Wollondilly Shire Council

NSW STATE EMERGENCY SERVICE

Wollondilly Shire

Local Flood Plan

FloodSafe

WOLLONDILLY SHIRE

FLOOD EMERGENCY SUB PLAN

A Sub Plan of the Local Emergency Management Plan (EMPLAN)

Volume 1 of the Wollondilly Shire Local Flood Plan

Endorsed by the Emergency Management Committee

February 2022

VERSION HISTORY

Version Number	Description	Date
	Wollondilly Shire Flood Emergency Sub Plan	Nov 2015
	Wollondilly Local Flood Plan	Feb 1995

The above below lists all previously endorsed versions of this plan.

AMENDMENT LIST

Suggestions for amendments to this plan should be forwarded to:

Community Planning & Readiness
NSW State Emergency Service
PO Box 6126, Wollongong NSW 2500
nswses.communityplanning@ses.nsw.gov.au

Amendments in the list below have been entered in this plan.

Amendment Number	Description	Updated by	Date

Document Issue:

Available for general use and distribution on the following websites - www.emergency.nsw.gov.au or www.ses.nsw.gov.au

AUTHORISATION

The Wollondilly Shire LGA Flood Emergency Sub Plan is a sub plan of the State Emergency Management Plan (EMPLAN). It has been prepared in accordance with the provisions of the ***State Emergency Service Act 1989*** (**NSW**) and is authorised by the Local Emergency Management Committee in accordance with the provisions of the ***State Emergency and Rescue Management Act 1989*** **(NSW)**.

Recommended

NSW SES Local Commander
Date: 22 February 2022

Approved

Chair, Local Emergency Management Committee
Date: 3 February 2022

CONTENTS

1 OUTLINE AND SCOPE

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 in the Wollondilly Shire Local Government Area (LGA).

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'), the *State Emergency Service Act 1989* (NSW) ('SES Act') and the NSW State Emergency Management Plan (EMPLAN).

1.2.2 This plan is a sub plan of the Wollondilly Shire Council Local Emergency Management Plan (EMPLAN) and is endorsed by the Emergency Management Committee (LEMC).

1.3 ACTIVATION

1.3.1 This plan does not require activation. The arrangements set out in this plan are always active.

1.3.2 The Wollondilly Shire Council Emergency Management Plan (EMPLAN) is active at all times in anticipation of the need to coordinate support and resources requested by combat agencies, including the NSW State Emergency Service (NSW SES).

1.4 SCOPE

1.4.1 The area covered by this plan is the Wollondilly Shire LGA. The Wollondilly Shire Council Area and its principal towns, villages, rivers and creeks are shown in Appendix A.

1.4.2 The council area is in the NSW SES South Eastern Zone and for emergency management purposes is part of the South West Metro Emergency Management Region.

1.4.3 The plan sets out the Wollondilly Shire Council level emergency management arrangements for prevention, preparation, response and initial recovery for flooding in the Wollondilly Shire LGA. Hazard and Risk information can be found in Volume 2 of this document, and NSW SES Response Arrangements can be found in Volume 3 (where these volumes are developed).

1.4.4 In this plan a flood is defined as a relatively high-water level which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with drainage before entering a watercourse.

1.4.5 This plan outlines the local level arrangements for the management of downstream consequences of dam failure, however it does not cover the

management of flooding of an underground mine by inrush or other cause, which should be covered by the Mine Sub Plan for the respective mine.

1.5 GOALS

1.5.1 The primary goals for flood emergency management in NSW 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 and emergency incident;

f. Protection of residential property;

g. Protection of assets and infrastructure that support individual and community financial sustainability and aid assisting a community to recover from an incident; and

h. Protection of the environment and conservation values considering the cultural, biodiversity and social values of the environment.

1.6 KEY PRINCIPLES

1.6.1 The protection and preservation of human life (including the lives of responders and the community) is the highest priority.

1.6.2 Evacuation is the primary response strategy for people impacted by flooding.

1.7 ROLES AND RESPONSIBILITIES

1.7.1 General responsibilities of emergency service organisations and functional areas are set out in the State EMPLAN.

1.7.2 Specific roles and responsibilities for agencies, functional areas and organisations in relation to flooding within Wollondilly Shire Council are detailed within this plan, Appendix B and Appendix C.

1.7.3 Any agency with agreed responsibilities in this plan that are temporarily, or no longer able to fulfil their responsibilities must as soon as possible notify the:

a. NSW SES Incident Controller (for local level responsibilities during response operations);

b. NSW SES Zone Commander (for regional level responsibilities outside of response operations); and

c. NSW SES Local Commander (for local level responsibilities outside of response operations).

1.8 PLAN MAINTENANCE AND REVIEW

1.8.1 The NSW SES will maintain the currency of this plan by:

a. Ensuring that all supporting emergency services and functional areas, organisations and officers mentioned in it are aware of their roles and responsibilities;

b. Conducting exercises to test arrangements;

c. Reviewing the contents of the plan:

- When there are changes which alter agreed plan arrangements;
- When changes to land use strategic plans and policies increase the population at risk;
- After a flood including from after action reviews, reports or inquiries; and
- As determined by the NSW SES Commissioner.

d. The plan is to be reviewed no less frequently than every five years.

1.9 SUPPLEMENTARY DOCUMENTS

1.9.1 Supplementary material published in previous versions of the Local Flood Plan is now maintained on the NSW SES website at: NSW SES Flood, Storm & Tsunami Plans including:

a. Flood Plan Glossary;

b. Dam Failure Notification Flowchart;

c. NSW SES Resupply Flowchart.

2 OVERVIEW OF NSW FLOOD HAZARD AND RISK

2.1 THE FLOOD THREAT

2.1.1 The NSW SES maintains information on the nature of flooding and effects of flooding on the community in the Wollondilly Shire LGA.

2.1.2 Declared dams in or upstream of the Wollondilly Shire LGA.

Dam Name	Owner
Avon Dam	Water NSW
Brennan's Creek Dam	Water NSW
Broughtons Pass Weir Dam	Water NSW
Cataract Dam	Water NSW
Cordeaux Dam	Water NSW
Nepean Dam	Water NSW
Warragamba Dam	Water NSW
Wollondilly Washery Dam	Burragong Valley Coal Pty Ltd

3 PREVENTION/ MITIGATION

3.1 INTRODUCTION

3.1.1 The Floodplain Development Manual outlines the NSW Government's Flood Prone Land Policy which details the framework for managing flood prone land in New South Wales. Incorporation of floodplain risk management into land use planning is one of the key means to limit the exposure to flood risks to our communities and help build long term resilience to future flood events.

3.2 LAND USE PLANNING

3.2.1 **Strategy:** Work with landuse planning and consent authorities to advocate that the risks arising from floods are considered so as to prevent the creation of intolerable impacts of these hazards on the community.

Actions:

a. NSW SES will provide strategic input about land use planning matters which have or will create significant flood risk;

b. NSW SES will provide responses to land use planning proposal referrals that have or will create significant flood risk;

3.3 FLOODPLAIN RISK MANAGEMENT

3.3.1 **Strategy**: NSW SES advocates for the recognition of emergency management considerations through participation in the floodplain risk management program.

Actions:

a. NSW SES will provide coordinated and consistent emergency management advice to councils and other agencies in relation to the management of land that is subject to flooding or coastal inundation; and

b. NSW SES will provide advice, support and technical resources for NSW SES representatives to contribute effectively to local Floodplain Management Committees.

4 PREPARATION

4.1 INTRODUCTION

4.1.1 Preparation includes arrangements or plans to deal with an emergency or the effects of an emergency.

4.2 FLOOD EMERGENCY PLANNING

4.2.1 **Strategy**: NSW SES develop, review and maintain flood sub-plans

Actions:

a. Develop and review this NSW SES Local Flood Plan as required. Local Flood Plans outline the specific arrangements for management of flood events within

a Local Government Area (LGA), and may include cross boundary arrangements; and

b. Review plans as per Section 1.8.

4.2.2 Local EMPLAN Consequence Management Guides for flood are NOT required for communities covered by NSW SES Local Flood Plans.

4.3 FLOOD INTELLIGENCE SYSTEMS

4.3.1 **Strategy**: NSW SES develop and maintain a flood intelligence system to identify flood behaviour, its impact on the community and required response actions.

Actions:

a. Gather and assess flood information for the full range of flood types and severities;

b. Collect, collate and assess information on the characteristics of communities at risk and the potential effects of flooding on communities at risk; and

c. Share flood intelligence information with supporting agencies.

4.4 DEVELOPMENT OF WARNING SYSTEMS

4.4.1 **Strategy**: Develop, maintain and prepare systems for the provision of flood warnings and associated warning services.

Actions:

a. All levels of government work in partnership to develop and maintain flood warning infrastructure;

b. NSW SES maintains a list of the requirements for flood warnings for flood gauges in NSW (including flood classifications, warning times required and key statistics) and can be found in the supplementary document to the State Flood Plan (see Section 1.8). Gauges of relevance to the Wollondilly Shire LGA are also listed in Volume 3 (where developed) of this Plan;

c. The NSW SES will recommend new warning services and changes to warning alert levels for gauges to the NSW Flood Warning Consultative Committee.

d. The State Government, in partnership with Local Government, is responsible for developing and maintaining flash flood warning systems for local catchments where required;

e. Wollondilly Shire Council has developed and maintains a flash flood warning system for three gauges with alarm dial-out triggered at specific gauge height and rainfall intensity thresholds. Stonequarry Creek at Picton (212053), Lakesland Road (568295) and Thurns Road (568296).

f. Dam Owners will provide Dam Failure Warning Systems (where required) and consult NSW SES on alert levels and messaging. Alert level definitions are listed in Dam Emergency Plans (DEPs);

g. NSW SES will maintain a dedicated dam failure hotline and procedures to ensure priority dissemination of dam failure warnings.

h. NSW SES will develop and maintain warning and flood information products by:

- Utilising flood intelligence data;
- Developing pre-written warning and flood information products;
- Continuously reviewing warning and flood information products; and
- Consulting with affected communities, key stakeholders, Dam Safety NSW and the NSW Flood Warning Consultative Committee; and Operational Readiness

4.4.2 **Strategy**: Ensure NSW SES, supporting agencies, functional areas and the community are prepared and familiar with the strategies and arrangements within the Flood Sub-Plan and supporting documents.

