Hawkesbury City Council

Attachment 5 to item 1

Hawkesbury-Nepean Flood Emergency Plan (2020)

date of meeting:7 September 2021
location:by audio-visual link
time: 5.30 p.m.

Hawkesbury-Nepean Flood Emergency Plan

2020-0.4

DRAFT

A Sub Plan of the

State Emergency Management Plan (EMPLAN)

Endorsed by the State Emergency Management Committee

June 2020

NSW emergency management plans are updated regularly and printed plans may be out of date. The current plan is always available at www.emergency.nsw.gov.au

Contents

Supporting Documents to this Plan

(insert links to these in final published plan)

NSW SES Response Arrangements for Hawkesbury-Nepean Valley

Annex A – Hazard and Risk in the Hawkesbury-Nepean Valley

Annex B - Flood Warning Gauges

Annex C – Sectors, Sub Sectors and Stategy selection considerations

Annex D - Evacuation Management Arrangements

Annex E - Flood Rescue Arrangements

Annex F - Resupply Arrangements

Annex G - Dam Emergency Arrangements

1 Introduction

1.1 Purpose

1.1.1 The purpose of this plan is to set out the multi-agency arrangements for the emergency management of flooding affecting the Hawkesbury-Nepean Valley in New South Wales.

1.2 Authority

1.2.1 This Plan is written and issued under the authority of the *State Emergency and Rescue Management Act 1989* (NSW) ('SERM Act') and the NSW State Emergency Management Plan (EMPLAN). In addition to these instruments, the following Acts and Regulations apply to managing flooding in the Hawkesbury Nepean Valley:

- *State Emergency Service Act 1989* https://www.legislation.nsw.gov.au/#/view/act/1989/164/full
- *Dams Safety Act 2015* *https://www.legislation.nsw.gov.au/#/view/act/2015/26/full*
- *Dams Safety Regulation 2019* *https://legislation.nsw.gov.au/#/view/regulation/2019/506/full*
- *Water Act NSW 2014* *https://legislation.nsw.gov.au/#/view/act/2014/74/full*
- *Floodplain Development Manual 2005 (issued pursuant to Section 733 of the Local Government Act 1993)*

1.2.2 This plan is a Sub-plan to the NSW State Emergency Management Plan (EMPLAN). It was approved by the Commissioner of the NSW State Emergency Service, which is the designated Combat Agency for floods, on [DATE] and was endorsed by the NSW State Emergency Management Committee (SEMC) on [DATE].

1.2.3 Revision history

Version	Date endorsed	Amendment notes
2020-0.4		

1.2.4 The following table lists all previously endorsed versions of this plan.

Version	Date Endorsed
Hawkesbury Nepean Flood Emergency State Plan	February 1993
Hawkesbury Nepean Flood Emergency Sub Plan	December 2005
Hawkesbury Nepean Flood Emergency Sub Plan	September 2013
Hawkesbury Nepean Flood Emergency Sub Plan (major amendment)	June 2014
Hawkesbury Nepean Flood Emergency Sub Plan	September 2015

1.3 Activation

1.3.1 The arrangements in this plan are active at all times and do not require formal activation. Flood response operations will begin:

- On receipt of a Bureau Severe Weather Warning or Thunderstorm Warning that includes heavy rain or storm surge; or
- On receipt of a Bureau Flood Watch or Flood Warning; or
- On receipt of warnings for flash flood; or
- On receipt of a dam failure alert; or
- When other evidence leads to an expectation of flooding.

1.3.2 The decision to implement this plan is driven primarily by the potential need to:

- Completely evacuate whole communities before mainstream flooding cuts evacuation routes (refer to Annex D)
- Undertake rescue operations where areas are not fully evacuated (refer to Annex E)
- Manage large scale resupply operations to some affected areas where full evacuation is not required. (refer to Annex F)

1.4 Scope

1.4.1 This plan describes the state-level emergency management arrangements for floods affecting the Hawkesbury-Nepean Valley.

1.4.2 This plan includes:

- The potential risks and consequences of flooding to the social, built, economic, and natural environments in the Hawkesbury-Nepean Valley
- The policy and programs in place to mitigate these risks before, during and after an emergency
- The control and coordination arrangements for managing a flood impact
- Transition to recovery
- Links to sources of information where the reader can obtain further detail.

1.4.3 This plan outlines the agencies responsible for managing specific strategies but does not include detail about the operational activities of individual agencies.

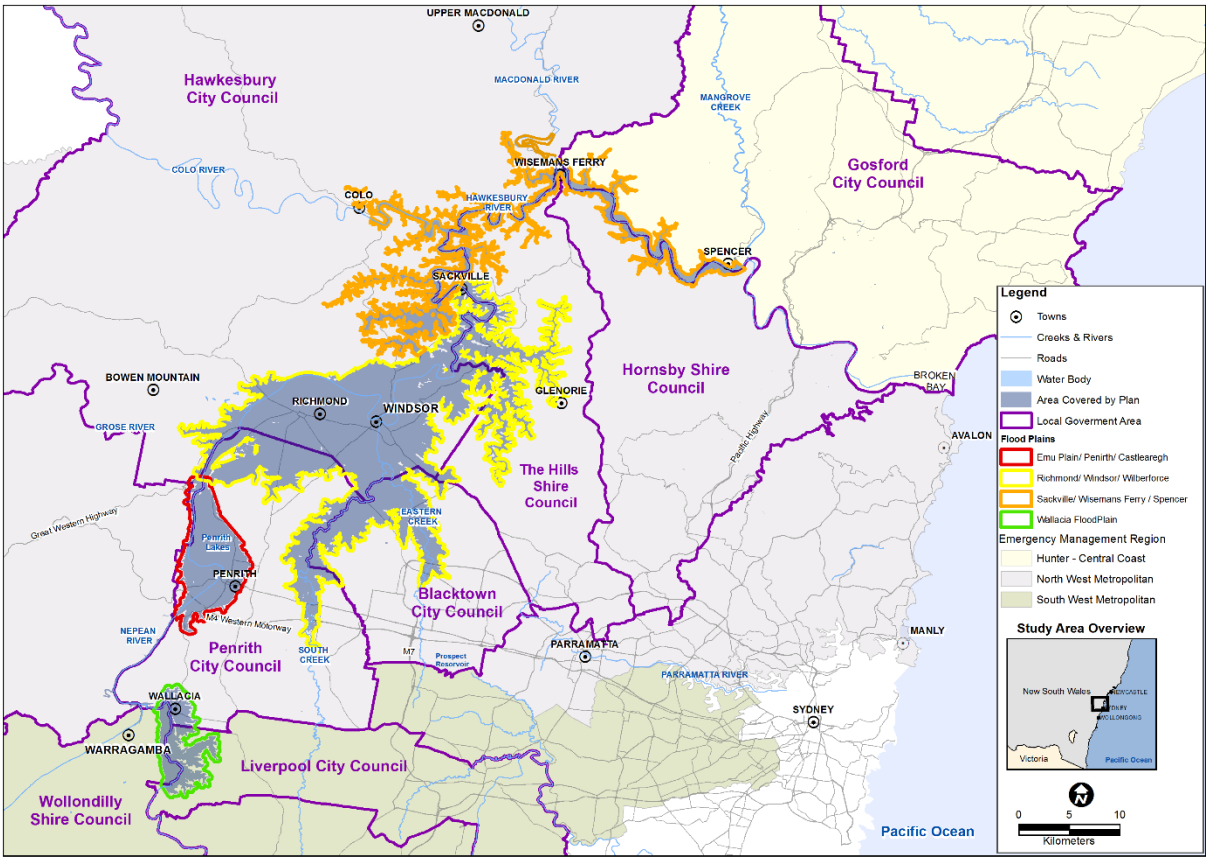
1.4.4 This plan is based on existing information available at the time of writing. Planned and future development beyond current levels within the Hawkesbury-Nepean Valley are not covered by this plan. Consultation with the NSW SES and modification to this plan will be required to account for future population increases and development within the area. Note this does not preclude Incident Controllers considering new information available since the endorsement of this plan.

1.4.5 **Assumptions**

1.4.6 This plan is based on the following assumptions:

a. all the agencies and organisations with a role or responsibility included in this plan maintain their own capability; including detailed operational plans, adequately trained personnel, and enough resources to fulfil their role.

b. warning systems will provide sufficient notice of an emergency to allow resources to be pre-deployed



Map 1: Area Covered by the Hawkesbury Nepean Flood Emergency Sub Plan (Wallacia to Spencer)

1.5 Goals

1.5.1 The primary goals for flood emergency management in the Hawkesbury-Nepean Valley are:

a. Protection and preservation of life;

b. Establishment and operation of flood warning systems;

c. Issuing of community information and community warnings;

d. Coordination of evacuation and welfare of affected communities;

e. Protection of critical infrastructure and community assets essential to community survival during a flood emergency;

f. Protection of residential property;

g. Protection of assets and infrastructure that support individual and community financial sustainability and assist a community to recover from an emergency; and

h. Protection of the environment and conservation values including cultural heritage.

