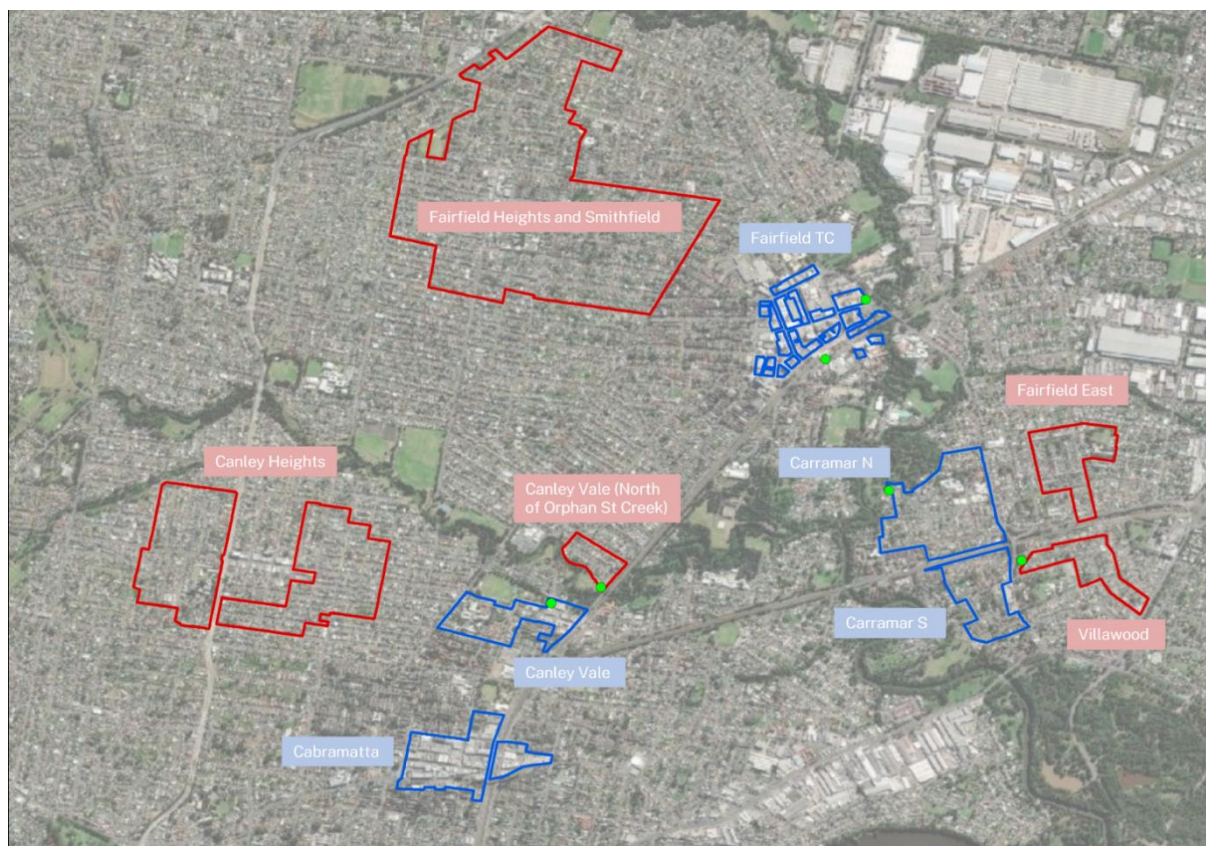


Figure 1: Indicative location of the Town Centres (blue) and Medium Density Areas (red)  
(Source: prepared by the Department)

## 2.2 Background of Planning Proposal

19. The Proposal represents 'Stage 2' of a two-part process to update the LEP in accordance with the NSW Accelerated LEP Program. Under the program Council was provided grant funding to revise the provisions and controls in the LEP to better align with the outcomes of Council's Local Strategic Planning Statement (LSPS).
20. Table 2 below provides a brief history of the Proposal to date.