Actions:

a. NSW SES will consult stakeholders through the development of plans;

b. NSW SES will inform stakeholders of content changes after revisions;

c. NSW SES will ensure NSW SES facilities and resources are maintained and operationally ready.

d. NSW SES will train personnel for their expected flood operation roles; and

e. NSW SES will regularly brief and exercise the arrangements contained in the Flood Sub-Plan with stakeholders.

4.5 COMMUNITY RESILIENCE TO FLOODING

4.5.1 **Strategy**: NSW SES provides and maintains a flexible volunteer workforce to support community resilience.

Actions:

a. Ensure ongoing recruitment and training of a diverse range of volunteers.

b. Ensure pre-planning to facilitate the management of spontaneous volunteers and community members during a flood.

4.5.2 **Strategy**: NSW SES works with individuals, communities, businesses and government agencies to build flood resilience.

Actions:

a. Work with communities to understand and manage the risks associated with floods, including providing business continuity guidance (NSW SES Business Floodsafe), family preparedness (NSW SES Home Floodsafe) and other engagement strategies.

b. NSW SES will collate, assess and disseminate flood information to the community.

c. Collaborate with individuals, businesses, government agencies and communities when developing flood intelligence, preparedness and response information.

d. Plan for floods collaboratively with communities through community and stakeholder participation and engagement.

5 RESPONSE

5.1 INTRODUCTION

5.1.1 Flood response operations will begin:

a. On receipt of a Bureau of Meteorology (BoM) Severe Weather Warning or Thunderstorm Warning that includes heavy rain or storm surge; or

b. On the receipt of a BoM Flood Watch or Flood Warning; or

- On receipt of warnings for flash flood; or

c. On receipt of a dam failure alert; or

d. When other evidence leads to an expectation of flooding.

5.2 INCIDENT MANAGEMENT ARRANGEMENTS

5.2.1 **Strategy**: Maintain effective control of flood operations across New South Wales.

Actions:

a. The NSW SES uses the Australasian Inter-service Incident Management System (AIIMS) to manage the flood response;

b. Control of flood response will be at the lowest effective level and may be scaled to suit the incident;

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

d. The Incident Controller, in consultation with participating supporting emergency services and Functional Areas will determine appropriate breakdown of an incident area into Divisions and/or Sectors in accordance with the principles of AIIMS as well as the predefined Divisions and Sectors outlined within Volume 3 (where developed) of this plan.

5.2.2 **Strategy**: Maintain Incident Control Centre(s).

Actions:

a. NSW SES will operate Incident Control Centre(s) as required;

b. The NSW SES Incident Control Centre(s) will:

- Control resources from NSW SES and coordinate resources of supporting emergency services and functional areas;
- Manage Requests for Assistance (RFAs) tasking and ensure they are actioned in a timely manner;
- Undertake response planning and determine future resourcing requirements; and
- Coordinate information flow, including warnings, public information and social media.

5.2.3 **Strategy**: Provide effective liaison between the NSW SES and supporting agencies or functional areas in accordance with Local EMPLAN.

Actions:

a. Supporting emergency services and Functional Areas should provide Liaison Officers to NSW SES Incident Control Centres and/or Emergency Operation Centres as required; and

b. NSW SES will provide Liaison Officer(s) to Emergency Operations Centres as required.

5.2.4 **Strategy**: Coordinate resources and logistics support to ensure operational effectiveness.

Actions:

a. The NSW SES Incident Controller will notify agencies of potential access issues between locations, for the consideration of pre-deployment of resources;

b. The NSW SES may request resources and logistics support directly from a supporting emergency service or Functional Area.

c. Wherever possible, supporting organisations are to provide their own logistic support in consultation with NSW SES where appropriate.

d. The NSW SES Incident Controller will control air support operations and may utilise supporting agencies in the management of aircraft.

5.3 USE OF INFORMATION AND COLLECTION OF INTELLIGENCE

5.3.1 **Strategy**: Ensure flood information is effectively communicated and collected during a flood.

Actions:

a. Information relating to the consequences of flooding, response strategies, situational awareness and operational updates will be distributed by NSW SES to supporting emergency services and Functional Areas listed under this plan;

b. All supporting emergency services and Functional Areas will accurately record and report information relevant to their activities and any real time flood information (including road closure information) to the NSW SES Incident Controller. This may be in the form of a combined EOC report, or direct from agencies where an EOC has not been established;

c. The NSW SES may establish and operate a Joint Intelligence Unit to coordinate the collection, collation, interpretation, mapping, actioning and dissemination of information; and

d. Reconnaissance, mapping, damage assessments, intelligence validation and post flood evaluation will be coordinated by NSW SES. This may occur post impact and continue into the recovery phase.

5.3.2 **Strategy**: Ensure flood intelligence is incorporated into operational decision-making.

Action: The NSW SES will use flood intelligence and official forecasts and warnings, to undertake an assessment of the predicted impact of a flood and to inform operational decision-making.

5.4 PROVISION OF INFORMATION AND WARNINGS TO THE COMMUNITY

5.4.1 **Strategy**: Timely and effective warnings are distributed to the community.

Actions:

a. The BoM issues public weather and flood warning products before and during a flood. These may include:

- Severe Thunderstorm Warnings with reference to heavy rainfall
- Regional Severe Thunderstorm Warnings with reference to heavy rainfall
- Detailed Severe Thunderstorm Warnings (for Sydney / Newcastle / Wollongong) with reference to heavy rainfall,
- Severe Weather Warnings with reference to heavy rainfall and/or storm surge,
- Flood Watches, and
- Flood Warnings.

b. Dam Owners will utilise Dam Failure Warning Systems to provide warnings and information to NSW SES and communities (where appropriate).

c. NSW SES Incident Controllers will issue the following NSW SES flood information products incorporating warnings from the above, expected consequences and safety messages:

- Livestock and Equipment (pump) Warnings
- Local Flood Advices
- Flood Bulletins
- NSW SES Evacuation Warning
- NSW SES Evacuation Order
- NSW SES All Clear

d. NSW SES will contact the BoM to discuss the development of flood warnings as required.

e. NSW SES will provide alerts and deliver flood information to affected communities using a combination of some of the following methods:

- Mobile and fixed public address systems;
- Two-way radio.
- Emergency Alert (SMS and voice message alerting system);
- Telephony (including Auto dial systems);
- Facsimile
- Standard Emergency Warning Signal;

- Doorknocking;
- Mobile and fixed sirens;
- Variable message signs;
- Community notices in identified hubs;
- Distribution through established community liaison networks, partnerships and relationships; and
- NSW SES social media and website.

f. NSW SES may request supporting agencies redistribute NSW SES alerts and information, including through the provision of doorknocking teams;

g. Road closure information will be provided to the community through the following agencies/methods:

- Local Government Council websites; and
- Transport for NSW 'Live Traffic' website: Live Traffic NSW or 'Transport Info Line': 131 500. VMS Messaging on Roadways may also be used to advise motorists

h. The Public Information and Inquiry Centre will be established by the NSW Police Force where required to provide information regarding evacuees and emergency information.

i. The Disaster Welfare Assistance Line will be established by Disaster Welfare Services where required to provide information on welfare services and assistance.

5.5 PROTECTION OF PROPERTY

5.5.1 **Strategy**: Coordinate the protection of property from destruction or damage arising from floods.

Action: NSW SES, supporting agencies, and community volunteers will assist the community (where resources are available and where feasible) in:

a. The protection of properties through flood protection systems (e.g. sandbagging) to minimise entry of water into buildings; and

b. The lifting or moving of household furniture and commercial stock/equipment.

5.6 ROAD AND TRAFFIC CONTROL

5.6.1 **Strategy**: Coordinate the closing and re-opening of flood affected roads.

Actions:

a. Wollondilly Shire Council will coordinate the closure and reopening of council managed roads;

b. The Transport Management Centre (TMC) in coordination with Transport for NSW and the NSW SES will coordinate the closure and reopening of the state road network;

c. The NSW Police Force may close and re-open roads, (once inspections have been carried out by the relevant authority) but will normally only do so if the Wollondilly Shire Council or the Transport for NSW have not already acted and if public safety requires such action;

d. NSW SES will assist with erecting road closure signs and barriers when time and resources permit.

5.6.2 **Strategy**: Coordinate traffic control measures in flood affected areas.

a. The NSW SES Incident Controller may direct the imposition of traffic control measures into flood affected areas in accordance with the provisions of the *State Emergency Service Act, 1989* and the *State Emergency Rescue Management Act, 1989.*

b. The NSW SES Incident Controller may request the Local Emergency Operations Controller provide personnel to assist with traffic coordination.

5.7 PROTECTION OF ESSENTIAL SERVICES

5.7.1 Arrangements for the protection of local assets are outlined in Volume 3 (where developed) of this NSW SES Local Flood Plan. In addition, Local and Region EMPLAN's contain infrastructure inventories.

5.7.2 **Strategy**: Minimise disruption to the community by ensuring protection of infrastructure and supply of essential energy and utility services.

Actions:

a. Transport Services Functional Area will keep the NSW SES informed of the status of transport Network;

b. The Energy and Utility Services Functional Area is to coordinate the assessment and restoration of essential energy and utility services (not including telecommunications);

c. The Telecommunications Services Functional Area is to coordinate the assessment and restoration of telecommunications and the Government Radio Network;

d. The Engineering Services Functional Area is to coordinate the assessment and restoration of critical public buildings for example hospitals; and

e. Functional Areas will keep the NSW SES informed of the status of utilities and infrastructure.

5.8 EVACUATION

5.8.1 Evacuation is the NSW SES's primary response strategy for managing the population at risk of flooding.

5.8.2 Community specific evacuation arrangements are located in Volume 3 (where developed) of this Plan.

5.8.3 **Strategy**: Conduct planning to ensure all evacuation constraints are considered.