1.6 Audience

1.6.1 The audience for this plan is the NSW Government and agencies within the emergency management sector, including non-government organisations (NGOs) business and community groups with a significant role in emergency management.

1.6.2 Although the wider community is not the primary audience, community members may find the contents of this plan informative.

1.7 Linkages

1.7.1 This plan reflects current legislation, the arrangements in the EMPLAN, the strategic direction for emergency management in NSW and the accepted State practice for emergency management.

1.7.2 The EMPLAN arrangements have not been repeated unless necessary to ensure context and readability. Any variations from these arrangements have been identified and justified.

1.7.3 The general arrangements for managing floods in NSW are outlined within the NSW State Flood Plan. This plan is a Sub Plan of the NSW State Flood Plan and should be read in conjunction with it.

1.7.4 The special arrangements in this plan augment those described within the respective NSW SES local flood plans. The plans listed below are subordinate plans to this plan as well as being subordinate plans to the relevant local EMPLANS:

- Blacktown City Local Flood Plan 2010
- Hawkesbury City Local Flood Plan 2010
- Hornsby Shire Local Flood Plan 2013
- Penrith City Local Flood Plan 2012
- The Hills Shire Local Flood Plan 2010
- Central Coast Local Flood Plan (Gosford Council 2014 and Wyong Council 2013)

1.8 Maintaining the plan

1.8.1 The NSW SES Commissioner will keep this plan current by:

a. ensuring that all emergency service organisations, functional areas and officers included in this plan are made aware of their roles and responsibilities;

b. conducting exercises to test arrangements;

c. reviewing the contents of the plan:

- after significant flood response operations;
- when changes to the use of land significantly increases the population at risk;
- when there are changes to the machinery of government;
- when there are changes that alter agreed plan arrangements; and
- as determined by the NSW SEMC.

1.8.2 This plan will be reviewed no less frequently than every five years.

2 The Emergency risk context

2.1 The Hazard

2.1.1 The Hawkesbury-Nepean Valley covers 425 square kilometres of floodplain and falls mainly within four fast-growing Local Government Areas in Western Sydney: Penrith City, Hawkesbury City, The Hills Shire and Blacktown City. It includes the population centres of Penrith, Richmond and Windsor and many surrounding suburbs. Expanding urban development across the Valley means that flood exposure will increase in the future.

2.1.2 The NSW 2017 State Level Emergency Risk Assessment (SLERA) classifies flood as a priority hazard that poses a significant risk to the Hawkesbury-Nepean Valley. The identified scenario (widespread heavy rainfall and inland flooding) was assigned an extreme risk rating with major consequences expected.

2.1.3 Nearly all of the large flood-producing events on the Hawkesbury-Nepean have been either caused by east coast lows (ECLs) or the interaction of ECLs and other rain-producing systems. ECLs are the major flood producing mechanism on large catchments on the east coast of New South Wales and are being very actively studied. The NSW 2017 SLERA also classifies an East Coast low weather event as a priority hazard which was similarly assigned an extreme risk rating with major consequences expected.

2.1.4 Detailed studies have been undertaken since 1997 to identify the factors, which are critical to the conduct of flood operations on the scale required to deal with the consequences of severe to extreme floods in the Hawkesbury-Nepean Valley.

2.1.5 The most recent study is the Hawkesbury-Nepean Valley Regional Flood Study (July 2019). The current work builds on extensive flood modelling and its review since the 1980s. Updated flood modelling shows that scientific understanding of the probability of flooding on the Hawkesbury-Nepean Valley has not changed significantly; however new techniques allow a better understanding of other characteristics of floods such as rate of rise

2.1.6 Real flood events exhibit an enormous degree of variability, most of which is determined by exactly when and where rainfall falls. Flood events are influenced by how wet the catchment is and, in the case of the Hawkesbury-Nepean Valley, the levels in Warragamba Dam prior to an event.

2.1.7 Many issues have been identified but none has more significance than the timing of decisions to commence warning and evacuation of the population due to:

a. Significant rates of rise (refer Annex A);

b. Extreme depth of flooding due to the river constrictions in the Valley (refer Annex A);

c. Heavy reliance on the road network for vehicle-based evacuation given the limitations on rail and air transport in the Valley (refer Annex A and Annex D);

d. Many of the critical roads are cut at low points before the areas being evacuated are actually flooded (refer Annex A, Annex C and Annex D).

2.1.8 The Hawkesbury-Nepean Valley Flood Study Final Report (July 2019) states that 'Monte Carlo approaches in flood estimation have typically focused on capturing the variability in input conditions and how this variability affects peak flood levels and flow. The approach adopted here was the first time that a Monte Carlo approach has been used for assessing warning time and evacuation strategies and one of the first times it has been adopted for a flood study in Australia'.

2.1.9 The Insurance Council of Australia considers this Valley to have the highest single flood exposure in New South Wales, if not Australia.

2.1.10 **Circumstances that may give rise to flooding**

2.1.11 Refer to the supporting document Annex A for a more detailed description of flooding and the causes and types of flooding likely to be experienced in the Hawkesbury-Nepean Valley.

2.2 Consequences

2.2.1 Infrastructure NSW commissioned a study to update data on flood impacts in the Valley. It found that a major flood event would cause billions of dollars of damage and place tens of thousands of homes and people at risk. The impact would extend beyond the Valley and be felt across the NSW and Australian economies.

2.2.2 Up to 134,000 people live and work on the floodplain and could require evacuation. Over 25,000 residential properties and two million square metres of commercial space are currently subject to flood risk, and this will significantly increase in the coming years.

2.2.3 The Hawkesbury-Nepean Valley has a high flood hazard, with both historical and geological evidence of rapid widespread flooding cross the Valley. There is also a high level of flood exposure as the floodplain is located in the Western Sydney region, an area with a large and growing population. It is one of Australia's most significant and diverse economies, with an annual gross regional product of about $104 billion in 2013/14.

2.2.4 Refer to the supporting document Annex A for a more detailed description of potential consequences to property; vulnerable facilities, people and businesses; infrastructure; agriculture; and the environment.

3 Prevention

3.1 Floodplain Management

3.1.1 Actions to minimise the risk to life and to reduce property damage can be undertaken by carefully managing floodplains. These actions help to ensure that the use of floodplain land is not at odds with the nature of the flood hazard and allows for sustainable use of the land.

3.1.2 The arrangements for managing flood prone land in New South Wales are detailed in the State Government's Flood Prone Lands Policy and the Floodplain Development Manual. Further detail is contained within the NSW State Flood Plan, Section 3.

3.1.3 The NSW SES and Environment, Energy and Science Group, within the Department Planning Industry and Environment, have published the following supporting emergency management guidelines to inform councils and other bodies of the NSW SES's requirements from flood studies and floodplain risk management studies.

- NSW SES Requirements from the Floodplain Risk Management Process
- Flood Emergency Response Planning Classifications of Communities

3.1.4 In May 2017 the NSW Government released a Flood Strategy which details how the Government, local councils, businesses and the community are working together to reduce and manage the flood risk in the Hawkesbury-Nepean Valley: Resilient Valley, Resilient Communities – Hawkesbury-Nepean Valley Flood Risk Management Strategy

Strategy

3.1.5 The NSW SES is to be represented on relevant floodplain risk management committees established by local councils within the Hawkesbury-Nepean Valley.

Outcome

3.1.6 Councils ensure that emergency management considerations are accounted for in land use planning for the Hawkesbury-Nepean Valley.

Actions

3.1.7 Provide coordinated and consistent emergency management advice to Floodplain Risk Management Committees established by the following Councils in relation to the management of land that is subject to flooding:

a. Penrith City Council
b. Blacktown City Council
c. Hawkesbury City Council
d. The Hills Shire Council
e. Hornsby Shire Council
f. Central Coast Council

3.2 Regional Land Use Planning

3.2.1 One of the key findings of the Hawkesbury-Nepean Flood Management Strategy (1998) was that the planning and construction of urban development on the floodplain must be improved to reduce the impact of flooding on people and property. To this end, the Hawkesbury-Nepean Flood Management Advisory Committee commissioned the production of flood-specific planning guidelines for the Hawkesbury Nepean Valley:

a. Land Use Guidelines
b. Sub-division Guidelines
c. Building Guidelines

3.2.2 These guidelines provide advice to individuals and organisations to improve flood emergency risk management outcomes. These guidelines:

a. Recognise that all new development should be designed and built to ensure that emergency management action can be safely and efficiently implemented when a flood threatens.
b. Assist individuals and businesses to minimise the damage that would otherwise be done to their property when it is flooded. Houses and buildings cannot be moved as a flood approaches but basic modifications, some required at the time of construction, can make the difference between a total flood loss and a recoverable asset.