Table 2: Timeline of rezoning

Date	Proposal Stage	Comment
June 2018	NSW Government Accelerated LEP Review Program	In June 2018, Council endorsed participation in the NSW Government's Accelerated Local Environmental Plan Review Program.
November 2020	Fairfield Stage 1 – Planning Proposal Implemented	The Fairfield Stage 1 – Accelerated Planning Proposal made various minor amendments to the LEP to address priorities set out in the LSPS. Amendments included a new category for emergency works on Council land, altered zoning for various parcels of land, and clarification of heritage provisions in Schedule 5.

December 2020	Council endorsed Fairfield Stage 2 Planning Proposal	At the 1 December 2020 Council meeting, Council endorsed the referral of the Proposal to the Department for Gateway approval.
May 2021	Gateway determination was issued	The delegate of the Secretary recommended the Proposal proceed with several minor amendments including to finalise supporting studies prior to the exhibition stage.
2 June – 30 June 2021	Exhibition	The Proposal was exhibited publicly including consultation with several agencies identified at the Gateway stage, notably EHG and the SES.
July 2022	Post exhibition	Council returned the Proposal to the Department post-exhibition.
Current	Finalisation	PLUS is currently in the process of finalising the Proposal.

## 2.3 Planning Proposal

21. The Proposal seeks to modify the planning controls in the LEP applying to sections of key suburbs within the Fairfield LGA, including Carramar, Canley Vale, Cabramatta, and Fairfield.
22. The key changes to the LEP include:
  - Amendments to land zoning, floor space ratio (**FSR**), maximum height of building (**HOB**), minimum lot sizes, and active frontages in the town centres of Fairfield, Cabramatta, Canley Vale, and Carramar.
  - Amendments to FSR and HOB in the R3 Medium Density Residential zones across the LGA.
  - The introduction of the Standard Instrument clause 5.22 Special Flood Consideration.
  - Inclusion of items on the local heritage schedule.
23. The following **Error! Reference source not found.** below summarises the proposed changes to zoning in each town centre.

**Table 3: Summary of proposed zoning changes for the identified Town Centres in the Planning Proposal**

Town Centre	Summary of proposal changes
Fairfield	Amendments to FSR and HOB. Including, but not limited to: <ul style="list-style-type: none"> <li>• Increase HOB to 39 m, 29 m, and 20 m in certain areas.</li> <li>• Increase HOB to 45 m and 52 m on certain corner sites.</li> <li>• Increase FSR allowances to reflect increased in permitted heights.</li> <li>• Amend minimum lot amalgamation requirements to be consistent with desired built form outcomes of urban design studies.</li> </ul>
Cabramatta	Amendments to FSR and HOB. Including, but not limited to: <ul style="list-style-type: none"> <li>• Increase HOB in the B4 zone surrounding the proposed B3 core to 20-39 m and apply a consistent HOB of 14 m across the proposed B3 core.</li> <li>• Increase FSR allowances to reflect increased in permitted heights.</li> <li>• Amend minimum lot amalgamation requirements to be consistent with desired built form outcomes of urban design studies.</li> </ul>



	Amendments to FSR and HOB. Including, but not limited to:
Canley Vale	<ul style="list-style-type: none"> <li>Increased HOB along Canley Vale Road and Railway Parade to up to 39 m, an increase of 4-23 m.</li> <li>Amend minimum lot amalgamation requirements to be consistent with desired built form outcomes of urban design studies.</li> </ul>
	Various amendments to FSR and HOB. Including, but not limited to:
Carramar	<ul style="list-style-type: none"> <li>Rezoning areas within 400 m of town centre to R4 High Density, and within 800 m of town centre to R3 Medium Density zoning.</li> <li>Associated amendments to HOB and FSR within areas to be zoned R3 and R4.</li> <li>Rezone various locations to RE1 Public Recreation.</li> <li>Remove minimum lot size for dual occupancy in amended areas.</li> </ul>

## 3 The Panel's consideration

### 3.1 Key issues

24. The following section provides a summary of the key issues identified and considered by the Panel in response to the PLUS Request. The Panel considers the key issues to be:
  - Flood modelling, hazard and behaviour
  - Flood evacuation
  - Mitigation measures
25. The Panel notes that the Proposal consists of a number of separate geographical areas, including four town centres as well as surrounding areas to be rezoned medium density (see Figure 1).
26. The Panel acknowledges the various areas are affected by flooding to differing extents, noting some areas are more constrained by flooding than others. Notwithstanding, the Panel has taken a holistic approach in its consideration of the issues and in providing advice for this Proposal.