Actions:

a. Evacuations will take place when there is a risk to public safety. Circumstances may include:

- Evacuation of people when their homes or businesses are likely to flood.
- Evacuation of people who are unsuited to living in isolated circumstances, due to flood water closing access; and
- Evacuation of people where essential energy and/or utility services are likely to fail or where buildings have been or may be made uninhabitable; and

b. The NSW SES will consider the following in evacuation decisions:

- Duration of evacuation;
- Characteristics of the community;
- Numbers requiring evacuation;
- Availability of evacuation routes and transport;
- Time available for evacuation;
- Evacuee management requirements; and
- Resources and delivery of evacuation information.

c. NSW SES Incident Controllers, and flood planners will carefully consider the risks involved in conducting evacuations;

d. All evacuation decisions will be made as per the NSW SES Communication and Dissemination of Evacuation Decisions Standard Operating Procedure and Evacuation operations are to be consistent with the NSW Evacuation Management Guidelines;

e. Potential evacuation centres are located in Volume 3 Local EMPLAN; and

f. The NSW Police Force will coordinate the provision of overall security for evacuated areas.

5.8.4 **Strategy**: Evacuate people pre-emptively from dangerous or potentially dangerous places created by the flood hazard to safe locations away from the hazard.

a. NSW SES will control and coordinate the evacuation of affected communities;

b. The NSW SES Incident Controller will warn communities to prepare for a possible evacuation, where circumstances allow such lead time;

c. The NSW SES Incident Controller will order any necessary evacuations and provide information to the community about when and how to evacuate;

d. Support to evacuation operations may be requested from other emergency services and supporting agencies using arrangements in local EMPLAN and supporting plans;

e. Health Services Functional Area will coordinate the evacuation of hospitals, health centres and aged care facilities (including nursing homes) in consultation with the NSW SES and Welfare Services.

f. School administration offices (Department of Education, Catholic Education Office and Private Schools) will coordinate the evacuation of schools in consultation with the NSW SES and Welfare Services, if not already closed.

g. Caravan Park proprietors will inform the NSW SES Incident Controller when caravan park evacuations have been completed.

h. People who are reluctant or refuse to comply with any Evacuation Order will be referred to the NSW Police Force.

5.9 EVACUEE MANAGEMENT AND WELFARE

5.9.1 Research and experience in flood operations shows that most evacuees go to family, friends and commercial accommodation outside the impact area.

5.9.2 **Strategy**: Maintain the welfare of communities and individuals affected by the impact of a flood.

Actions:

a. NSW SES will provide initial welfare for evacuees where required but will hand the responsibility over to the Welfare Services Functional Area as soon as possible. In these cases the NSW SES will brief the Welfare Services Functional Area at the earliest opportunity regarding the assistance required;

b. Welfare Services Functional Area will manage evacuation centres for affected residents and travellers in accordance with the Welfare Services Functional Area Supporting Plan;

c. The Department of Education will manage the safety of students directly affected by flooding, will work with the NSW SES in the temporary closure of schools and will work with NSW SES and Welfare Services in the management of school evacuees.

d. Disaster Victim Registration will be controlled and coordinated by the NSWPF, with the assistance of NSW SES and Welfare Services Functional Area;

e. NSW SES will provide details of all residents assisted in evacuations to the Welfare Services Functional Area as early as possible;

f. Where the expected remaining number of evacuees and the duration of evacuation is assessed to be beyond the capability and capacity of the established evacuation centre arrangements the SEOCON may establish Major Evacuation Centres or Mass Care Facilities; and

g. The decision to establish Major Evacuation Centres or Mass Care Facilities will be made by the NSW SES and SEOCON in consultation with members of the State Emergency Management Committee.

5.9.3 **Strategy**: Coordinate available and accessible health services for flood affected communities.

Action: The provision of environmental health advice, assessment of public health risks and coordination of immediate mental health support will be provided by Health Services Functional Area.

5.9.4 **Strategy**: Coordinate maintenance of food supplies for flood affected communities.

Actions: All matters relating to the primary production, manufacturing, processing and handling of all food from primary industries to retail, inclusive of all restaurants, food services and catering businesses should be referred to the NSW Food Authority through the Agriculture and Animal Services Functional Area.

5.9.5 **Strategy**: Maintain the welfare of animals impacted by a flood.

Actions:

a. Agriculture and Animal Services Functional Area will coordinate the welfare of livestock, pets, companion animals and wildlife including support to primary producers, animal holding establishments and community members; and

b. Agriculture and Animal Services Functional Area role will assist with evacuation, emergency care of animals and assessment, humane destruction and disposal of affected animals, and supply of emergency fodder, water and aerial support where necessary.

5.10 FLOOD RESCUE

5.10.1 **Strategy**: Control and coordinate flood rescue of people and domestic animals.

Actions:

a. NSW SES will perform flood rescue, where training and equipment is suitable and where a risk assessment has indicated that the risk to rescuers is acceptable;

b. Flood rescue operations will be conducted in accordance with the State Rescue Board Land Rescue Policy and the NSW State Rescue Board Flood Rescue Policy which sets out the framework, governance, responsibilities and requirements for the management and conduct of flood rescue in NSW;

c. NSW SES may request other supporting emergency services to undertake flood rescues on behalf of the NSW SES. Agencies must be authorised/accredited to undertake flood rescue operations in accordance with State Rescue Board requirements, as prescribed by NSW SES. Supporting emergency services must supply information regarding rescues performed to the NSW SES. Notification arrangements with NSW Police Force are outlined in the NSW State Rescue Board Flood Rescue Policy; and

d. Rescue agencies will conduct rescue of domestic small and large animals as per the State Rescue Board Land Rescue Policy (and may include Large Animal Rescue of family horses and cows at a residence or property). The rescue of livestock (which includes commercial animals found on farming and breeding enterprises) will be coordinated through Animal and Agriculture Services Functional Area.

5.11 RESUPPLY

5.11.1 **Strategy**: Coordinate resupply to towns and villages isolated by flooding to minimise disruption to the community.

Actions:

a. NSW SES will advise communities and businesses if flood predictions indicate that areas are likely to become isolated, and indicative timeframes where possible.

b. Retailers should be advised to ensure sufficient stock is available for the duration of the flood.

c. When isolation occurs, NSW SES will establish loading points where retailers can instruct suppliers to deliver goods.

d. NSW SES will endeavour to deliver mail to isolated communities, but may not be able to do so according to normal Australia Post timetables.

e. NSW SES will assist hospitals with resupply of linen and other consumables where able.

f. NSW SES may request resupply assistance from supporting agencies.

5.11.2 **Strategy**: Coordinate resupply to rural properties isolated by flooding.

Actions:

a. When requested, NSW SES will establish a resupply schedule and coordinate the resupply for isolated rural properties;

b. NSW SES will provide local suppliers with designated loading points. Resupply items are to be packaged by the supplier; and

c. Isolated households unable to afford resupply items will be referred to Welfare Services Functional Area for assistance.

5.12 ALL CLEAR AND RETURN

5.12.1 **Strategy**: Coordinate the safe return of communities to flood affected areas when the immediate danger to life and property has passed.

Actions:

a. NSW SES Incident Controller will determine when it is safe to progressively return in consultation with the relevant Emergency Operations Controller and supporting agencies, considering the impact on the following:

- Access and egress;
- Communications;
- Power supply;
- Gas supply;
- Infrastructure damage;
- Hazardous materials; and
- Public health risks.

b. NSW SES Incident Controller will specify the level of access to affected communities as the following:

- Not suitable for access;
- Limited access by emergency services and response agencies;

- Limited access by residents and/or business operators; or
- Full access.

c. NSW SES Incident Controller will issue an 'All Clear' message when the immediate danger to life and property has passed for areas assessed as safe; and

d. The NSW SES will facilitate the return of evacuees to their homes.

5.13 END OF RESPONSE OPERATIONS

5.13.1 **Strategy**: Conclude response operations.

Actions:

a. Response operations will conclude when:

- The physical impact of the flood has ceased;
- All requests for assistance related to the flood have been completed;
- The need for warning and evacuation no longer exist;
- There is no further prospect of rescuing people;
- Resupply is no longer required (resupply operations may occur concurrently with the recovery phase);
- Response to fire and hazardous material incidents have concluded (not including subsequent clean-up of contaminated sites); and
- All affected areas have had an 'All Clear' issued.

5.14 POST IMPACT ACTIONS

5.14.1 **Strategy**: Learnings from the event are used to inform recovery and future events.

Actions:

a. NSW SES will continue to engage with communities after significant floods through convening one or more community forums, workshops or other opportunities to provide communities a chance to provide feedback, address any concerns and provide input into the recovery process. These will typically include other agencies such as the Bureau of Meteorology, Welfare Services and Wollondilly Shire Council representatives;

b. NSW SES will ensure that damage assessment information is provided to the relevant Emergency Operations Controller to inform the recovery impact assessment;

c. NSW SES will conduct After Action Reviews, wherever possible, within three weeks of the end of response operations, which will involve all stakeholders. Findings will be shared and incorporated into improved disaster resilience planning;

d. NSW SES will undertake/coordinate a comprehensive review of intelligence and plans following significant flood events.

5.14.2 **Strategy:** Participate in post flood data collection analysis.

Actions: NSW SES will work with the NSW Department of Planning, Industry and Environment (DPIE) and Wollondilly Shire Council on post flood data collection analysis including review of flood intelligence where necessary.

6 RECOVERY OPERATIONS

6.1 INTRODUCTION

6.1.1 Recovery is the process of returning an affected community to its proper level of functioning after an emergency. It will generally commence simultaneously with the Response phase.

6.1.2 Recovery operations will be initiated and conducted as outlined in the State EMPLAN and as further detailed in the NSW Recovery Supporting Plan.

6.1.3 Flood recovery operations for Wollondilly Shire Council area will be coordinated as per the recovery arrangements in Part 8 of the Hawkesbury Nepean Flood Emergency Sub Plan.

6.2 NSW SES RECOVERY ROLE

6.2.1 **Strategy**: NSW SES will support recovery operations and established Recovery Committees.

Actions:

a. NSW SES will provide representation to Recovery Committees as required and may have an ongoing role in the Recovery phase through its community engagement personnel;

b. NSW SES roles on Recovery committees may include providing information about any continuing response, guidance on mitigation strategies and general advice and assistance to the committee as a subject matter specialist;

c. NSW SES will provide information to Office of Emergency Management to support applications to Treasury for Natural Disaster Relief and Recovery Arrangements;

d. The NSW SES, in conjunction with a Recovery Committee, will provide a service to support the information needs of a community immediately following a flood; and

e. NSW SES will assist with clean-up operations after floods, where possible.