Strategy

3.2.3 Outcome 3 of the NSW Government endorsed Resilient Valley, Resilient Communities – Hawkesbury-Nepean Valley Flood Risk Management Strategy (Flood Strategy, 2017) has an action to develop a Hawkesbury Nepean Regional Land Use Planning Framework to better manage flood risk in the Valley.

Outcome

3.2.4 Develop a land use planning approach that takes into account the different characteristics of the floodplain as well as the evacuation constraints and the complexity of evacuation in a severe to extreme flood.

Actions

3.2.5 Department of Planning, Industry and Environment are developing a Land Use Planning Framework utilising data, information and reports developed or gathered from workshops with council staff and government agencies.

3.2.6 Establish a new land use and settlement strategy for the Valley based on flood risk, flood behaviour and evacuations constraints to enable future development to continue whilst increasing the resilience of the community.

3.3 Evacuation Routes

3.3.1 Flood emergency management is focussed on protecting people first and then their property. The capability to evacuate people off the floodplain is the key flood emergency management strategy for the Hawkesbury-Nepean Valley.

3.3.2 It is vital that any future population increases and development within the Hawkesbury-Nepean Valley considers evacuation requirements.

3.3.3 The capacity of the existing evacuation routes within the Hawkesbury-Nepean Valley may need to be increased to cope with the evacuation of the existing population in particular areas by reducing evacuation timelines to within the limit of confident flood forecasting where evacuation timelines extend beyond that limit.

Strategy – Determine evacuation routes

3.3.4 The NSW SES, in consultation with Transport for NSW and relevant Councils, determines evacuation routes for the Hawkesbury Nepean Valley.

Outcome

3.3.5 Develop a road evacuation master plan for the Hawkesbury-Nepean Valley.

Actions

a. The regional road evacuation routes within the Hawkesbury-Nepean Valley are designated in Annex D.

b. The NSW SES will provide GIS layers for the evacuation routes to Councils, Transport Management Centre and Transport for NSW.

Strategy – Development of the road evacuation network

3.3.6 Council, (RMS) and Transport for NSW are to advise the NSW SES of any proposed changes to roads and supporting infrastructure on the regional road evacuation routes.

Outcome

3.3.7 Maintain road capacity to safely evacuate the whole population in a timely fashion. Identify a coherent evacuation road network for the Hawkesbury-Nepean Valley.

Actions

3.3.8 Undertake around 40 high priority local evacuation road upgrades, subject to business cases.

3.3.9 Proposals for modifying existing Regional Evacuation Routes, or for new evacuation routes, are to consider the following evacuation route objectives:

a. **Extent** - Regional evacuation routes are to extend firstly beyond the PMF extent and then to a point where the wider traffic network can absorb evacuation traffic without causing congestion back into the evacuation route network.

b. **Increase capacity** - Where relevant evacuation timelines extend beyond the limit of confident flood forecasting, provide more lane capacity on current routes or provide new additional routes to reduce the timeline to within the forecasting limit.

c. **Resilience** - Regional evacuation routes affected by local flooding from local streams crossing the route are protected where practicable up to 1:500 year local flood events.

d. **Higher evacuation route** - Where the route is inundated by mainstream flooding and where practicable, raise the height of the lowest point/s on the route.

e. **Independence** - Routes should be independent where possible to reduce or eliminate convergence of evacuation routes before merging into the wider traffic network.

f. **Simplify traffic management** –improvement in intersections, upgrading the type of road and ensuring traffic flows freely to safety without prolonged congestion or queuing

g. **Decouple evacuation from floodplains** - Divert evacuation streams from the Hawkesbury River floodplain to reduce or eliminate convergence on evacuation routes in the Nepean River floodplain.

h. **Redundancy** - Provide an alternative route where possible to provide redundancy in case of serious incidents on the main route.

3.3.10 Any changes to evacuation routes will, after consultation with Councils, RMS and Transport for NSW, be advised by way of amendment to Annex D.

3.3.11 More than 150 new evacuation route signs have been installed across the Hawkesbury-Nepean Valley to help guide residents along key flood evacuation routes.

4 Preparedness

4.1 Emergency planning

4.1.1 Preparedness includes arrangements or plans to deal with an emergency or the effects of an emergency. Preparedness activities are undertaken by:

- Agencies and organisations that have responsibilities before, during and after an emergency; and
- Communities, businesses and households that are likely to be affected by flooding.

Strategy – Maintain flood plans

4.1.2 As the combat agency for flooding, the NSW SES is required to develop, review and maintain flood sub-plans.

Actions:

4.1.3 Develop and review NSW SES local flood plans as required. Local flood plans outline the specific arrangements for management of flood events within a Local Government Area and may include cross boundary arrangements

4.1.4 The plans listed below are subordinate plans to this plan:

- Blacktown City Local Flood Plan 2010
- Hawkesbury City Local Flood Plan 2010
- Hornsby Shire Local Flood Plan 2013
- Penrith City Local Flood Plan 2012
- The Hills Shire Local Flood Plan 2010
- Central Coast Local Flood Plan (Gosford Council 2014 and Wyong Council 2013)

4.1.5 **Supporting Plans**

4.1.6 In addition to this Plan and the lower level NSW SES Local Flood Plans, there a number of Supporting Plans and Strategies that are required to deal with the management of important functions which contribute to an efficient and effective response to a flood.

4.1.7 Supporting plans and strategies are prepared by agencies with the responsibility and expertise to develop the appropriate supporting arrangements. Some of the supporting plans and strategies for the Hawkesbury-Nepean Valley are currently in development or are yet to be developed.

4.1.8 Current supporting plans include:

a. Hawkesbury Nepean Healthplan - Nepean Blue Mountains Local Health District

- (NSW Health) Deals with the evacuation of health facilities such as hospitals and nursing homes during a flood and health clients at risk in the community.

b. Hawkesbury Nepean Recovery Strategy (Draft)

- (Department of Justice, Office of Emergency Management) Deals with the recovery arrangements following a flood event within the Hawkesbury-Nepean Valley.

c. Hawkesbury Nepean Flood Emergency – Traffic and Transport Operations Procedure and Pre-Plan and Traffic Management Task Manual (Draft)

- (Transport for NSW) Deals with the detailed transport and traffic management arrangements for the Hawkesbury-Nepean regional flood evacuation routes

4.1.9 The following supporting plans are to be developed:

a. Hawkesbury Nepean Flood Emergency – Agriculture and Animal Services Supporting Plan

- (Department of Primary Industry) To deal with the management of livestock and animals from farming areas affected by flood. The plan also deals with the important issues of domestic pets and companion animals belonging to people who have to be evacuated during a flood.

  The supporting plan for the State was endorsed by the SEMC 2017. However, a more specific plan for the Hawkesbury Nepean has been on the agenda since the HN Flood Plan 2005, given the vary large animal population in the Valley and the significant evacuation issues for animals.

4.1.10 **Planning for fire and hazardous materials**

Strategy – Identify risks of hazardous materials

4.1.11 Flooding can result in secondary incidents of fire and hazardous materials.

4.1.12 Locations at risk of fire during flooding which may pose a significant threat to surrounding populations should be identified by Fire and Rescue NSW and NSW Rural Fire Service.

Actions

4.1.13 Fire and Rescue NSW, in consultation with Local Government, WorkCover and the Environment Protection Authority, are to identify any land-based locations which may pose a risk of hazardous material incidents. The NSW SES is to be notified of those facilities that pose a significant threat for incorporation into NSW SES flood intelligence and planning.

4.1.14 NSW Health as Public Health can provide advice on the likely public health impacts of a Hazmat Incident.

4.2 Operational readiness

4.2.1 The NSW State Flood Plan sets out the arrangements for:

- Flood Intelligence systems (4.3)
- Development of warning systems (4.4)
- Briefing, training and exercising (4.5)

4.2.2 The Metro Zone of the NSW SES will:

a. Recruit and maintain sufficient volunteers to carry out the functions under the State Flood Plan and this Plan.

b. Provide options for adequate control facilities within the Metropolitan area from which flood operations under this Plan can be conducted.

c. Conduct regular exercises

4.3 Community resilience

4.3.1 Members of the community that prepare ahead of time and know how to respond appropriately often recover more efficiently and effectively. This helps them, their household and their community to become more resilient.

4.3.2 Preparation is particularly important within the Hawkesbury-Nepean Valley due to the high risk to life from flooding (as described in the supporting document Annex A.

4.3.3 Floods within the Hawkesbury-Nepean Valley are likely to require the mass evacuation of people from flood impact areas in order to protect life. Given the large population and short timeframes to evacuate these areas, the protection of property is a secondary priority.

4.3.4 NSW SES encourages and supports individuals and businesses to build community resilience. This may include activities to prevent, prepare, respond and recover from the impact of flooding based on policy, guidance, and resources from government and other sources such as community organisations.