### 3.2 Flood modelling, hazard, and behaviour

#### Council Comments

27. In its meeting with the Panel on 12 May 2023, Council noted:
  - The majority of the flood-affected land:
    - Is located in flood hazard level H1 and H2 areas, which involves flooding of low depth (less than 500 mm) and low velocity (less than 2 m per second).
    - Is impacted by overland flooding, rather than riverine flooding. Overland flooding is noted to be shorter in duration, and primarily attributable to blockages and surcharge in stormwater infrastructure.

- In 2011, Council commissioned a climate change sensitivity assessment with respect to the *Georges River Floodplain Risk Management Study & Plan* (Bewsher Consulting, 2004) (**Georges River FRMS&P**), which it noted did not find sufficient justification to vary design flood or freeboard levels as per the original study.
- Council contended that climate change analysis has been carried out in flood studies covering the relevant areas in the Proposal. Notably, the *Cabravale Overland Flood Study* (Catchment Simulation Solutions, 2019), covering Cabramatta, Canley Vale and Carramar town centres, included sensitivity analysis simulations of 10%, 20%, and 30% rainfall intensity increase to quantify climate change impacts.
  - The sensitivity analysis informed the Proposal's flood hazard assessments.
  - The findings of the sensitivity analysis performed were noted not to warrant changing the freeboard level nor other flood planning controls.
- Council noted the prevalence of overland flooding in the Proposal and contended that the level and nature of flooding experienced does not warrant review of the flood models and flood risk analysis for the area.
- Council contended that, with respect to the areas covered by the Proposal, the flood planning controls in the LEP and Fairfield Development Control Plan 2013 (**DCP**) are informed by, and factor in, recent flood studies and reviews coordinated by Council over the past 2 years, which include modelling of the Probable Maximum Flood (**PMF**) level.

#### PLUS Comments

28. In its meeting with the Panel on 12 May 2023, PLUS noted:
- 3,000 to 4,000 dwellings, out of the potential 9,820 dwellings, are located within the flood planning area (**FPA**).
  - The flood studies informing the Proposal do not include data from the recent 2021 and 2022 floods for Orphan School Creek, Prospect Creek, or Georges River.
  - It is likely that flood extents, depths and hazards have changed over time, and therefore the flood risk reported by Council in this Proposal may not reflect actual risk.

#### TAG Advice

##### *Flood Modelling and Climate Change*

29. TAG members considered that while the selection of studies informing the Proposal contained modelling of the full range of floods, including the 1% Annual Exceedance Probability (**AEP**), 0.2% AEP, 0.01% AEP and the PMF events, this information was not applied to inform flood risk analysis for the Proposal, which focused almost exclusively on the 1% AEP event.
30. TAG members advised the Georges River catchment was identified by the Flood Inquiry as a 'high-risk' catchment. Given this, the flood information presented is not considered fit-for-purpose to enable a risk-based assessment of the Proposal, as it:
- Does not provide assessment of the likely flooding consequences across a range of probabilities (events), depending too heavily on the 1% AEP.
  - Relies on the Georges River FRMS&P, which is now two decades old.
  - Does not adequately consider climate change.
31. The TAG considered a 10% increase in rainfall intensity to be conservative and not representative of observed increases in intensities from the 2011 baseline to today. The TAG advised that a 20% increase in rainfall intensities should be used in this modelling.

32. The TAG noted it is unclear whether the scenario of overland and riverine flooding impacts occurring at the same time have been considered. This has the potential to materially affect flood risk. Further, the TAG noted that climate change is likely to impact on flood magnitudes in the region because of both riverine flooding pathways from the Georges River and overland flooding pathways from the local catchments.