7 ABBREVIATIONS

AIIMS	Australasian Inter-service Incident Management System
BoM	Australian Government Bureau of Meteorology
DPIE	NSW Department of Planning, Industry and Environment
DEP	Dam Emergency Plan
EMPLAN	Emergency Management Plan
EOC	Emergency Operations Centre
EOCON	Emergency Operations Controller
FRNSW	Fire and Rescue NSW
LEMC	Local Emergency Management Committee
LEOCON	Local Emergency Operations Controller
LGA	Local Government Area
MHL	Manly Hydraulics Laboratory
NSW RFS	New South Wales Rural Fire Service
NSW SES	New South Wales State Emergency Service
OEM	Office of Emergency Management
PMF	Probable Maximum Flood
RMS	Roads and Maritime Services (Transport for NSW)
SDOC	State Duty Operations Controller
SEOCON	State Emergency Operations Controller
SERCON	State Emergency Recovery Controller
SOC	State Operations Centre
TMC	Transport Management Centre

8 GLOSSARY

For a full list of definitions refer to the Supporting Document - State Flood Plan Glossary https://www.ses.nsw.gov.au/media/2650/glossary.pdf

Community Resilience. Communities and individuals harnessing local resources and expertise to help themselves in an emergency, in a way that complements the response of the emergency services. Resilient communities are better able to withstand a crisis event and have an enhanced ability to recover from residual impacts.

Dam Failure. The uncontrolled release of a water storage. The failure may consist of the collapse of the dam or some part of it, or excessive seepage or discharges. The most likely causes of dam failure are:

- **Flood Induced Dam Failure -** dam failure caused by flood, either due to overtopping erosion or by subsequent structural failure.
- **Sunny Day Dam Failure** - dam Failure as a result of factors other than flood i.e. other than flood flow into the reservoir. Causes of "Sunny Day" dam failure can include internal erosion, landslide, piping, earthquake, structural weaknesses or sabotage.

Damage Assessment. Collection and collation of specific impact information to inform the impact assessment. The information assists with the transition to recovery.

Declared Dam. A Declared Dam is a dam or proposed dam that is declared by order under section 4 of the 2019 regulation:

- a dam having a dam wall that is more than 15 metres high.
- an existing or proposed dam that Dams Safety NSW is reasonably satisfied would result in a major or catastrophic level of severity of damage or loss were there to be a failure of the dam.
- dams that were 'prescribed' under the old Dams Safety Act (1978) became Declared dams upon commencement of the new Act.

Once a dam is declared, the dam owner must comply with all the relevant requirements of the legislation.

Evacuation. A risk management strategy that may be used to mitigate the effects of an emergency on a community. It involves the movement of people to a safer location and their return. For an evacuation to be effective, it must be appropriately planned and implemented.

Evacuation Order. Notification to the community, authorised by the NSW SES, when the intent of an Incident Controller is to instruct a community to immediately evacuate in response to an imminent threat.

Evacuation Warning. Notification to the community, authorised by the NSW SES, when the intent of an Incident Controller is to warn a community of the need to prepare for a possible evacuation.

Flash Flooding. Flooding which is sudden and often unexpected because it is caused by sudden local or nearby heavy rainfall and typically occurs in small catchments. Technically, flash flooding means any flooding of short duration with a relatively high peak discharge in which the time interval between the observable causative event and the Flood is less than six hours.

Flood. Relatively high water level which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with drainage before entering a

watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves (including tsunami) overtopping coastline defences.

Flood Intelligence. The product of a process of collecting, evaluating and analysing flood information relating to an event and presenting and communicating it in such a way as to inform decision making and to devise treatment options across prevention, preparedness, response and recovery. NSW SES maintain a Flood Intelligence system to store Flood Intelligence.

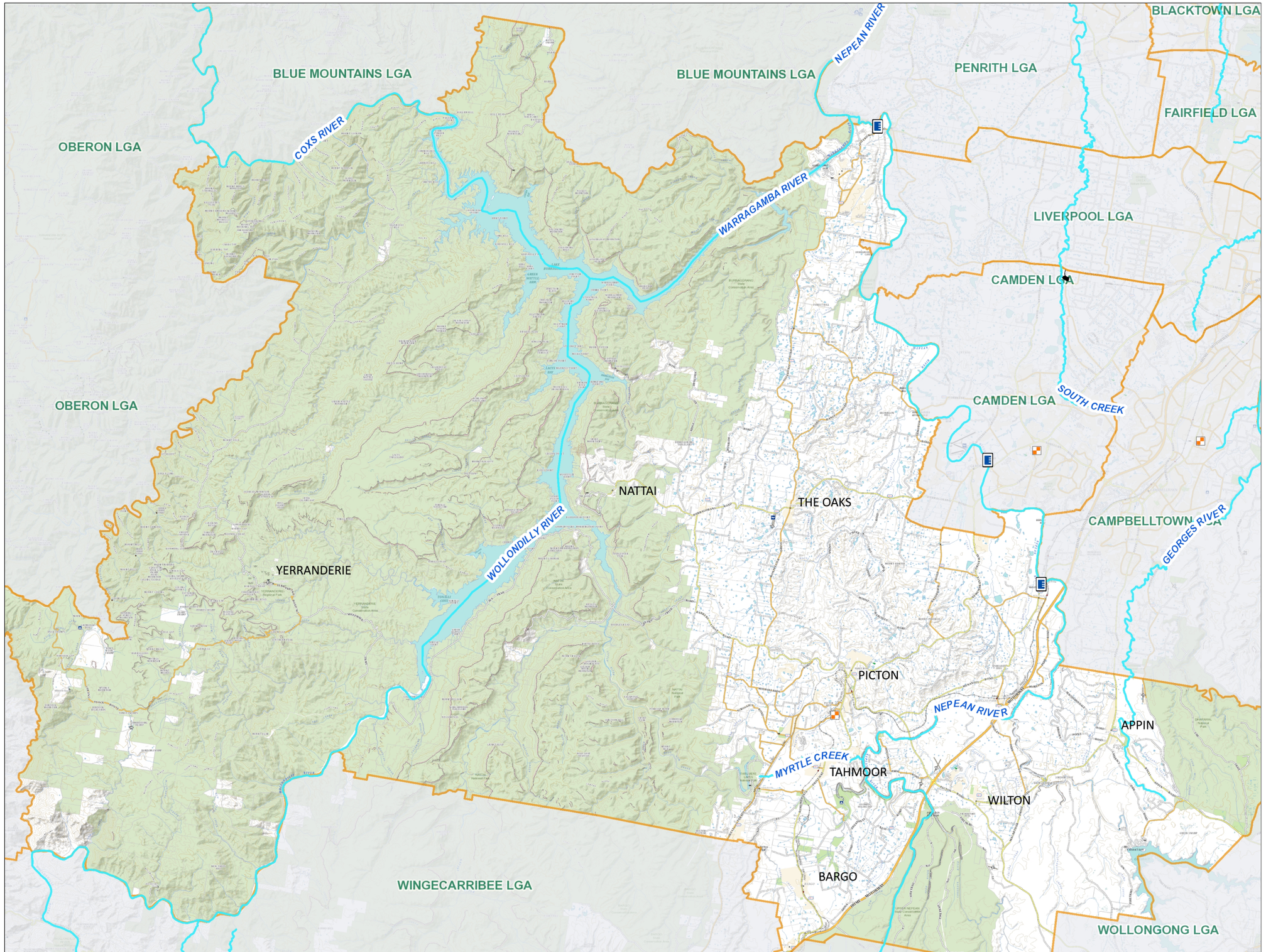
Incident Controller. The individual responsible for the overall management of an emergency or critical incident.

NSW SES State Controller. The NSW SES Commissioner, in connection with the exercise of his or her functions under the SES Act, may use the title NSW SES State Controller and the NSW SES Deputy Commissioner may use the title NSW SES Deputy State Controller.

NSW SES State Duty Operations Controller (SDOC). The delegated authority appointed by the NSW SES State Controller, responsible for providing advice and support to an Incident Controller and/or Operations Controller when required. State Duty Operations Controller is in command of emergency response operations.

Riverine Flooding. Any flooding where the rain-to-flood delay time is relatively high and typically more than six hours, but excludes Flooding caused by: elevated sea levels, storm surge, flash floods, failure of any man-made infrastructure, for example failure of dams or levees, or urban overland flow.

Spontaneous Volunteers. Emergent volunteers during times of crisis who volunteer their time to help their local communities but do not wish to have an ongoing commitment to an organisation**.**



NSW STATE EMERGENCY SERVICE

Appendix A - Wollondilly Shire Council Area

Legend

- NSW SES Headquarters
- Gauges BOM Forecast Locations
- Major Rivers
- Levees
- Prescribed Dams
- Local Government Areas
- States Australia

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Printed: 17/06/2020

10 Appendix B – Roles and Responsibilities

AGENCY	RESPONSIBILITIES
NSW State Emergency Service	The NSW SES is the designated Combat Agency for floods, storms and tsunami and controls response operations. NSW SES roles and responsibilities in relation to floods are detailed within the New South Wales State Flood Plan.