4.3.5 The NSW SES will use a range of strategies to deliver community engagement, education and awareness programs in partnership with and tailored to communities in the Hawkesbury-Nepean Valley. These include, but are not limited to:

a. Development and delivery of community engagement and capacity building programs that enhance community resilience to floods;

b. Fostering of partnerships and building links with networks that can enhance community engagement, education and awareness;

c. Providing opportunities for community members to be involved in the flood planning process;

d. Education and training programs for key community and at-risk groups;

e. Design, production and distribution of information resources and online tools.

4.3.6 The following activities are examples of actions taken to enhance community resilience:

- Emergency preparedness workshops. The NSW Government partnered with the University of Sydney, NSW SES, the Office of Emergency Management, and local councils to run a series of workshops for community service providers
- Community engagement. The Hawkesbury-Nepean Valley Flood Risk Management Directorate and Infrastructure NSW joined the NSW SES at the Hawkesbury Show to provide information about how people can better prepare themselves for future floods
- Community updates. Providing links to the Regional Flood study for the Hawkesbury-Nepean Valley and all the other work currently underway to reduce and manage flood risk
- Community meetings/forums. Providing opportunities for community members to talk about flooding and the Flood Strategy program
- Horse Care and Safety Open day. Infrastructure NSW teamed up with several other agencies to deliver advice that focused on helping owners keep their animals safe during floods.

5 Response

5.1 Concept of operations

5.1.1 This concept of operations provides guidance for:

a. The development of subordinate flood plans;

b. The development of Incident Action Plans prepared by the IMT appointed to manage a particular Hawkesbury Nepean flood event.

5.1.2 An Incident Action Plan developed for a particular event will contextualise this Concept of Operations to the prevailing and predicted conditions at the time.

5.1.3 **Principles of Flood Operations**

5.1.4 The NSW SES is the combat agency for dealing with floods and members of the NSW Police Force, other emergency service organisations and other agencies are required to recognise the authority of emergency officers appointed under the SES Act 1989.

5.1.5 Control and coordination of flood operations are carried out at the lowest effective level. However, control and coordination may be assumed at the NSW SES Zone and State levels for whole operations, or for the performance of particular functions after consultation with the relevant controllers.

5.1.6 To ensure that local knowledge is available for operations, local resources should be utilised.

5.1.7 If local NSW SES and other local resources are insufficient or likely to be exhausted, additional NSW SES resources may be deployed by the NSW SES Metro Zone Commander or delegate. If further NSW SES resources are required from other Zones they will be deployed by the NSW SES State Headquarters.

5.1.8 Resources from supporting emergency services and functional areas may be requested directly by the NSW SES at any level (local, regional or state), or under EMPLAN arrangements. Emergency Operations Controllers will be responsible, when requested, to coordinate this additional support and are to be responsive to the requirements of NSW SES Controllers.

5.1.9 **Operational Objectives**

5.1.10 The operational objectives of this Plan are:

- Protection of life (highest priority)
- Minimisation of damage to property
- Minimisation of interruption to utilities, and
- Effective transition to recovery

5.1.11 **Operational Strategies**

5.1.12 The main response strategies for NSW SES flood operations in the Hawkesbury Nepean Valley are:

a. Provision of timely, relevant, accurate and tailored information (including warnings) to the community regarding the potential impacts of a flood and what actions to undertake to support and encourage proactive measures;

b. Evacuate people pre-emptively from dangerous or potentially dangerous places created by the flood hazard to safe locations away from the hazard;

c. Rescue people and domestic animals from floods in accordance with the NSW Flood Rescue Policy including where evacuation operations have not been successfully completed;

d. Coordinate the protection of property of residents, businesses and essential infrastructure at risk of flood damage where feasible;

e. Resupply properties, towns and villages which have become isolated as a consequence of flooding to minimise disruption of the community;

f. Manage the transition from response operations to recovery.

5.1.13 **Response Strategies**

5.1.14 The following sections describe the response strategies that will be used to deal with flood events under this Plan. The basis on which a strategy or set of strategies may be selected is also described.

5.1.15 The main strategies available in the response operation are:

a. Progressive evacuation;

b. Partial evacuation;

c. Complete evacuation;

d. Resupply;

e. Rescue.

5.1.16 The Sectors and Sub-Sectors (Described in Map 1 and Tables 1 to 4 in Annex C of this Plan and further described in Local Flood Plans) are classified into categories based on the impact of flooding on the community as one of the following:

a. Flood Islands (Low or High);

b. Trapped Perimeters (Low or High);

c. Areas with Overland Access;

d. Areas with Rising Road Access; or

e. Indirectly Affected Areas.

5.1.17 For each of these categories the selection of these response strategies will depend on the severity of flooding. These considerations are detailed in the following paragraphs.

Progressive Evacuation (Rising Road Access)

5.1.18 The only strategy needed for these areas should be to progressively evacuate depending on the expected upper limit of flooding. Evacuation can take place by vehicle or as a last resort on foot along roads as floodwaters advance.

Partial Evacuation Strategy (Islands, Overland Access)

5.1.19 In some floods, at the upper limit of expected flooding the road evacuation routes for a sector will be cut but the island will not be submerged beyond the point of sustainability. If the assessment of the upper limit of flooding can be made with a high level of confidence, a decision may be made by the Controller to implement a partial evacuation strategy.

5.1.20 The purpose of partial evacuation is to reduce the total number of people isolated on the island requiring resupply. Also, if it later becomes necessary to remove those people not evacuated if the flood height is revised upward, the rescue operation required will not be as large.

5.1.21 It is also possible that even though a complete evacuation may have been initiated, it could become necessary to change to a partial evacuation strategy. This will result when a road evacuation is commenced on the basis of an initial flood prediction and is deliberately terminated before completion because later flood predictions indicate that although an island will form, it **definitely** will not be completely covered by floodwater. Alternatively, a partial evacuation may need to be changed to a complete evacuation strategy if flood predictions are increased.

5.1.22 A partial evacuation strategy will result in the need to maintain the isolated island population by conducting a resupply operation until road routes re-open.

5.1.23 Note that during a partial evacuation operation there may still be some internal evacuations from the low-lying edges of the island to higher ground on the island.

5.1.24 During a partial evacuation strategy consideration will need to be given to the sufficiency and availability of essential services to support the population that remains.

Complete Evacuation Strategy (Low and High Island, Low and High Trapped Perimeter Overland Access)

5.1.25 A complete evacuation may be initiated for an area for one of the following reasons:

a. The predicted flood height will result in the area being completely submerged;

b. The predicted flood height will result in the area being flooded to such an extent that it is too small or has too few support services functioning to cope with the number of people left on the island (i.e. flooded beyond the point of sustainability);

c. Services such as water, electricity and sewage are expected to be unavailable for a prolonged period;

d. There is a high level of uncertainty about the predicted upper level of flooding.

5.1.26 For Trapped Perimeters, if it will not be possible to provide adequate support to the community, evacuation may have to take place before isolation occurs or in some cases after isolation.

Resupply Strategy (Islands, Overland Access, Trapped Perimeters)

5.1.27 If there is **a definite prediction** that the sector's road evacuation routes will be cut but the island or trapped perimeter will not be substantially inundated there may be no need to evacuate all people away to external evacuation centres.

5.1.28 This will result in the need to maintain the isolated population by conducting a resupply operation.

5.1.29 The coordination of resupply is the responsibility of the NSW SES as detailed in the NSW State Flood Plan.

5.1.30 There may be some internal evacuation from the low-lying edges of the island or trapped perimeter to higher ground.

5.1.31 However, evacuation may also be required if services such as water, electricity and sewage are likely to be unavailable for extended periods of time. The decision to evacuate will also need to consider the loss of essential services for extended periods of time such as power, gas, water and wastewater services.

5.1.32 Resupply of essential goods and services to the populations may be required for a period ranging from a few hours up to several days and may have to deal with populations ranging in number from 1,000 up to 9,000 people per area.

Rescue Strategy (Islands, Overland Access)

5.1.33 For Rising Road Access Areas people should not be trapped unless they delay their evacuation. For example, people living in two storey homes may initially decide to stay but reconsider after water surrounds them. In these circumstances people may need to be rescued.

5.1.34 If road evacuation routes are cut, particularly on flood islands or in overland escape route areas, a rapid rescue operation may be required to save large numbers of people before the area is inundated by floodwater. This will require the use of large numbers of aircraft (mostly rotary wing) and flood rescue boats. Short-term resupply may be required until all people have been rescued.

5.1.35 Even though an evacuation strategy (complete or partial) or an isolated population strategy may have been initiated on the basis of the early flood prediction, a revised assessment of the expected upper limit of flooding may make it necessary to change to a rescue strategy for one of the following reasons:

a. Temporary closure of a road evacuation route because of short term local flooding or some other blockage, resulting in insufficient time being available to complete the road evacuation of the required number of people;

b. Permanent closure of a road evacuation route before the road evacuation of the required number of people can be completed.

Indirectly Affected Areas

5.1.36 During an extreme flood indirectly affected communities outside the Hawkesbury-Nepean Valley could be without essential services such as electricity, water, and sewer for some time.