#### *Flood Hazard and Behaviour*

33. TAG members advised the information submitted is inadequate to assess the flood hazard across the full range of flooding.
34. The TAG members noted the Proposal is impacted by both overland flooding, due to stormwater system capacity, and riverine flooding.
35. TAG members advised they are unable to make an assessment as to flood hazard, as the submitted material fails to account for climate change, and therefore the flood hazard ratings submitted are likely to be underestimates. Additionally, the outdated nature of flood studies relied upon, notably the Georges River FRMS&P, further contributes to uncertainty for the hazard assessments provided.
36. TAG members advised that there is insufficient detail in the documentation to make an informed opinion as to the risk to life associated with the Proposal.
37. It was advised that hazard ratings for multiple flood events up to the PMF should be provided to enable a risk-based assessment, rather than solely relying on the 1% AEP event.
38. TAG members also advised that no cumulative or off-site impacts were discussed in the submitted material.

#### **Agency Comments**

39. In its advice provided to the Panel on 2 June 2023, EHG noted:
- In order to appropriately assess flooding risk and hazard, flooding conditions should be modelled for the full range of events up to the PMF. The *Fairfield Stage 2 Planning Proposal (LEP Amendment 46)* report (**Amendment 46**) is not considered adequate as it relies on the 1% AEP event.
  - Some rezoning would be impacted by overland and riverine flooding from Prospect Creek, Orphan School Creek, and Georges River. However, the flooding impacts on these sites for events greater than the 1% AEP is not considered.
  - Projected climate change scenarios and associated flooding impacts have been considered for some areas.
  - EHG advised that there is flood modelling and data from recent studies and investigations, including those undertaken by neighbouring councils, which are available and should be included in the assessment of flooding risk. The flood modelling for this Proposal could be made fit-for-purpose by incorporating these relevant studies, available at Appendix B.
  - EHG recommended that given the likely design life of the developments in this Proposal, the Amendment 46 Report should include adaptive provisions based on the latest climate change information.
  - Cumulative impacts, considering planned and anticipated developments in the catchment, have not been considered. EHG advised that development activities associated with the rezoning may have localised and regional impacts through altering overland flow paths. Additionally, adverse impacts may arise from filling flood storage areas, such as where rezoning sites are below the 1% AEP level.
40. In its advice provided to the Panel on 12 May 2023, INSW noted:
- The information provided is not adequately detailed in relation to flooding, flood risk and emergency preparedness.

- The hazard mapping provided is only relevant to the 1% AEP event. Hazard classification maps for the 0.5% and 0.2% AEP events, and up to the PMF, would be useful to indicate flood risk for more extreme events in the future under climate change.
  - Development proposed below the 1% AEP level is not supported.
  - Any infrastructure proposed to mitigate flooding, such as stormwater upgrades, should be designed, constructed, and validated prior to any rezoning occurring.
  - Work that was undertaken in 2011 to assess the impacts of climate change which found minimal increases in the flood planning level due to these impacts may need to be updated using the Australian Rainfall & Runoff (ARR) 2019 guidelines, to confirm these results remain valid.
41. In correspondence provided to the Panel on 17 May 2023, TfNSW did not provide specific comment on flood modelling, hazard, or behaviour, noting that the records for flooding activity in the area are managed by other State agencies.
42. In advice provided to the Panel on 25 May 2023, the SES noted:
- The studies relied upon for this Proposal are outdated and advised they do not consider contemporary climate change considerations, nor the latest ARR 2019 guidelines.
  - Floodwaters in this catchment are advised to rise at rapid rates *“with flooding commencing less than 6 hours after the commencement of heavy rain if the catchment is already saturated”*. Further, in extreme events streets could become too dangerous to travel on less than 30 minutes after a storm commences.
  - A flood event with a duration of up to 31 hours was observed in this area in 1986.
  - It does not support rezoning land below the 1% AEP, which increases the risk to life and property.
  - There is no assessment of cumulative impacts upstream and downstream of the proposed changes.
  - It recommends further investigation be undertaken which adequately assesses climate change impacts and the joint probability issues of riverine and overland flooding.

#### **Panel considerations of flood modelling, hazard and behaviour**

43. The Panel acknowledges the advice received that the flood mapping presented in this Proposal is based on outdated flood studies, noting:
- The Georges River FRMS&P is now two decades old.
  - The modelling did not use the latest ARR 2019 guideline.
  - The modelling does not include data from the most recent flood events.
44. Additionally, the Panel notes the advice that the flood modelling does not adequately consider climate change. The Panel agrees that the Proposal should include updated flood modelling using the latest available studies and appropriately considering climate change impacts.
45. The Panel notes flood impacts are not considered for events greater than the 1% AEP and the TAG advice that a full assessment of flood risk and hazard is therefore not able to be made. The Panel agrees that flood modelling and hazard mapping should be undertaken for the full range of flood events up to the PMF to enable a risk-based assessment.
46. The Panel notes the impacts of overland flooding across the Proposal and acknowledge the advice that this flooding is primarily driven by capacity and blockages in stormwater infrastructure.