AGENCY	RESPONSIBILITIES
Agriculture and Animal Services Functional Area	The roles and responsibilities for Agriculture and Animal Services are outlined in the Agriculture and Animal Services Supporting Plan Roles and responsibilities in addition to the Supporting Plan are: • Disseminate briefing information to participating agriculture and animal services and related stakeholders; • When activated the Agriculture and Animal Services will coordinate the provision of required services which may include: – Coordinate response for animal welfare including pets, livestock and wildlife; – Supply and delivery of emergency fodder; – Emergency water replacement in certain circumstances; and – Financial, welfare and damage assessment assistance to flood affected primary producers. • Support recovery arrangements including: – Administer transport subsidies to primary producers.
Australian Government Bureau of Meteorology (BoM)	The roles and responsibilities of the Australian Government Bureau of Meteorology are outlined in the NSW State Flood Plan.
Council - Wollondilly Shire	**Preparedness** • Establish and maintain floodplain and coastal risk management committees and ensure that key agencies are represented; • Develop and implement floodplain risk management plans in accordance with the NSW Government's Flood Prone Land Policy and the Floodplain Development Manual; • Provide levee studies, flood studies and floodplain management studies to the NSW SES; • Coordinate the development of warning services for catchments prone to flash flooding (small catchments), where appropriate;

AGENCY	RESPONSIBILITIES
	• Maintain council-owned flood warning networks and flood mitigation works; • Participate in NSW SES-led flood emergency planning meetings, to assist in the preparation of Flood Sub-Plans; • Maintain a plant and equipment resource list for the council area. • Contribute to community engagement activities. **Response** • Subject to the availability of council resources, assist the NSW SES with flood operations including: – Traffic management on council managed roads; – Provision of assistance to the NSW SES (plant, equipment and personnel where able and requested); – Property protection tasks including sandbagging; – Assist with the removal of caravans from caravan parks – Warning and/or evacuation of residents and other people in flood liable areas; – Provision of back-up radio communications – Resupply of isolated properties; and – Technical advice on the impacts of flooding. – Close and reopen council roads (and other roads nominated by agreement with Transport for NSW) and advise the NSW SES, the NSW Police Force and people who contact the council for road information; – Assist the NSW SES to provide filled sandbags and filling facilities to residents and business in areas which flooding is expected. • Assist with making facilities available for the domestic pets and companion animals of evacuees during evacuations. • Operate the flash flood warning systems; • Operate flood mitigation works including critical structures such as detention basins and levees and advise the NSW SES regarding their operation; • Manage and protect council-owned infrastructure facilities during floods; • 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; • Advise the Environmental Protection Agency of any sewerage overflow caused by flooding;

AGENCY	RESPONSIBILITIES
	• Work with the NSW SES and DPIE to collect flood related data during and after flood events. **Recovery** • Provide for the management of health hazards associated with flooding including removing debris and waste; • Ensure premises are fit and safe for reoccupation and assess any need for demolition; • Provide services, assistance and advice to State Government in accordance with the State Recovery Plan.
Caravan Park Proprietor(s)	• Ensure that owners and occupiers of movable dwellings are aware that the caravan park is flood liable by providing a written notice to occupiers taking up residence and displaying this notice and emergency management arrangement within the park; • Ensure that owners and occupiers of movable dwellings are aware that if they are expecting to be absent for extended periods, they should: – Provide the manager of the caravan park with a contact address and telephone number in case of an emergency; and – Leave any movable dwelling in a condition allowing it to be relocated in an emergency (i.e.: should ensure that the wheels, axles and draw bar of the caravans are not removed, and are maintained in proper working order); • Ensure that occupiers are informed of Flood Information. At this time, occupiers should be advised to: – Ensure that they have spare batteries for their radios; – Listen to a local radio station for updated flood information; and – Prepare for evacuation and movable dwelling relocation; • Ensure that owners and occupiers of caravans are aware of what they must do to facilitate evacuation and movable dwelling relocation when flooding occurs; • Coordinate the evacuation of people and the relocation of movable dwellings when floods are rising and their return when flood waters have subsided. Movable dwellings will be relocated back to the caravan park(s) by owners or by vehicles and drivers arranged by the park managers; • Secure any movable dwellings that are not able to be relocated to prevent floatation; and • Inform the NSW SES of the progress of evacuation and/or movable dwellings relocation operations and of any need for assistance in the conduct of these tasks.

AGENCY	RESPONSIBILITIES
Childcare Centres and Preschools	• When notified of possible flooding or isolation, child care centres and preschools should; – Liaise with the NSW SES and arrange for the early release of children whose travel arrangements are likely to be disrupted by flooding and/or road closures; and – Assist with coordinating the evacuation of preschools and child care centres.
Dams Safety NSW	The roles and responsibilities of the Dams Safety NSW (formerly NSW Dam Safety Committee) are outlined in the NSW State Flood Plan.
Department of Defence	Arrangements for Defence Assistance to the Civil Community are detailed within the State EMPLAN (section 448).
Department of Industry	The roles and responsibilities for the Department of Industry (Crown Lands and Water Division) are outlined in the NSW State Flood Plan.
Energy and Utilities Services Functional Area	The roles and responsibilities for Energy and Utilities Services are outlined in the Energy and Utility Services Supporting Plan (EUSPLAN). Roles and responsibilities in addition to the Supporting Plan are: • Assist NSW SES with identification of infrastructure at risk of flood damage where resources are available. • Facilitate local utility service distribution providers (electricity, gas, water, wastewater) to: – Provide advice to the NSW SES of any need to disconnect power/gas/water/wastewater supplies or of any timetable for reconnection. – Advise the NSW SES of any hazards from utility services during flooding and coastal erosion/inundation. – Advise the public with regard to electrical hazards during flooding and coastal erosion/inundation, and to the availability or otherwise of the electricity supply. – Clear or make safe any hazard caused by power lines or electricity distribution equipment. – Reconnect customers' electrical/ gas/ water/wastewater installations, when certified safe to do so and as conditions allow. – Assist the NSW SES to identify infrastructure at risk of flooding for incorporation into planning and intelligence.
Engineering Services Functional Area	The roles and responsibilities for Engineering Services are outlined in the Engineering Services Supporting Plan.
Environmental Services Functional Area	The roles and responsibilities for Environmental Services are outlined in the Environmental Services (ENVIROPLAN) Supporting Plan.

AGENCY	RESPONSIBILITIES
Floodplain Management Australia	The roles and responsibilities of Floodplain Management Australia are outlined in the NSW State Flood Plan.
Fire and Rescue NSW (as per NSW State Flood Plan)	**Preparedness** • Identify and notify the NSW SES of any locations at risk of fire (within Fire Districts (13) or hazardous materials that pose a significant threat to surrounding populations due to the impact of a flood for incorporation into NSW SES flood intelligence and planning; and **Response** • Meet the agreed arrangements described in the NSW SES and Fire and Rescue NSW Mutual Aid Agreement; • Provide Incident Management personnel and Liaison Officers to the NSW SES where required; • When requested by NSW SES, provide support to the NSW SES in response to flood emergencies across the State; • Assist the NSW SES with the warning and/or evacuation of at risk communities; • Assist the NSW SES with the monitoring/reconnaissance of flood prone areas; • Provision of Land Based and In Water Flood Rescue Operators as required; • Provision of appropriately trained personnel to perform Down the Wire (DTW) functions as required; • Conduct Hazmat operations including asbestos risks, rising from flood emergencies in coordination with the SES Incident Controller. • Decontamination of Flood Rescue Operators as required; • Assist the NSW SES with the resupply of isolated communities and/or properties; • Assist the NSW SES with property protection tasks including sandbagging; • Provide resources for pumping flood water out of buildings and from low-lying areas; • Assist with clean-up operations, including the hosing out of flood affected properties; • Provide trained staff to support a joint intelligence unit, if established by NSW SES, including Remotely Piloted Aircraft System (RPAS) pilots to assist with field observations;

AGENCY	RESPONSIBILITIES
	• Assist the NSW SES to undertake damage assessment including structural collapse risks; • Coordinate the pre-deployment of fire resources to communities within NSW Fire Districts if access is expected to be lost, in consultation with the NSW SES; and • Coordinate the deployment of the FRNSW Hightrans Pump to locations in consultation with NSW SES. **Recovery** • Participate in After Action Reviews as required.
Forestry Corporation of NSW	**Response** • Close and reopen Forestry Corporation of NSW roads when affected by flood waters and advise the NSW SES of its status; • Manage traffic on Forestry Corporation of NSW roads; • Facilitate the safe reliable access of emergency resources on Forestry Corporation managed roads; • Assist the NSW SES with identification of road infrastructure at risk of flooding; • Assist the NSW SES with the communication of warnings and information provision to the public through variable message signs and other appropriate means; and • Close and relocate people from camping grounds at risk of flooding in State Forest managed areas.
Health Services Functional Area	The roles and responsibilities for Health Services Functional Area are outlined in the Health Services (HEALTHPLAN) Supporting Plan. Roles and responsibilities in addition to the Supporting Plan are: • Ensure that appropriate business continuity plans are developed for essential health infrastructure and are activated during floods.
Local Emergency Operations Controller (LEOCON)	• Monitor flood operations. • If requested, coordinate support for the NSW SES Incident Controller.
Local Emergency Management Officer (LEMO)	• If requested by the NSW SES Incident Controller, advise appropriate agencies and officers of the start of response operations.
Manly Hydraulics Laboratory (MHL)	The roles and responsibilities of Manly Hydraulic Laboratory are outlined in the NSW State Flood Plan.
Marine Rescue NSW (as per NSW State Flood Plan)	**Response**

AGENCY	RESPONSIBILITIES
	• When requested by NSW SES, assist in flood operations when training and equipment are available and suitable including assistance with: – Warning and/or evacuation of at risk communities; – Providing communications personnel; – Property protection tasks including sandbagging; and – Flood rescue operations.
NSW Ambulance	The roles and responsibilities for NSW Ambulance are outlined in the Health Services (HEALTHPLAN) Supporting Plan.
NSW Department of Education	**Preparedness** • 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 school closing time); • Ensure that evacuation plans for flood liable schools have arrangements for flooding; and • Assist NSW SES with community engagement and capacity building programs. **Response** • Assist with the coordination of the evacuation of schools and the immediate welfare of students until returned to the appropriate carer; • Pass information to school bus drivers/companies and/or school principals on expected or actual impacts of flooding; and • Provide space in schools for evacuation centres where necessary.
NSW Department of Industry, Planning and Environment (as per NSW State Flood Plan)	**Prevention** • Oversee the delivery of the NSW Flood Prone Land Policy including financial support through the Floodplain Management Program. Provide technical advice to councils and state agencies including assistance with the identification of risks, the preparation and implementation of Floodplain Risk Management Plans and associated mitigation and management actions, and understanding flood mitigation schemes including levees. • Work with the NSW SES on the Flood Data Access Program to improve the provision of flood information through the NSW Flood Data Portal; • Assist the Department of Industry-Water in the preparation of rural floodplain management plans under the *Water Management Act 2000* (NSW); and **Preparedness** • Assist the NSW SES in the exercising of Flood Sub Plans;