5.1.37 Interruptions of electricity can have the following impacts:

a. Communities can be without power for several days to months. For example, for flood levels exceeding 14.5m, all electricity supply west of the river is likely to be shut off. The communities most likely to be affected are in North Richmond, Bilpin, Grose Vale, Grose Wold, Kurmond, Kurrajong, Kurrajong Heights, Ebenezer, Freemans Reach, Glossodia and Wilberforce. Marlow and Lower Mangrove may also be indirectly affected. During extreme flood events electricity supply to wide parts of Western Sydney can also be interrupted for extended periods of time;

b. Loss of mobile telephone services. Mobile base stations typically have 4 – 8 hour battery backup and if electricity mains power is not restored in that time then the base stations dependent on that mains power will fail;

c. Loss of landline voice and data services. Telecommunications roadside cabinets will fail in the event of the loss of mains power or from being inundated;

d. Back-up generators at telecommunications exchanges will need to be refuelled. Telecommunications exchanges have back up power generators and batteries on site. Beyond 4 – 8 hours of loss of main power this infrastructure will require refuelling and telecommunication maintenance crews may require assistance from NSW SES to access the site;

e. Transmission line circuits owned by Transgrid, Endeavour Energy or Sydney Trains (Transport for NSW) passing through flood affected areas may remain energised at lethal voltages to maintain electricity supplies for essential services and customers in the Sydney Metropolitan areas.

Table 1: Response Strategy Options dependant on Flood Emergency Classification

Classification	Progressive evacuation	Partial Evacuation	Complete Evacuation	Resupply	Rescue
Low Flood Island		Yes (in low lying areas)	Yes	Yes	Yes
High Flood Island		Yes	Yes	Yes	Yes
Low Trapped Perimeter		Yes (in low-lying areas)	Yes	Yes	Yes
High Trapped Perimeter		Yes	Yes	Yes	Yes
Overland Escape Route		Yes	Yes	Yes	Yes
Rising Road Access	Yes				Yes
Indirectly Affected		Yes			

5.1.38 **Selection of Response Strategies**

5.1.39 The NSW SES Hawkesbury-Nepean Incident Controller will determine the appropriate response strategy to deal with the expected impact of the flood in each sector and will communicate these operational intentions to the NSW SES State Duty Operations Controller. The impact may vary from sector to sector so a number of different strategies may have to be selected and implemented across the whole operational area

5.1.40 To assist with strategy selection the critical flood heights for flood island sectors are summarised in Tables 1 to 4 within Annex C of this Plan.

5.1.41 The initial choice of a particular strategy or group of strategies is highly dependent on flood prediction information. The choice between an Evacuation Strategy and a Resupply Strategy, for example, must be made early in the flood event because of the need to maximise time available for warning and evacuation. This means that decisions may have to be made before the Bureau of Meteorology can provide a clear indication of the likely upper limit of flooding.

5.1.42 The selection of a Resupply Strategy depends on the fact that people who are left in a sector will be safe from subsequent inundation, even after the road evacuation route or other escape route is closed. The selection of this strategy also requires that there is a low probability that the river could experience a later rise, flooding so much land within a sector that people could not be sustained there.

5.1.43 Strategy selection depends therefore on a high level of confidence in the predicted flood height and a clear picture of the expected weather over the hours and days following the initial flood producing rainfall. In the early stages of most floods, particularly because rainfall has often not ceased, there is a high level of uncertainty. The early assessments of flooding are likely to only contain indications that certain heights will be exceeded, rather than indications of what the upper limit of flooding might be.

5.1.44 There are several critical flood heights associated with the strategy selection process for the various sectors. These are:

a. The height that closes the sector road evacuation route/s;

b. The height that cuts the sectors last viable escape route of any kind;

c. The height that limits the capability of a sector to sustain an isolated population (Sustainability Height);

d. The height that will completely submerge all safe land within a sector.

5.1.45 The possibility of any of these critical flood heights being reached or exceeded will set the parameters within which strategy selection must take place.

5.1.46 In reality a mix of strategies is the most likely course of action. It must also be remembered that as circumstances change during a flood, such as a revised flood prediction after additional rainfall, it may be necessary to change to one of the other available strategies.

5.1.47 The critical heights for strategy selection for the various sectors are summarised in Tables 1 to 4 in Annex C of this Plan.

5.1.48 The selection of a particular strategy for sectors will be highly dependent on the ability of the Bureau to provide a confident assessment of the upper limit of expected flooding.

5.1.49 **Decision Making Parameters**

5.1.50 As noted in Annex A, Annex C and Annex D, there are several sectors, especially the potential flood islands, for which operational decisions must be made very early in a flood.

5.1.51 In a PMF event, the last of the critical evacuation routes, Castlereagh Road out of the Richmond Sector, will be cut by floodwater at a height of about 20.2 metres. In a PMF, this will happen around 24 hours after the river exceeds a height of about 6 metres at Windsor Bridge. All other evacuation routes will have been cut earlier and at lower flood levels. The operational decisions therefore relate to the need to complete evacuation from sectors by using the road network in the time available before the roads are cut by floodwater.

5.1.52 For each sector where a flood will have an impact, there are four critical parameters that must be considered in the decision-making process. These parameters are:

a. The time required to mobilise for a response operation;

b. The time required to ensure all residents are warned of the need to evacuate;

c. The time required to move all vehicles out of the area;

d. The minimum amount of time likely to be available before floodwater closes the road at the low point.

5.1.53 **Decision Making Triggers**

5.1.54 By assessing the above parameters on a sector-by-sector basis, decision making triggers for each sector can be determined. There is a relationship between elapsed time and the average rate of river rise. However, as the rate of river rise can be variable (10) it is difficult to define these triggers definitively in terms of flood height. Rather, decisions must be made based on the amount of time required to evacuate the sector compared with the amount of time predicted to be available before the evacuation route is cut.

5.1.55 The decision to evacuate may need to be made when there is still a high degree of uncertainty regarding when the critical points on evacuations routes are cut. This is particularly the case for Windsor and Richmond due to the amount of time required to evacuate the population at risk.

5.1.56 Supporting document Annex C summarises the information used to make decisions about the conduct of evacuation operations for the various Sectors. However, note that in determining decision timings the following will need to be taken into account:

a. the actual flood heights achieved prior to the decision point;

b. predicted heights;

c. the expected rates of rise over the subsequent time period; and

d. any changes to the number of dwellings and vehicles.

5.1.57 Whilst an average rate of rise of 0.5m /hr has most often been used in evacuation planning based on the 72hr PMF, an average rate of rise of 0.7m/hr is possible in a 24hr PMF (10). The actual rate of rise can be variable, is normally higher in the initial stages of flooding and can depart significantly from average rates of rise (10).

5.1.58 During large flood events, in order to complete the evacuation of all vehicles before evacuation routes are cut, the decision to evacuate will need to be made early. This means that decisions may have to be made before the Bureau can provide a clear indication of the key flood heights and the likely upper limit of flooding.

5.1.59 The Hawkesbury Nepean Incident Controller may decide to call off evacuation of specific flood island Sectors based on firm predictions by the Bureau of Meteorology that key thresholds will not be exceeded. This may result in supply operations to the remaining population on the flood islands.

5.2 Control and coordination

5.2.1 **Incident Control**

Strategy

5.2.2 Maintain effective control of flood operations across the Hawkesbury-Nepean Valley.

Actions

a. The NSW SES is the combat agency for dealing with floods under the SES Act 1989. Control of flood operations will be conducted in accordance with the NSW State Flood Plan.

b. The NSW SES State Operations Centre will provide overall coordination of flood and storm operations and allocate resources between possible concurrent flood and storm operations in Sydney and elsewhere in NSW.

c. The NSW SES State Controller will appoint Incident Controllers and establish Incident Control Centres

d. The NSW SES Hawkesbury-Nepean Valley Incident Controller will implement flood operations in accordance with this Plan and Local Flood Plans.

5.2.3 The NSW SES State Controller may relocate to the Incident Control Centre where the Hawkesbury Nepean Incident Controller would be located to more closely monitor flood operations in the Sydney Metropolitan area and to deal with strategic issues.

5.2.4 Flood operations throughout the Hawkesbury-Nepean River system, from Bents Basin to Wisemans Ferry, will be under the control of the Hawkesbury Nepean Incident Controller using arrangements under this plan and the Local Flood Plans for Penrith, Blacktown, Hawkesbury and The Hills.

5.2.5 Concurrent flood operations on the Hawkesbury River downstream of Wisemans Ferry on the southern side of the Hawkesbury River will be under the control of the Hawkesbury Nepean Incident Controller and using arrangements under the Local Flood Plan for the Hornsby LGA.

5.2.6 Concurrent flood operations on the Hawkesbury River downstream of Wisemans Ferry on the northern side of the Hawkesbury River will be under the control of the SES Northern Zone.