### 3.3 Flood Evacuation

#### Council Comments

47. In its meeting with the Panel on 12 May 2023, Council advised:
- All areas of the Proposal have access to an extensive road network which facilitates evacuation.
  - That it is safer for occupants to shelter in place than evacuate in many areas due to the prevalence of overland flooding as the type of flooding impacting the Proposal, which is associated with a shorter duration.
  - That in general for flooding, the Bureau of Meteorology issues warnings, and the SES controls evacuation processes.
  - In the recent 2022 flooding events impacting Fairfield LGA, it noted that properties located along lower parts of Prospect Creek (in high flood risk areas) were directed to evacuate by the SES.

#### PLUS Comments

48. In its meeting with the Panel on 12 May 2023, PLUS noted that the documentation submitted, does not adequately address evacuation capacity or ability.

#### Agency Advice

49. In its advice provided to the Panel on 2 June 2023, EHG noted:
- Emergency management issues and evacuation constraints for floods rarer than the 1% AEP event should be considered.
  - In the context of the intensification of development, rezoning sites which are subject to hazard ratings H3 and H4 may face evacuation constraints and emergency management issues in the future.
  - That analysis and modelling should be undertaken to determine the demand for evacuation from both existing developments and the proposed intensification, including the capacity and adequacy of the routes.
50. In advice provided to the Panel on 17 May 2023, TfNSW highlighted the following:
- Within the Planning Proposal area, there is no allocated funding to upgrade the existing classified road network.
  - The majority of classified roads within the planning Proposal area are significantly constrained corridors. In lieu of alternative strategies, such as shelter in place, for which SES requirements should be satisfied, additional supporting infrastructure would be required to support mass evacuation at this scale. This would include appropriate network modelling to demonstrate the routes have capacity.
  - Upgrades to rail interchanges at Canley Vale and Fairfield have been undertaken with some associated local road improvements.
  - It does not undertake mass transport operations during flooding emergencies. The SES is the lead state agency responsible for flooding emergency and evacuations, and the suitability of flood evacuation routes is advised to be a matter for SES.
51. In advice provided to the Panel on 17 May 2023, INSW noted:
- There is inadequate consideration of flood evacuation, with no modelling undertaken which accounts for increased development. There is only a general statement provided regarding all properties within H1 and H2 areas of the 1% AEP event being near local roads allowing them to safely evacuate following warnings being issued.
  - It recommended evacuation should be considered for the full range of flood events up to the PMF, including how it would be managed by the SES.

52. In advice provided to the Panel on 25 May 2023, SES noted:
- Evacuation modelling has not been completed to consider the potential increase in development.
  - It is advised that the evacuation capacity and capability should be considered for the Proposal for the full range of flood events up to the PMF.
  - Recent examples in the Proposal area of SES assisted evacuation and rescues during flooding events include:
    - Kiora, Arburus and Derria Streets – Canley Heights (2018 and 2022).
    - Sandal and Waterside Crescents – Carramar (2016, 2020 and 2022).
    - Canley Vale Road, Freeman Avenue, Railway Parade, Delamere Street, Francis Street and Sackville Street – Canley Vale (2016 and 2022).
    - Nile and Sackville Streets – Fairfield Heights (2020 and 2022).
  - It considers that there is no evidence to support the statement in the Planning Proposal that the amendments *“are located in close proximity to or have direct access to local roads that in the event of a flood warning or evacuation order being issued, are able to safely evacuate”*. Constraints to evacuation include:
    - Parts of the LGA are Low Flood Islands, which lose evacuation routes prior to becoming inundated.
    - Roadways adjoining Fairfield town centre have been identified in Council’s studies to become flood ways during flood events rarer than 1% AEP.
    - The Georges River FRMS&P identifies that Cabramatta, Fairfield and Canley Vale have their evacuation routes flooded by Cabramatta Creek, Prospect Creek, and backwater from Georges River.
  - The complexity of managing evacuation, which relies on human behaviour, is increased with additional people in flood prone areas. SES advises that intensification within flood prone areas would require further community engagement and preparedness programs, additional resources to manage evacuations, and ultimately increases residual risk to life.
  - It advises that there is no flood warning system for Prospect Creek and other tributaries.
  - Where the local SES unit monitors gauges on creeks and informs the community, warning times are noted to be limited due to the nature of flooding.
  - It is advised that SES would not support a shelter in place strategy due to the potential depth, velocity, and duration of flooding in the LGA.