AGENCY	RESPONSIBILITIES
	• Management of the state government's water level gauges for the flood warning network in tidal areas in NSW (Manly Hydraulic Laboratory operates this system as a service provider on behalf of DPIE.); • Advise NSW SES about conditions which may lead to coastal inundation or retarded river drainage near the coast. **Response** • Provide related advice on flood risks to the NSW SES on request; and • Work with the relevant local council and NSW SES to collect flood related data during and after flood events. **Recovery** Support recovery committees as required.
NSW Food Authority	The roles and responsibilities for NSW Food Authority are outlined in the Food Industry Emergency Sub Plan.
NSW National Parks and Wildlife Services (as per NSW State Flood Plan)	**Preparedness** • Assist the NSW SES with identification of road infrastructure in National Parks at risk of flooding; **Response** • Close and reopen National Parks and Wildlife Service roads when affected by flood waters and advise the NSW SES of its status; • Facilitate the safe reliable access by emergency resources on National Parks and Wildlife Service managed roads; • Assist the NSW SES with the communication of warnings and information provision to the public through variable message signs and other appropriate means; and Close and direct people to leave camping grounds at risk of flooding in National Parks and Wildlife Service managed areas.
NSW Police Force (as per NSW State Flood Plan)	**Preparedness** • Participate in NSW SES briefings, training and exercises as required. **Response** • Provide a Liaison Officer to the NSW SES Operation Centre if required; • When requested by NSW SES, in flood operations when training and equipment are available and suitable; – Assist with warning and/or evacuation of at risk communities; – Assist with monitoring / reconnaissance of flood prone areas; – Assist with flood rescue operations;

AGENCY	RESPONSIBILITIES
	• Conduct road and traffic control operations in conjunction with council and/or RMS; • Coordinate searches for missing people within flood affected areas; • Coordinate security of supply lines, evacuated and damaged areas. • Manage Disaster Victim Registration; and • Operate the Public Information and Inquiry Centre, if requested or otherwise needed during flood events. **Recovery** • Participate in After Action Reviews as required.
NSW Rural Fire Service (as per NSW State Flood Plan)	**Preparedness** • Participate in NSW SES briefings, training and exercises as required; and • Meet the agreed arrangements described in the NSW SES/NSW RFS Memorandum of Understanding. **Response** • Provide a Liaison Officer to the NSW SES Operation Centre or Emergency Operations Centre as required; • Provide Incident Management Personnel when requested; • Provide trained staff to support a joint intelligence unit, if established by NSW SES; • Provide aviation support, management and advice as requested through the State Air Desk; • Provide speciality aircraft and appropriately trained personnel to perform Down the Wire (DTW) functions as required; • Assist with Damage Assessments; and • Provide Strike Teams during flood operations when requested by NSW SES. This may include assistance with: – Warning and/or evacuation of at risk communities; – Monitoring / reconnaissance of flood prone areas. – Property protection tasks including sandbagging; – Pumping flood water out of buildings and from low-lying areas; – Back-up radio communications; – Clean-up operations, including the hosing out of flood affected properties; – Deploying resources to communities within Rural Fire Districts where access is expected to be lost in consultation with the NSW SES;

AGENCY	RESPONSIBILITIES
	– The resupply of isolated communities and/or properties; and – Decontamination of NSW SES Flood Rescue Operators as required. **Recovery** • Participate in After Action Reviews as required.
NSW Volunteer Rescue Association (as per NSW State Flood Plan)	**Response** • Where requested by the NSW SES, assist in flood operations when training and equipment are available and suitable, including assistance with: – The warning and/or evacuation of at risk communities; – Flood rescue operations; – Monitoring / reconnaissance of flood prone areas; – Resupply of isolated communities and/or properties; and – Property protection tasks including sandbagging.
Office of Emergency Management	The roles and responsibilities of the Office of Emergency Management are outlined in the NSW State Flood Plan.
Owners of Declared Dams within or upstream of the LGA (as per NSW State Flood Plan)	**Preparedness** • Assist the NSW SES with community engagement programs; • Provide NSW SES with information necessary for response planning and warning distribution; • Assist the NSW SES identify correlations between water level and/or discharges at the dam for use in flood response operations (warning and evacuation); and • Consult with the NSW SES State Headquarters in the development of Dam Safety Emergency Plans, including the development of dam failure alerts, in accordance with the Dam Safety NSW Guidelines. **Response** • Where water level monitoring or other instrumentation allows, provide NSW SES with flood advices as per pre-agreed thresholds for use in downstream flood response operations (warnings); • Notify NSW SES of potential or actual dam failures in accordance with the Dam Safety Emergency Plan and Dam Safety NSW Guidelines; • Close at risk camping grounds / recreational areas within their managed areas; • In the case of declared dams whose risks are intolerable, assist the NSW SES in planning to warn and evacuate people at risk of dam failure and maintain and operate any special Dam Failure Warning Systems and/or automatic telemetered monitoring devices to assist with early

AGENCY	RESPONSIBILITIES
	detection of incidents which are installed until such time that the risks have been lowered to an acceptable level; and Owners of gated dams: • Provide all available information to the BoM and the NSW SES on storage levels and actual and prospective water releases and their likely impacts on downstream river levels; • Advise the downstream community of prospective and actual water releases, except in those circumstances where the BoM would issue flood warnings; and • Where possible actively work with NSW SES and the BoM to reduce the impacts of flooding on communities through management of water releases within identified safe parameters and within statutory licencing provisions under the *Water Management Act 2000* and *Water NSW Act 2014*.
Public Information Services Functional Area	The roles and responsibilities for Public Information Services are outlined in the Public Information Services Supporting Plan. Roles and responsibilities in addition to the Supporting Plan are: • On receipt of advice from NSW SES of any weather event likely to result in significant multi agency operational activity, the PIFAC determines if a daily multi-agency teleconference is required to ensure that the information needs of each agency are being met and to address any issues. These teleconferences continue through the response phase into the recovery phase.
Transport for NSW	• Transport for NSW coordinates information on road conditions for emergency services access. • Transport for NSW coordinates the management of the road network across all modes of transport. • Transport for NSW (TMC) in conjunction will assist the NSW SES with the evacuation of at-risk communities by maintaining access and egress routes; • TMC will assist the NSW SES with the communication of flood warnings and information provision to the public through Live Traffic and Social Media, and variable message signs (VMS) according to the VMS protocols and procedures; • Assist the NSW SES with identification of road infrastructure at risk of flooding.
SEOCON/SEOC	The roles and responsibilities of the SEOCON/SEOC are outlined in the NSW State Flood Plan.

AGENCY	RESPONSIBILITIES
Telecommunications Services Functional Area	The roles and responsibilities for Telecommunications Services are outlined in the Telecommunications Services (TELCOPLAN) Supporting Plan.
Transport Services Functional Area	The roles and responsibilities for Transport Services are outlined in the Transport Services Supporting Plan. Roles and responsibilities in addition to the Supporting Plan are: • Participate in risk management studies; • Assist the NSW SES to identify transport infrastructure at risk of flood damage for incorporation into planning and intelligence; and • Coordinate the provision of traffic and transport operations as consistent with the roles of Transport organisations.
WaterNSW	The roles and responsibilities for WaterNSW are outlined in the NSW State Flood Plan.
Welfare Services Functional Area	The roles and responsibilities for Welfare Services are outlined in the Welfare Services Functional Area Supporting Plan.

11 Appendix C – Community Specific Roles and Responsibilities (examples only)

Community Members	**Preparedness** • Understand the potential risk and impact of flooding; • Prepare homes and property to reduce the impact of flooding; • Understand warnings and other triggers for action and the safest actions to take in a flood; • Households, institutions and businesses develop plans to manage flood risks, sharing and practicing this with family, friends, employees and neighbours; • Have an emergency kit; and • Be involved in local emergency planning processes.
Picton Chamber of Commerce	• Assist with communication to potentially affected businesses in the Picton CBD https://pictonchamber.com.au/contacts/

HAZARD AND RISK IN WOLLONDILLY SHIRE

Volume 2 of the Wollondilly Shire Local Flood Plan

Last Update: April 2016

AUTHORISATION

The Hazard and Risk in Wollondilly Shire has been prepared by the NSW State Emergency Service (NSW SES) as part of a comprehensive planning process. The information contained herein has been compiled from the latest available technical studies.

Approved

Manager Emergency Risk Management

Date:

Approved

NSW SES Sydney Southern Region Controller

Date:

Tabled at LEMC

Date:

CONTENTS

LIST OF TABLES

VERSION LIST

The following table lists all previously approved versions of this Volume.

Description	Date
Wollondilly Local Flood Plan	February 1995

AMENDMENT LIST

Suggestions for amendments to this Volume should be forwarded to:

The Wollondilly Shire Local Controller

NSW State Emergency Service

PO Box 492, PICTON, NSW 2571

Amendments promulgated in the amendments list below have been entered in this Volume.

Amendment Number	Description	Updated by	Date

Document Issue: V2-10022014

1 THE FLOOD THREAT

1.1 LANDFORMS AND RIVER SYSTEMS

1.1.1 **The southern section** of the Hawkesbury-Nepean catchment is drained by the Wollondilly, Nattai, Wingecarribee and Cockbundoon Rivers. These streams flow northward traversing hilly to undulating country at an elevation of between 600-750 metres. The Wollondilly River flows into the Warragamba River which in turn flows into Lake Burragorang. This lake is formed by the Warragamba Dam.

1.1.2 T**he eastern section** of the Hawkesbury-Nepean catchment is in a high rainfall area and feeds the Nepean River. It has an area of around 1,800 square kilometres. It is bounded by the Illawarra escarpment which forms the headwaters of the Nepean River tributaries, the Avon, Cataract and Cordeaux rivers. These streams flow in a north-westerly direction and Dams have been constructed on all of them. The Nepean River joins the Warragamba River 3.5 kilometres below Warragamba Dam.

STONEQUARRY CREEK

1.1.3 Above Picton, Stonequarry Creek drains a significant catchment and is joined by a number of tributaries including Rumker, Matthews, Cedar, Crawford and Racecourse Creeks plus Scroggies and Long Gullies.

1.1.4 The catchment is bounded by Picton to the east, Thrilmere to the southeast and Razorback Range to the north. The total catchment area is 82.8km2.

NEPEAN RIVER - ABOVE MENANGLE

1.1.5 Immediately downstream of Nepean Dam, the Nepean River flows through steep gorge country for approximately 11.6km before being joined by the Cordeaux River at Pheasants Nest. From here it continues for another 30km in gorge country to the Menangle area. Although farming and development is widespread on the adjacent land, it is completely curtailed within the boundary of the gorge (1).

NEPEAN RIVER -BELOW COBBITY WEIR

1.1.6 Here the river flows through floodplain until it reaches Theresa Park Weir. In this reach it is joined by a number of tributaries - the more significant of which are Sickles Creek, Mount Hunter Rivulet and Wattle Creek. All of these streams can be affected by back-up flooding from the Nepean River (1).