5.2.7 Concurrent flood operations on the upper Nepean River (upstream from Bents Basin) in the Liverpool and Camden LGAs will be under the control of the relevant Incident Controller in NSW SES Metro Zone using arrangements under the Local Flood Plans for Liverpool and Camden.

5.2.8 Concurrent flood operations on the upper Nepean River in the Wollondilly LGA (other than the sectors in the Wollondilly LGA reporting to the Hawkesbury Nepean Incident Controller) will be under the control of the relevant Incident Controller in NSW SES South East Zone using arrangements under the Local Flood Plan for Wollondilly.

5.2.9 The Hawkesbury Nepean Incident Controller will control and coordinate flood operations and response in the Hawkesbury-Nepean Valley in accordance with the NSW State Flood Plan 2018 and the Australasian Inter Agency Incident Management System (AIIMS) including:

- Coordinate the development and communication of NSW SES Flood Bulletins to at risk communities within the Hawkesbury-Nepean Valley;
- Coordinate reconnaissance and flood response impact assessments of areas likely to be affected by floods;
- Coordinate the resupply of isolated communities and properties;

- Coordinate the evacuation and immediate welfare of people at risk;
- Coordinate flood rescue operations;
- Provide immediate welfare support to evacuees; and
- Establish a Joint Media Information Centre at the Hawkesbury Nepean Incident Control Centre.

5.2.10 Flood affected areas within the Hawkesbury-Nepean Flood Plans area of operation have been defined into areas known as Sectors for operational control purposes.

5.2.11 Where applicable Sectors have been further divided into Sub-sectors for planning and operational purposes.

5.2.12 The Sectors are grouped into the following Divisions for operational control purposes:

a. Nepean River Division
b. South Creek West Division
c. South Creek East Division
d. Eastern Creek Division
e. Hawkesbury Flood Islands Division
f. Lower Hawkesbury West Division
g. Lower Hawkesbury East Division
h. Wisemans Ferry Division
i. Hornsby Division
j. Gunderman Division (NSW SES Northern Zone)

5.2.13 Flood operations will be controlled using the Divisions and Sectors as outlined in Table 2 and Table 3 (refer also to the Central Coast Local Flood Plans).

Table 2: NSW SES Hawkesbury Nepean Incident Control Structure

Local Government Area	Division	Sector	Localities	Relevant Gauge	Sector Control Centre
Penrith	Nepean River Division	Wallacia Wallacia South Bents Basin	Wallacia, Mulgoa Rd and Bents Basin Road areas	Wallacia	Wallacia Shopping Centre
		Emu Plains	Emu Plains, Emu Heights and Leonay areas	Victoria Bridge	Intersection of Mitchell's Pass and the Great Western Highway, Blaxland
		Penrith South	Mulgoa, Regentville and Glenmore Park	Victoria Bridge	Regentville Community Hall

Local Government Area	Division	Sector	Localities	Relevant Gauge	Sector Control Centre
			areas		Jeanette Street Regentville
		Penrith	Penrith, Jamisontown, Peach Tree Creek	Victoria Bridge	NSW SES Penrith Local HQ
		Penrith North	North Penrith, Penrith Lakes (lower Castlereagh) and Cranebrook areas	Victoria Bridge	Community Centre Hosking Street Cranebrook
	South Creek West Division	Londonderry	Upper Castlereagh, Agnes Banks (South), Londonderry, Berkshire Park and Llandilo areas	Windsor Bridge	Community Centre Hosking Street Cranebrook
		South Creek A	Colyton, Dunheved, Erskine Park, Oxley Park, St Marys, St Clair and Werrington areas	Windsor Bridge	NSW SES Penrith Local HQ
Hawkesbury	Hawkesbury Flood Islands Division	Yarramundi	Yarramundi area		Yarramundi Rural Fire Station
		McGraths Hill	McGraths Hill and Vineyard areas	Windsor Bridge	McGraths Hill Community Centre
		Windsor	Windsor, Cornwallis, South Windsor	Windsor Bridge	St Matthews Church Hall
		Windsor Downs	Windsor Downs	Windsor Bridge	TBA
		Bligh Park	Bligh Park	Windsor Bridge	Tiningi Community Centre
		Pitt Town	Pitt Town area	Windsor Bridge	Pitt Town Public School

		Richmond	Richmond, East Richmond, Hobartville, Agnes Banks and Clarendon areas	Windsor Bridge	Richmond Public School
	Lower Hawkesbury West Division	Richmond Lowlands	Agnes Banks Lowlands, Cornwallis	North Richmond	NSW SES Hawkesbury Local HQ
		North Richmond	North Richmond and Grose Wold areas	North Richmond	NSW SES Hawkesbury Local HQ
		Wilberforce	Wilberforce and surrounding areas	Windsor Bridge	NSW SES Hawkesbury Local HQ
		Oakville/ Cattai	Oakville and Cattai areas	Windsor Bridge	Oakville Bushfire Brigade Shed
		Colo River	Upper Colo, Central Colo and Colo Heights areas	Colo River (Putty Road)	NSW SES Hawkesbury Local HQ
		Webbs Creek	Webbs Creek and Leetsvale West	Webbs Creek (Wisemans Ferry)	NSW SES The Hills Local HQ
		Macdonald River	Lower Macdonald, Central Macdonald and St Albans areas	St Albans	NSW SES The Hills Local HQ
The Hills	Lower Hawkesbury East Division	Lower Reaches (South Maroota)	Parts of Maroota	Sackville	NSW SES The Hills Local HQ
		Lower Reaches (Sackville North)	Parts of Sackville	Sackville	NSW SES The Hills Local HQ
		Lower Reaches (Lower Portland East)	Parts of Lower Portland	Lower Portland	NSW SES The Hills Local HQ
		Lower Reaches (Leets Vale South)	Parts of Leets Vale	Lower Portland	NSW SES The Hills Local HQ

Local Government Area	Division	Sector	Localities	Relevant Gauge	Sector Control Centre
	Wisemans Ferry Division	Wisemans Ferry West and Wisemans Ferry Central	Wisemans Ferry area west of Old Northern Road	Webbs Creek	NSW RFS Station Wisemans Ferry (if flood is predicted to be below 6.7m AHD or 1% AEP at the Webbs Creek gauge) or alternative venue Sth Maroota Community Centre *
Blacktown	South Creek East Division	South Creek B	Shane Park, Ropes Creek and Tregear areas	Windsor Bridge	NSW SES Mount Druitt Unit HQ
	Eastern Creek Division	Eastern Creek A	Riverstone area	Windsor Bridge	Riverstone High School
		Eastern Creek B	Marsden Park area	Windsor Bridge	NSW SES Blacktown Local HQ
		Eastern Creek C	Area between Eastern Creek and Bells Creek	Windsor Bridge	Marsden Park Public School
		Vineyard	Vineyard	Windsor Bridge	TBC

Note: * Mobile phone coverage at this location is known to be limited and may potentially impact upon operations.

5.2.14 **Operations Centres**

Strategy

5.2.15 Maintain a single strategic control centre and coordinate support of flood operations in the Hawkesbury-Nepean Valley (7.3.1 HNV Flood Plan 2015)

Actions

5.2.16 The Operations Centre controlling flood operations within the Hawkesbury-Nepean Valley will be located at 4 Murray Rose Drive, Sydney Olympic Park, or site determined by the State Duty Commander. For ease of reference in the plan this location is referred to as the Hawkesbury Nepean Incident Control Centre.

5.2.17 Refer to the Local Flood Plans for Penrith, Hawkesbury, Blacktown, The Hills and Central Coast for locations of NSW SES Local Headquarters.

5.2.18 Supporting Emergency Operations Centres will be located as follows:

a. NSW SES State Operations Centre NSW SES State Headquarters 93-99 Burelli Street, Wollongong

b. State EOC (SEOC), Level 4, Sydney Police Centre, 151-241 Goulburn Street, Surry Hills

c. EOC North West Metropolitan District, Second Floor, Penrith Police Station, High Street, Penrith

d. EOC Hunter – Central Coast District

5.2.19 The State EMPLAN and the relevant Region and Local EMPLANs will operate to provide support as requested by the respective NSW SES Incident Controllers.

5.2.20 Other supporting operations centres will be functional as required:

a. Health Services Emergency Operations Centre (HSEOC)

b. Transport Services Functional Area Coordination Centre (TSFACC)

c. NSW Transport Management Centre, Eveleigh

Strategy

5.2.21 Effective liaison is to be established and maintained between the NSW SES and supporting agencies.

Actions

5.2.22 The Hawkesbury Nepean Incident Controller may request Liaison officers be provided to the Hawkesbury Nepean Incident Control Centre by the following agencies:

a. Fire and Rescue NSW

b. NSW Rural Fire Service

c. NSW Ambulance Service

d. NSW Police Force Traffic Liaison

e. NSW Police Force Specialist Liaison

f. Animal and Agriculture Services Functional Area

g. Energy and Utilities Functional Area

h. Environmental Services Functional Area

i. Department of Education

j. Department of Corrective Services

k. Health Services Functional Area

l. Marine Rescue

m. NSW Transport Management Centre

n. Telecommunications Services Functional Area

o. Transport Services Functional Area

p. Welfare Services

q. Water NSW

r. Other liaison officers may operate at the Hawkesbury Nepean Incident Control Centre or the SEOC as required

5.3 Emergency information and warnings

Background/Context

5.3.1 Detailed analysis of the dynamics of the warning and evacuation process have concluded that decisions must be related to the expected rate of rise of the river.