## **TAG Advice**

### *Evacuation Modelling, Capacity and Strategy:*

53. The TAG advised that Council’s submitted documentation does not adequately address evacuation. It noted that each of the town centres has unique overland and riverine flooding pathways, for which a general response to evacuation is problematic.
54. The TAG advised that there was no modelling or analysis of broader evacuation and shelter in place plans submitted with the Proposal.
55. TAG members advised that to properly address evacuation scenarios, the full range of flood events up to the PMF need to be considered.
56. It was advised that the submitted documentation identified limited existing road capacity and poor intersection operation for Cabramatta and Canley Vale, and accordingly any increase in density would need to adequately consider road network capacity and intersection performance in the context of flood evacuation.



### Panel Advice

57. The Panel acknowledges the advice from the TAG and Government agencies that no evacuation modelling has been undertaken to account for the increase in development resulting from this Proposal.
58. The Panel notes the unique flooding characteristics of each proposal area, scale of the proposed rezoning and the complexity regarding flood impacts. Further, the Panel notes that overland flooding impacts significant areas and has the potential to cut off evacuation routes.
59. Therefore, the Panel agrees with the advice that evacuation modelling must be undertaken to validate the capacity and capability of routes under existing and future development conditions. It also agrees that evacuation modelling should be undertaken for the full range of flood events up to the PMF, using the latest flood data and appropriate climate change considerations.
60. The Panel notes advice on the constrained existing traffic conditions of major roads and intersections in the Proposal area and acknowledges that evacuation modelling would enable demand impacts to be considered to determine whether upgrades are required at critical intersections to support intensification.

## 3.4 Mitigation Measures

### Council Comments

61. In its meeting with the Panel on 12 May 2023, Council noted:
  - A primary mitigation measure for the Proposal area is for the removal of selected properties which were identified in a recent overland flood study update to have a flood hazard rating of H3 and H4.
    - 44 properties within the boundary of the proposed uplift to R3 Medium Density and R4 High Density in Carramar are proposed to be removed by Council.
  - Flood Risk Precincts are categorised by Council as being either low, medium, or high risk. Based on this categorisation, the DCP outlines suitability or otherwise of various land uses.

### PLUS Comments

62. In its meeting with the Panel on 12 May 2023, PLUS noted:
  - Amendment 46 seeks to remove selected properties subject to flood hazard level of H3 or higher where the flood risk is not able to be reasonably managed. These are:
    - Carramar: 44 properties.
    - Villawood: 6 properties.
  - Other measures to manage residual flood risks noted by PLUS include:
    - Locating building footprints away from high flood risk areas.
    - Including notations on relevant '*flood control lots*' and addressing flood approvals criteria for complying development.
    - Future development on sites identified flood hazard H1 and H2 to be constructed with flood resistant materials, and with regard to flood levels per the DCP.
    - Improve stormwater infrastructure where deficient drainage causes flooding.