1.1.7 From Theresa Park Weir the river flows through gorge country again for about 4km to Bent's Basin. The river valley then opens out for about 10km until just past Wallacia where it again narrows down to a short gorge before joining the Warragamba River (1).

1.2 STORAGE DAMS

1.2.1 Dam locations are shown on Map 2.

Table 1: Prescribed Dams in Wollondilly Shire LGA; summary of information about each storage.

Avon Dam (2)	
Owner / Operator	Sydney Catchment Authority
Description of Dam	Storage capacity of 214360 ML. No known deficiencies.
Location	Located on Avon River, approximately 97km southwest of Sydney
Communities Downstream	Approximately 500 properties are at risk in a Sunny Day failure at Camden (4 properties), Eldersie (406 residential properties, 5 commercial and 16 industrial), Menangle (24 properties), Narellan, Wallacia (2 properties). This includes Camden High/Primary School, Police Station, Showgrounds, Bowling Club, Private/Public Hospitals, Ambulance Station, Camden South Primary School. Aerodrome, Macarthure/Cowpasture/Macquarie Road Bridges, SES, Water, Sewerage Treatment Plant, Library, Council Chambers, Fire Station, Electricity Supply and Telecommunications in Camden. Caravan Park, Post Office, Fire Station in Elderslie. Post Office, Menangle Railway Station, Menangle Park Railway Station, South Western Freeway Bridge, Menangle Road Bridge, Southern Railway Bridge in Menangle. Sewerage Pumping Station and High School in Narellan. Blaxlands Crossing Bridge in Wallacia. Over 1600 residences would be inundated in a PMF dam failure.
Monitoring System	IICATS system and visual gauge board at the dam crest.
Warning System	White alert at FSL (320.18m AHD) + 1m and rising by >0.2m/h or FSL + 1.5m and rising. Amber alert at FSL + 2m and rising. Red alert at FSL + 3m ad rising.
Other	Time to start of rise is from 30 minutes, reaching velocities of greater than 7m/s and depths greater than 56.3m.

Brennan's Creek Dam (3)	
Owner / Operator	BHP Billiton – Illawarra Coal
Description of Dam	Storage 320 ML An embankment dam, of soft rock fill and upstream bituminous membrane. Approximately 17m high and 186m long. The dam crest flood has a peak outflow of 387m3/s, and can accommodate a 3500000 year ARI event without overtopping.
Location	2km south of Appin on Brennan's Creek.
Communities Downstream	Appin (Wollondilly LGA) - potentially 5 dwellings in Kennedy Street/Grove, Marhnyes Hole (public occupation place), 2 crossings on Brennans Creek within 1km of the dam, and road crossings at Lysaght Road and Blackburn Road on the Georges River.

Monitoring System	Visual inspection, and external Agency Advise
Warning System	A callout system (Whispir) is used to alert downstream residents
Other	Travel time to the Nepean River is 80minutes, where it is largely absorbed in the Menangle Weir Pool, reducing river rise to approximately 0.1m.

Broughtons Pass Weir (4)	
Owner / Operator	Sydney Catchment Authority
Description of Dam	Storage 50 ML FSL is 130.60m AHD. A PMF has a peak inflow/outflow of 3430m3/s and a surcharge of 7.09m over the spillway crest.
Location	Near Appin, on the Cataract River (meeting the Nepean River 7km downstream of the weir), approximately 60km south of Sydney, and 20km west of Bulli Pass.
Communities Downstream	Wollondilly, Camden, Penrith, Hawkesbury, Baulkham Hills - loss of life is not expected, however failure would have a significant impact on water supply (esp. to Macarthur Water Treatment Plant).
Monitoring System	Visual Inspections, seismic Alarm. IICATS alarms.
Warning System	Red alert may be issued at FSL + 7m and rising, or a structural integrity issue has occurred for a sunny day failure
Other	Travel time to Broughton Pass is approximately 45minutes and to Camden, approximately 2h 15 minutes, causing a maximum incremental flooding of 19.7m, and maximum velocities of 8.6m occurring at Broughtons Pass.

Cataract Dam (3)	
Owner / Operator	Sydney Catchment Authority
Description of Dam	Total storage capacity of 94,300 ML No known Deficiencies.
Location	Cataract Dam is located approximately 80 km south of Sydney, and 13 km west of the Bulli Pass
Communities Downstream	Broughtons Pass, Menangle (6 residential), Camden, Elderslie (90 residential, 1 commercial and 3 industrial), Narellan.. Over 1100 properties are at risk in a PMF dam break scenario.
Monitoring System	The dam has an Integrated Instrument Control Automation and Telemetry System (IICATS) which is monitored remotely from the Sydney Water System Operation Centre 24 hours per day
Warning System	White Alert FSL + 1.5m & rising ≥0.5m/hr OR FSL + 1.7m & rising. (FSL = 289.87m AHD) Amber Alert FSL + 2.0m & rising. (FSL = 289.87m AHD) Red Alert FSL + 2.5m & rising. (FSL = 289.87m AHD)
Other	Time to start of rise is from 20 minutes at Broughtons Pass, reaching velocities of greater than 7m/s and depths greater than 40.8m.

Cordeaux Dam (3)	
Owner / Operator	Sydney Catchment Authority
Description of Dam	The outlet works were recently upgraded to provide for emergency closure of the outlets under full flow conditions No known Deficiencies.
Location	Cordeaux Dam is located on Cordeaux River approximately 70 km South-West of Sydney
Communities Downstream	Menangle, Camden, Elderslie, Wallacia and Narellan. Up to 111 residential premises would be inundated in a sunny day failure in Camden/Elderslie, 6 in Menangle, 2 in Camden-Bents Basin, and 2 in Bents Basin- Wallacia.In a PMF failure, over 1300 residences would be inundated, and 50 commercial premises mostly in Argyle St Camden, and 10 industrial premises. The only access to Camden would be via Remembrance Drive to the South as Macarthur and Cowpasture Brides would be damaged or destroyed.
Monitoring System	The dam has an Integrated Instrument Control Automation and Telemetry System (IICATS) which is monitored remotely from the Sydney Water System Operation Centre 24 hours per day.
Warning System	White Alert FSL + 0.8m & rising ≥0.2m/hr OR FSL + 1.4m & rising. (FSL = 303.73m AHD) Amber Alert FSL + 2.0m & rising. (FSL = 303.73m AHD) Red Alert FSL + 2.7m & rising. (FSL = 303.73m AHD)
Other	Time to start of flood rise at Pheasants Nest is 30 minutes, with an hour to Menangle, where peak flood levels reach 78m AHD.

Nepean Dam (3)	
Owner / Operator	Sydney Catchment Authority
Description of Dam	Nepean Dam is a mass gravity cyclopean masonry dam, curved in plan. It has a catchment area of 31 850 ha. Nepean Dam is part of the network which provides Sydney's water supply, and is connected to the Avon Dam via the Nepean-Avon Tunnel. Water from the Avon and Nepean dams flow into the same river system approximately 12 km downstream of each dam. FSL of 70170 ML. No known deficiencies.
Location	It is located on the Nepean River, 100 km south-west of Sydney and upstream of Camden.
Communities Downstream	Immediate downstream valley damage to major road bridges, including two serving the F5 Freeway. No residents are affected in the immediate downstream area, as the flood is contained within the narrow gorge. Damages or destruction of 15 residences and the Southern railway line bridge downstream of Menangle. Severe damage to the commercial and residential areas of Camden. The flood peak reaches a depth ranging up to 6 m in the main shopping centre and up to 8 m over outer areas of the town. Approximately 2705 dwellings could be inundated in a PMF. Although damage to major road bridges may occur in the immediate downstream area, including two serving the F5 Freeway, no residents are affected until Douglas Park, as the flood is contained within the narrow gorge.
Monitoring System	The dam has an Integrated Instrument Control Automation and Telemetry System (IICATS) which is monitored remotely from the Sydney Water System Operation Centre 24 hours per day, as well as a pipeline monitoring system, and dam monitoring system. The Water Systems Operator also undertakes routine inspections of the dam. All measured parameters have a pre-set alarm level which triggers the initiation of emergency communications.
Warning System	WhiteFSL + 1.0 m and rising by ≥ 1.0m/hr OR FSL + 3.0 and rising (FSL = 317.17 m AHD) Amber FSL + 5.0 m AHD (FSL = 317.17 m AHD) Red FSL + 6.0 m AHD (FSL = 317.17 m AHD)
Other	There is an estimated 3 minutes for arrival to the Avon Dam Road, and 40 minutes for the peak to reach this location.

Warragamba Dam	
Owner / Operator	Sydney Catchment Auhtority
Description of Dam	This Warragamba Dam is able to safely pass the Probable Maximum Flood (PMF). FSL is 2057 000 ML (with a spillway crest of 116.72m AHD) No known deficiencies.

Location	Warragamba Dam is built across the Warragamba River, 3.4 km upstream of the Nepean River junction, 65 km West of Sydney. It is the primary water source for Sydney and the Blue Mountains. It has a catchment area of 9050km2 and impounds Lake Burragorang, which is fed by the Cox's and Wollondilly Rivers and their tributaries, the Kowmung, Nattai and Wingecarribee Rivers (3)
Communities Downstream	Approximately 4000 dwellings may be inundated if Warragamba Dam failed, and a further 6400 houses damaged.
Monitoring System	The dam has an Integrated Instrument Control Automation and Telemetry System (IICATS) which is monitored remotely from the Sydney Water System Operation Centre 24 hours per day, as well as a pipeline monitoring system, and dam monitoring system. The Water Systems Operator also undertakes routine inspections of the dam. All measured parameters have a pre-set alarm level which trigger the initiation of emergency communications.
Warning System	White Alert is FSL +9m and rising, Amber alert is FSL + 11m and rising, Red Alert is FSL + 13m and rising.
Other	Dam break travel time to Wallacia is approximately 5 hours, with a rise of approximately 10.8m and a velocity of 15.8m/s.