5.3.2 *Resilient Valley, Resilient Communities – Hawkesbury-Nepean Valley Flood Risk Management Strategy* advises that 'currently the Bureau of Meteorology has advised that it can provide up to 15-hour flood level predictions for large flood events. However, the NSW SES requires more than 15 hours to evacuate some flood islands in the Valley during large flood events. This could force the NSW SES to make evacuation orders based on uncertain flood prediction. If the flood exceeds the prediction, lives could be at risk.

5.3.3 Evacuation decisions will, therefore, often need to be made under uncertainty due to the limit of confident flood prediction for the Hawkesbury-Nepean Valley.

5.3.4 Flood warning services are provided by the Australian Government Bureau of Meteorology (Bureau), with the NSW SES augmenting the Bureau's predictions with additional information in accordance with the NSW State Flood Plan.

5.3.5 The warning products provided by the Bureau of Meteorology are outlined in Section 5.4 of the NSW State Flood Plan 2018.

5.3.6 The Bureau of Meteorology may provide the Extended Lead Time Flood Forecast - Hawkesbury-Nepean Valley product for use by emergency services only when released by the Bureau of Meteorology in the next two years. This product was developed as action of the Resilient Valley, Resilient Communities – Hawkesbury-Nepean Valley Flood Risk Management Strategy. The Bureau of Meteorology has estimated that the Extended Lead Time Flood Forecast product may become a production service sometime in the next two years subject to finalisation of policy, procedures, manuals and formal training within the NSW SES)

5.3.7 Flood warning services are provided by the Australian Government Bureau of Meteorology (Bureau), with the NSW SES augmenting the Bureau's predictions with additional information in accordance with the NSW State Flood Plan.

5.3.8 The NSW SES will provide timely, relevant, accurate and tailored information to Hawkesbury-Nepean Valley communities regarding the potential impacts of a flood and what actions to undertake in preparation for flooding in accordance with the national Emergency Warning principles

5.3.9 The NSW SES Hawksbury Nepean ICC will coordinate the dissemination of flood information for the Hawkesbury-Nepean Valley, including the sectors in the Wollondilly and Liverpool LGAs that report to the NSW SES Penrith Unit Commander. The NSW SES Northern Zone will coordinate the dissemination of flood information for the sectors in the Central Coast LGA.

5.3.10 **Flood Warning Products**

5.3.11 **Livestock and Equipment Warnings:** These are issued by the NSW SES when there is evidence of significant rises in stream levels to below minor flood heights. The NSW SES may seek advice from the Bureau on likely rises.

5.3.12 **Severe Thunderstorm Warnings:** range in character from short-lived events causing patchy localised damage to more organised systems producing widespread damage across broader areas. Weather phenomena accompanying these storms include any combination of large hail, damaging or destructive winds, tornadoes and intense rainfall leading to local flash flooding. These warnings are issued when severe thunderstorms are already occurring in an area or are expected to develop within or move into the specified area over the next few hours.

5.3.13 **Severe weather warnings:** These are issued when severe weather is expected to affect land- based communities within the next 24-36 hours but are not directly the result of severe thunderstorms. They aim to provide advance notice of very heavy rainfall leading to local flash flooding or storm surge which is sometimes exacerbated by abnormally high tides. Severe Weather Warnings are distributed to the media by the Bureau and published on the Bureau's website.

5.3.14 **Flood Watches:** issued by the Bureau based on an assessment of catchment conditions and forecast rainfall. They provide advanced warning of large-scale weather systems that have the potential to cause flooding. This information is published on the Bureau's website and is incorporated into NSW SES Flood Bulletins for distribution to media outlets.

5.3.15 **Flood Warnings:** These normally predict flood heights (in metres at a gauge) which will be reached at a location at a specified time in the future. Flood Warnings are published on the Bureau's website and are incorporated into NSW SES Flood Bulletins for distribution to media outlets.

5.3.16 **Flood Bulletins:** These are issued to radio stations by NSW SES to inform people about what is expected to happen during flooding. NSW SES Flood Bulletins contain information on likely flood consequences and what actions are required to protect persons and property.

5.3.17 **NSW SES Evacuation Warning:** Evacuation Warnings are a message advising the community to prepare for likely evacuation. The warning advises people what to do and what to prepare to take with them.

5.3.18 **NSW SES Evacuation Order:** Evacuation Orders communicate the need for a community (or parts of a community) to evacuate by a specified time in response to an imminent threat. An Evacuation Order also advises where people should go and may advise which evacuation route to take.

5.3.19 **Means of dissemination of information and warnings**

5.3.20 The NSW SES will deliver flood warning information directly when possible, in addition to the media. Combinations of the following methods of warning that may be utilised include:

- Mobile and fixed public address systems
- Two-way radio
- Emergency alert
- Telephone and fax
- Doorknocking
- Mobile sirens
- Variable message signs
- Community notices in identified hubs

- Distribution through established community liaison networks, partnerships and relationships, and
- Internet

5.3.21 As new and emerging technologies become viable the warning system will continually evolve.

5.3.22 **Standard Emergency Warning Signal (SEWS):** The Standard Emergency Warning Signal will be used to precede all *Top Priority* Flood Warnings and all Evacuation Warnings.

5.4 Inter-jurisdictional support

5.4.1 The State Emergency Operations Centre will facilitate and process requests made to the State Emergency Operations Controller (SEOCON) for Commonwealth assistance.

5.4.2 In addition to arrangements in EMPLAN and the State Flood Plan 2018, and depending on the severity of expected flooding, the NSW SES State Duty Operations Controller will advise the SEOCON that larger operations are about to commence and may request support from the SEOCON to:

a. Request Emergency Management Australia to activate the National Registration and Inquiry System
b. Request the Commonwealth Government to provide Department of Defence (Defence) air assets for possible use in large scale evacuations
c. Advise the Commonwealth that further Defence assistance may be required if it is likely that the states resources will be exhausted

5.5 Impact assessment

5.5.1 The NSW SES will maintain and operate a flood intelligence system. The Flood Intelligence System will be the primary means by which flood consequences can be pro-actively identified at a detailed level

5.5.2 Reconnaissance, flood response impact assessments and post flood evaluation will be coordinated by NSW SES and conducted to:

- Develop a holistic assessment of the actual impact of a flood and for the purpose of flood intelligence records; and
- Inform rapid impact assessment activities undertaken as part of the transition to recovery

5.5.3 The NSW SES will provide impact information as early as possible following a flood to the SEOCON or delegated Emergency Operations Controller to inform an initial recovery impact assessment

5.6 Withdrawal from response

5.6.1 **All Clear and Return**

5.6.2 The NSW SES will coordinate the safe return of communities to flood affected areas when the immediate danger to life and property has passed.

5.6.3 As flood waters recede the environment is often characterised by a combination of lack of utility services, extensive debris and hazardous materials and potentially unsafe road infrastructure.

5.6.4 The ability for residents to return to their homes in a safe environment will be determined by several considerations including:

a. Cleaning of poles, wires and street transformers prior to re-energising of power lines;

b. Electricity safety checks of houses and buildings, prior to reconnection;

c. Gas line purging and re-lights of household services;

d. Sewer services cleaned and reconnection subject to service availability of the street mains;

e. Water supply purged and subject to service availability of the street mains;

f. Assessment of any damage to roads and bridges;

g. Assessment of hazardous materials in buildings or on thoroughfares; and

h. Assessment of public health concerns.

5.6.5 The NSW SES will assess, in consultation with the relevant EOCON and SERCON, each area affected and specify the level of access as one of the following:

a. Not suitable for access;

b. Limited access by emergency services and response agencies; or

c. Limited access by residents and/or business operators.

5.6.6 When the immediate danger to life and property has passed the relevant NSW SES Controller will issue an 'All Clear' message for particular areas when recovery operations have commenced, or full access is safe. However, declaring an ‘All Clear’ for the whole of the Hawkesbury Nepean Valley may take an extended amount of time.

Conclusion of Response Operations

5.6.7 Response operations will conclude once all of the following conditions are met:

a. The physical impact of the flood has ceased, and

b. All requests for assistance related to the flood have been completed, and

c. The need for warning and evacuation no longer exists, and

d. There is no further prospect of rescuing people, and

e. Response to fire and hazardous material incidents have concluded (not including subsequent clean-up of contaminated sites), and

f. All affected areas have had an ‘All Clear’ issued.

5.6.8 Utilities restoration as a response operation may continue for some time beyond the end of emergency service organisations’ response operations, depending on the scale and scope of the impacts of the flood.