## Agency Advice

63. In its meeting with the Panel on 2 June 2023, EHG noted:
- It is advised that the Proposal does not include any mitigation measures. EHG recommends a high-level risk management assessment is undertaken using the latest data available to identify appropriate mitigation measures.
64. In correspondence provided to the Panel on 17 May 2023, TfNSW recommended the Panel seek insights on any mitigation measure matters from SES.
65. In advice provided to the Panel on 17 May 2023, INSW noted:
- Amendment 46 places reliance on the SES for flood risk management including leading warning issuance and monitoring gauges in the catchment. The report does not assess adequacy and coverage of the flood monitoring network, nor how observations would be processed into forecasts and early evacuation warnings. Adequate detail on the confident warning times, accuracy of these, and the ability to evacuate the current and proposed population should be provided.
  - Bureau of Meteorology does not issue flash flooding forecasts if the time between rainfall and flooding is less than 6 hours. Hence, the increased development in the area may justify installation of monitoring and warning systems where there is potential for flooding within 6 hours of rainfall.
  - Consideration be given to deferring rezoning until the flood planning level (FPL) is recalculated, as the Georges River is considered a 'high-risk' catchment, and as per the Flood Inquiry the FPLs for these catchments are to be revised.
66. In advice provided to the Panel on 25 May 2023, SES noted:
- The mitigation proposed to manage flood risk is to remove areas defined as high flood risk.
  - The Georges River catchment is a 'high-risk' catchment which means its FPL is subject to revision in future, as per Flood Inquiry Recommendation 18. SES suggests considering deferring the rezoning until the revised FPL is determined.

## TAG Advice

### *Mitigation Measures:*

67. TAG members advised that the following mitigation measures are proposed:
- Ensuring future buildings are constructed using flood resistant materials,
  - Locating habitable areas above the 1% AEP plus 500 mm.
68. TAG members supported the approach proposing to remove properties affected by hazard level H3 and above, however noted that more properties may be affected based on revised hazard ratings when climate change and more recent data are considered. Hazard ratings should be provided for the full range of flood events up to the PMF, not just the 1% AEP, for a proper risk-based assessment.

## Panel Advice

69. The Panel supports Council's approach of removing properties with a flood hazard rating of H3 and above from the Proposal. However, the Panel acknowledges the concerns raised regarding the accuracy of the submitted flood modelling and associated hazard mapping.
70. The Panel notes that following updated flood modelling and hazard mapping, which accounts for the latest flood data and adequately considers climate change impacts, additional properties may be affected by hazard ratings of H3 and higher.

## 4 The Panel's Advice

71. The Panel has undertaken a review of the Proposal as requested by PLUS. In doing so, the Panel has considered the material listed in Appendix A, including submissions and additional information submitted by council and PLUS, as well as the advice provided by the TAG and NSW Government agencies.
72. While the Panel recognises the strategic significance of the Proposal, it has identified a number of issues that must be addressed before the Proposal can proceed.
73. The Panel notes the submitted flood modelling and hazard mapping:
  - Is based on outdated information.
  - Does not adequately consider climate change.
  - Does not consider the full range of flood events up to the PMF.
74. The Panel notes the submitted flood modelling almost exclusively focuses on the 1% AEP event. The flood hazard mapping is based entirely on the 1% AEP.
75. While the Panel supports Council's approach of removing lots impacted by a flood hazard rating of H3 and higher, it agrees with the advice received that these areas are likely to increase with updated flood modelling.
76. The Panel therefore recommends that areas currently below the 1% AEP be deferred from the current rezoning until updated modelling has been undertaken to determine the extent of change, if any, to the number of lots impacted by a flood hazard rating of H3 or higher.
77. Further, the Panel supports Council's proposal to adopt clause 5.22 Special Flood Consideration of the *Standard Instrument – Principal Local Environment Plan*, which will require a higher level of assessment of the compatibility of future development with flooding in the area.
78. The Panel notes that flood evacuation modelling has not been undertaken. The Panel considers that given the Planning Proposal's scale, spatial diversity, and complexity of impacts from both increased demand and flooding on evacuation routes, that evacuation modelling must be undertaken for the full range of events up to the PMF.
79. Therefore, the Panel recommends PLUS proceed with the Fairfield Planning Proposal under the following conditions:
  - Removal of all lots currently identified as having a hazard rating of H3 or above on the submitted hazard mapping.
  - Deferral of remaining areas currently identified below the 1% AEP event (i.e., with a flood hazard rating of H1 and H2), and thence proceeding to rezoning subject to:
    - New flood modelling being completed, incorporating the latest available flood data and appropriately considering climate change impacts.
    - Once updated modelling and hazard mapping has been undertaken, remove any additional lots identified as having a hazard rating of H3 or above on the revised hazard mapping.
    - Application of the updated FPL to land deemed suitable for rezoning and development.
  - Proceed with the rezoning of the land currently above the 1% AEP, subject to:
    - Appropriate evacuation studies being completed, including modelling evacuation demand and route capacity for the full range of flood events up to the PMF in the context of the existing and future development conditions.
    - Evacuation studies must consider impacts from overland flooding.