After Action Reviews

5.6.9 After Action Reviews involving all stakeholders, to consider the effectiveness of prevention and preparedness activities and response and recovery operations, are to be undertaken following each event

5.6.10 Findings from significant events are broadly shared and incorporated into improved disaster resilience planning.

6 Recovery

6.1 Arrangements

6.1.1 The arrangements for recovery operations in New South Wales are outlined in the State EMPLAN and further described in the State Recovery Plan.

6.1.2 For specific details in relation to the actions to be taken by NSW SES during Recovery operations refer to 6.2 NSW State Flood Plan.

6.1.3 The recovery operations associated with floods of the severity for which this Hawkesbury-Nepean Flood Emergency Sub-Plan have been written are likely to be of a long duration and be highly complex.

6.1.4 The NSW SES will:

a. Provide information to flood-affected people on safety matters and the restoration of belongings which have been in contact with flood waters

b. Provide impact information as early as possible following a flood to the SEOCON or delegated Emergency Operations Controller to inform an initial recovery impact assessment

c. Assist with clean-up operations after floods (if sufficient volunteers are available)

d. Assist with the return of evacuees to their homes (if sufficient volunteers are available)

e. Provide appropriate representation to the recovery committees if established, or recovery coordination team, for the duration of an event and as agreed during the recovery phase

6.1.5 The Office of Emergency Management have further arrangements beyond the above, including:

a. The Hawkesbury-Nepean Valley Flood Recovery Strategy (currently in draft by OEM).

b. The development of the Hawkesbury-Nepean Recovery Plan.

7 Logistics and finance

7.1.1 Logistics and financial arrangements are described in EMPLAN Part 10.

8 References

1. **Ministry for Police and Emergency Services.** *New South Wales State Emergency Management Plan (EMPLAN).* 2012.
2. **NSW Office of Water.** *Hawkesbury Nepean Valley Flood Management Review Stage 1 Final Report.* 2014.
3. **NSW Government.** *State Emergency Service Act (SES Act).* 1989.
4. **Department of Infrastructure, Planning and Natural Resources.** *Floodplain Development Manual: The management of flood liable land.* 2005.
6. **Transport for NSW.** Draft Operations Procedure and Pre-Plan for Traffic and Transport Management During a Hawkesbury-Nepean Flood Emergency. . s.l. : Transport for NSW, 2015.
7. —. Draft Hawkesbury-Nepean River Flood Emergency: Traffic Management Task Manual. s.l. : Transport for NSW, 2015.
8. **DoP.** *North West Sector Flood Evacuation Analysis.* s.l. : Report prepared by Molino Stewart Pty Ltd for NSW Department of Planning, 2012.
9. **Webb, McKeown & Associates Pty Ltd.** *Assessment of the Variability of Rates of Rise for Hydrographs on the Hawkesbury Nepean River.* s.l. : Report prepared for the NSW State Emergency Service, 2008.
10. **NSW Government.** *State Emergency Rescue Management Act (SERM Act).* 1989.

Appendix A—Roles and responsibilities

The general role and responsibilities of agencies in flood operations are described in EMPLAN

The roles and responsibilities of agencies in flood are described in Appendix A to the State Flood Plan 2018.

Additional roles and responsibilities under this plan are detailed below:

Agency	Responsibilities
Agriculture and Animal Services Functional Area	**Prevention** • Assist NSW SES in the Hawkesbury-Nepean Valley to build awareness for emergency prevention and preparedness by primary producers, animal holding establishments and the community. **Preparedness** • Prepare the Hawkesbury-Nepean Agriculture and Animal Services Supporting Plan. **Response** • Activate the Hawkesbury-Nepean Agricultural and Animal Services Area Supporting Plan.
Australian Government Bureau of Meteorology	**Preparedness** • Provide an Extended Lead Forecast for key gauges in the Hawkesbury Nepean Valley.
Councils of Local Government Areas	**Preparedness** • Assist the NSW SES with community engagement and capacity building programs in the Hawkesbury Nepean Valley • Advise the NSW SES of any proposed changes to roads and supporting infrastructure on the regional road evacuation routes. **Response** • Close and reopen council roads (and other roads nominated by agreement with the RMS) and advise the NSW SES, the NSW Police Force, the Transport Management Centre (TMC) and people who contact the council for road information (refer to supporting document Annex D HN Evacuation Management Arrangements. • Provide advice to the NSW SES and the Health Services Functional Area during floods about key council managed infrastructure such as sewerage treatment and water supply. • Ensure flooded premises are fit and safe for reoccupation and

Agency	Responsibilities
	assess any need for repair or demolition. • Coordinate the collection of post event flood data, in consultation with the NSW SES and Office of Environment and Heritage (OEH).
Energy and Utility Services Functional Area	**Preparedness** • Assist NSW SES to identify utilities infrastructure at risk of flood damage in the Hawkesbury Nepean Valley for incorporation into planning and intelligence.
Health Services Functional Area	**Preparedness** • Provide advice on the likely public health impacts of a Hazmat incident arising as a result of flooding in the Hawkesbury Nepean Valley **Response** • Activate the Nepean Blue Mountains Local Heath District - Hawkesbury-Nepean - Healthplan. • Consider and act on the advice of the NSW SES with regard to the warning and evacuation of hospitals, private hospitals and residential aged care facilities.
NSW Police Force	**Response** • In conjunction with the NSW Transport Management Centre secure, control and keep clear evacuation routes as outlined within: o supporting document Annex D HN Evacuation Management. o Hawkesbury-Nepean Flood Emergency – Traffic and Transport Operations Procedure and Pre-Plan and Traffic Management Task Manual.
NSW Rural Fire Service	**Preparedness** • Identify and notify the NSW SES of any locations within the Hawkesbury-Nepean Valley at risk of secondary incidents of fire that pose a significant threat.
NSW Transport Management Centre	**Preparedness** • Maintain the Hawkesbury-Nepean Flood Emergency – Traffic and Transport Operations Procedure and Pre-Plan and Traffic Management Task Manual. **Response** • Provide information to the public on traffic conditions on regional evacuations routes. • In conjunction with the NSW Police Force secure, control and keep

Agency	Responsibilities
	clear evacuation routes as outlined within: ○ supporting document Annex D HN Evacuation Management. • Hawkesbury-Nepean Flood Emergency – Traffic and Transport Operations Procedure and Pre-Plan and Traffic Management Task Manual.
Office of Emergency Management	**Preparedness** • Prepare the Hawkesbury Nepean Recovery Plan
Public Information Services Functional Area	**Response** • Assist the NSW SES in the establishment and operation of a Joint Media Information Centre at the NSW SES Hawkesbury Nepean Incident Control Centre.
State Emergency Operations Controller	**Response** • Activate the Public Information and Inquiry Centre. • Request Emergency Management Australia to activate the National Registration and Inquiry System. • Request the Energy and Utilities Functional Area Coordinator to begin monitoring the impact of flooding on utilities and keep the NSW SES State Duty Operations Controller advised. • Request the Transport Services Functional Area Coordinator to activate the Transport Services Functional Area Coordination Centre. • Request the Commonwealth Government to provide Department of Defence (Defence) air assets for possible use in large scale evacuations. • Advise the Commonwealth that further Defence assistance may be required. • Liaise with Defence on the status of Richmond Air Force Base. • Co-ordinate the establishment of a Major Evacuation Centre where the scale and duration of the emergency are beyond the capability and capacity of the established local / regional evacuation centre arrangements in accordance with the relevant provisions of the Major Evacuation Centre Guideline (Volume 3 Chapter 3).
Transport for NSW	**Preparedness** • Advise the NSW SES of any proposed changes to roads and supporting infrastructure on the regional road evacuation routes.

Agency	Responsibilities
Telecommunications Services Functional Area	**Preparedness** • Assist the NSW SES to identify critical telecommunications infrastructure in public telecommunications networks at risk of flood damage within the Hawkesbury-Nepean Valley for incorporation into planning and intelligence. **Response** • Keep the NSW SES informed of the status of critical telecommunications infrastructure during flood operations.
Transport Services Functional Area	**Response** • Provide a liaison officer to the NSW SES Hawkesbury Nepean Incident Control Centre. • Coordinate the provision of traffic and transport operations consistent with the roles of Transport organisations.
University of Western Sydney – Richmond Campus	**Preparedness** • Ensure that evacuation plans for the university have arrangements for flooding. **Response** • Liaise with the NSW SES and arrange for the early release of students whose travel arrangements are likely to be disrupted by flooding and/or road closures (or where required, for students to be moved to a suitable location until normal university closing time).

Appendix B—Glossary

Common emergency service terminology can be found within the Australian Emergency Management Glossary located at www.em.gov.au.

Readers should refer to EMPLAN Annex 9 – Definitions.

Refer to the NSW State Flood Plan for a complete glossary of terminology used throughout this plan and within NSW SES Flood Plans (emergency.nsw.gov.au/publications).