- The adoption of clause 5.22 Special Flood Consideration of the *Standard Instrument – Principal Local Environmental Plan*.
- Identify stormwater infrastructure improvements to address overland flooding and ensure upgrades occur in line with the redevelopment associated with the Proposal.
- Identify road network improvements to address evacuation requirements and ensure upgrades occur in line with the redevelopment associated with the Proposal.



Anthea Sargeant (Chair)  
DPE Executive Panel Member



Peter Williams  
Panel Member



Chris Wilson  
Panel Member

# Appendix A – Material considered by the Panel

Attachment ID / Date	Name	Author
	Advisory Panel Considerations Report	Department
Attachment A – October 2022	Fairfield LEP 2013 (Amend 46) - Flood Considerations	Council
Attachment B – June 2022	Planning Proposal - Fairfield Accelerated LEP Review Stage 2 - PP-2021-3029	Council
Attachment C – May 2021	Gateway determination report	Department
Attachment D – June 2022	DRAFT Finalisation Report	Department
Attachment E – July 2022	Letter from EES	Department
Attachment F – June 2021	Letter from SES	SES
Attachment G – December 2022	Letter to Fairfield on decision	Department
Attachment H	Draft Maps	Department
Attachment I – January 2023	Briefing Note	Department
Attachment J – January 2023	Letter to the Advisory Panel regarding the Fairfield Stage 2 LEP	Department
Council IN (12.05.2023)	Flood Advisory Panel - 12 May 2023	Council
PLUS IN (12.05.2023)	Fairfield Stage 2 – Flood Advisory Panel	PLUS
INSW IN (17.05.2023)	INSW Advice	INSW
SES IN (25.05.2023)	SES Advice	SES
TfNSW IN (17.05.2023)	TfNSW Advice	TfNSW
Fairfield TAR (06.06.2023)	Technical Advisory Group - Fairfield Technical Advice Report	TAG

# Appendix B – Flood Studies

**Georges River** (relating to broader Georges River Catchment assessment issues):

- Georges River Floodplain Risk Management Study and Plan 2004, Vol 1 (Parts 1 & 2) and Vol 2, Brewsher Consulting Pty Ltd.
- Georges River & Prospect Creek Climate Change Sensitivity Assessment, Floodmit, Sept 2011.

**Fairfield Town Centre and Fairfield Heights:**

- Prospect Creek Flood Study 2004, Cardno Willing.
- Prospect Creek, Floodplain Management Plan Review 2010, Brewsher Consulting Pty Ltd.
- Fairfield CBD Floodplain Risk Management Study and Plan 2020, BMT WBM.

**Cabramatta Town Centre:**

- Cabravale Overland Flood Study 2019, prepared by Catchment Simulation Solutions.

**Canley Vale Town Centre and Canley Heights:**

- SKM Flood Study for Orphan School Creek, Green Valley Creek and Clear Paddock Creek, Parts 1 & 2 (2008).
- Prospect Creek, Floodplain Management Plan Review 2010, Brewsher Consulting Pty Ltd.
- Three Tributaries Floodplain Risk Management Study and Plan 2015, Molino Stewart
- Canley Corridor Floodplain Risk Management Study and Plan 2015, Molino Stewart.

**Carramar Town Centre:**

- Prospect Creek, Floodplain Management Plan Review 2010, Brewsher Consulting Pty Ltd.
- SKM Flood Study for Orphan School Creek, Green Valley Creek and Clear Paddock Creek, Parts 1 & 2 (2008).
- Cabravale Overland Flood Study 2019, prepared by Catchment Simulation Solutions.

**Villawood, Villawood Heights and Smithfield West:**

- Three Tributaries Floodplain Risk Management Study and Plan 2015, Molino Stewart.
- Smithfield West Floodplain Risk Management Study 2018, by Catchment Simulation Solutions.