Wollondilly Washery (7)	
Owner / Operator	Burragorang Valley Coal Pty Ltd
Description of Dam	Storage 66 ML A water supply dam
Location	Burragorang Rd, Nattai. Six km west of Oakdale, and 26km west of Camden on an un-named creek
Communities Downstream	n/a
Monitoring System	Visual inspection.
Warning System	An emergency is defined as >50mm in 30 minutes, >100mm in 2 hours, >200mm in 8 hours, >300mm in 24 hours, earthquake, or otter incidents affecting the structural integrity.
Other	n/a

1.3 WEATHER SYSTEMS AND FLOODING

1.3.1 The occurrence of flooding in the valley is not linked to any particular seasonal pattern. The Hawkesbury-Nepean catchment displays wide variation in rainfall distribution. The annual average rainfall for the whole catchment is approximately 1000 millimetres however the annual average rainfall over the headwaters of the Nepean is 1500 millimetres while on the southern extremity of the basin near Goulburn the figure is about 625 millimetres. The majority of the rainfall occurs in the summer months but floods may be experienced during any part of the year.

1.3.2 There are many localities in the valley that have received 175 millimetres of rainfall in a 24 hour period. Falls in excess of 250 millimetres a 24 hour period have been recorded at Katoomba, Lawson, Springwood and Rylstone. It should be noted that these rainfall totals can often result from sustained falls of only 10-15 millimetres per hour and can produce severe floods.

1.3.3 The rainfall that produces severe flooding in the Hawkesbury-Nepean Valley will almost always come from East Coast Low Pressure Systems. These systems develop off the state's coast, usually during the cooler months, and direct moist winds onto the coast. Usually, but not exclusively, they move in a southerly direction. Orographic uplift of these air masses when they strike coastal ranges such as the Illawarra escarpment or the Great Dividing Range often produces very high rates of rainfall and heavy rain.

1.3.4 Several of the most severe floods experienced on the Hawkesbury-Nepean River have resulted from East Coast Low Pressure Systems. Among these was the flood of record in June 1867. More recently, flooding in 1964, 1978 and 1986 resulted from similar weather systems.

1.3.5 Several flood-producing East Coast Low Pressure Systems may be experienced annually in New South Wales. During the 1990s for example, there were between two and five such occurrences in most years. This can result in multiple flood events on the same river system within the same year.

1.4 CHARACTERISTICS OF FLOODING

1.4.1 The flood behaviour is generally flash flood in nature (occurring within 6 hours of rain falling).

1.4.2 Inundation is generally in the order of less than a day (10).

Table 2: Indicative Flow Travel Time for the Hawkesbury-Nepean River

Locations	Travel Time
Broughton Pass - Menangle	Approx. 4 hours
Pheasants Nest - Menangle	Approx. 3 hours
Menangle - Camden	Approx. 5 hours
Camden - Wallacia	Approx. 11 hours
Wallacia - Penrith	Approx. 2 hours

Stonequarry Creek

1.4.3 The concentration time for the catchment is short and heavy rainfall results in flash flooding along Stonequarry Creek as it flows through Picton.

1.4.4 Flash flooding occurs in the area of the bridge on Argyle Street in the centre of the Business District where about 20 premises can be affected by inundation. Some residential properties in Menangle Street West and Menangle Street can also be affected.

Nepean River – Above Menangle

1.4.5 The flood threat in this area is limited to the cutting of roads and bridges (1):

a. Douglas Park Drive can be cut at the Nepean Causeway by relatively low levels of flooding.

b. The Menangle Road Bridge deck height is 5.2 metres. This height signifies the start of Minor flooding for the area downstream of this bridge. The most severe flooding this century at the Menangle Bridge was in 1978 when the river peaked at a gauge height of just above 17.3 metres.

Nepean River – Below Cobbity Weir

1.4.6 Here the river flows through floodplain until it reaches Theresa Park Weir. In this reach it is joined by a number of tributaries - the more significant of which are Sickles Creek, Mount Hunter Rivulet and Wattle Creek. All of these streams can be affected by back-up flooding from the Nepean River.

1.4.7 From Theresa Park Weir the river flows through gorge country again for about 4km to Bent's Basin. The river valley then opens out for about 10km until just past Wallacia where it again narrows down to a short gorge before joining the Warragamba River.

1.5 FLOOD HISTORY

Nepean River – Below Cobbity Weir

1.5.1 Flooding has occurred in Picton in February 1956, October 1958, November 1959, November 1962, June 1964, November 1966, April 1969, March 1976 (where drainage overflow occurred due to 80mm of rain in 40 minutes), March 1983, August 1986 and June 2016 (11). Anecdotally the 1956 and 1969 floods are regarded as having the most amount of associated damage.

1.5.2 The flood problem along this section of the river may be illustrated by records for Camden and Wallacia (although these gauges are generally downstream). Some selected flood peaks are identified in table 1.

Table 3: Flood History at Camden and Wallacia

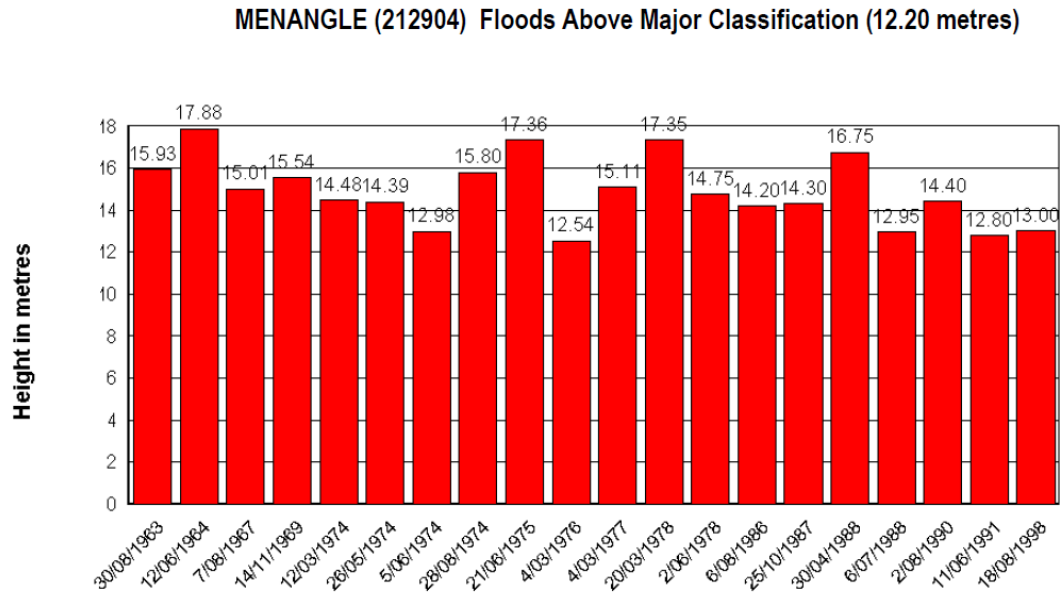
Year	Camden	Wallacia
1860	14.9	-
1867	14.02	-
1873	16.54	21.03 (approx)
1898	15.21	-
1949	12.62	-
1950	12.45	-
1952	11.28	-

1952	11.49	-
1956	12.42	-
1956	12.12	-
1961	12.67	15.24
1964	14.08	17.92
1969	11.01	-
1975	12.8	13.0 (approx)
1978	13.45	15.72
1986	9.8	-
1988	12.8	-

1.5.3 The adopted 1% AEP flood level for Camden is a gauge height of 16.54 metres or 72.2 metres AHD which is about the same as the 1873 Flood of Record. In Wallacia it is a gauge height of 17.95 metres or 44.5 metres AHD which is slightly higher than the most severe flood this century. The approximate height of the 1% flood at Menangle is 18.53, however should be approached with caution as this assumes the gauge zero is 58.47m (1% AEP level is 77m AHD).

1.5.4 Anecdotal evidence suggests that flooding was a frequent event in Picton prior to the construction of the railway viaduct. The creek contained many large boulders in the base of the gorge, which constricted the flow of floodwaters. The construction of the viaduct required sandstone to be quarried out of the side of the creek gorge. Once removed, the frequency of flooding in Picton dropped dramatically (1).

Figure 1: Flood History at Menangle above major classification



1.6 FLOOD MITIGATION SYSTEMS

1.6.1 In 1971, collapsible flood rails were installed on the Argyle Street Bridge in Picton to reduce the amount of debris trapped by floodwaters, reducing the flooding impacts upstream (1).

1.7 EXTREME FLOODING

1.7.1 A PMF would inundate, with the high hazard floodway affecting properties adjacent to Stonequarry Creek (2). The viaduct constricts outflows from the catchment causing high PMF levels (2).

1.7.2 Flood of record the water is said to have risen to approximately 1m above the Argyle St bridge, with waters extending as far as the old Westpac Bank building (now Arrow Office Supplies) (1).

1.7.3 For planning to be capable of being effective in all circumstances, it must take into account the worst floods that could occur. Information about the full range of possible flooding is obtained from scientific studies that have determined how bad the worst floods are likely to be. The greatest depth of rainfall possible over a given area in a nominated time period (eg 24hrs or 72hrs) is called the Probable Maximum Precipitation (PMP). The highest possible flood level is called the probable maximum flood (PMF).

1.7.4 For the Hawkesbury-Nepean Valley it is when the PMP distributed over the whole catchment in a 72 hour period that the greatest depth of flooding results i.e. the 72 hour PMF. The modelling for the 72 hour PMF in the Hawkesbury-Nepean Valley assumes the following conditions:

a. Full storage at the Warragamba Dam;

b. A fully saturated (wet) catchment;

c. Rainfall in the order of 770 millimetres across the Warragamba catchment in a 72 hour period (72 hour PMP). Note that this requires an average of only about 11 millimetres /hour.

1.7.5 A PMP in the Hawkesbury-Nepean Valley and the resulting PMF is estimated to have one chance in 100,000 each year of occurring. This means they are very rare events. Rainfall heavy enough to support the idea of PMP has been observed in various places around the world including Australia (Wollongong 1984 – 440 millimetres in 6 hours over a 100 square kilometre area). Flood records from around the world demonstrate that PMF events have occurred.

1.7.6 The PMP distributed over other time periods and the floods that would produce, have been modelled for the Hawkesbury-Nepean Valley. As an example, the PMP over a 24-hour period would cause flooding to occur more quickly because the river would rise faster but would not reach the same peak levels achieved in a 72 hour event.

2 EFFECTS ON THE COMMUNITY

2.1 COMMUNITY PROFILE

Table 4: Census of Housing and Population data (2011)

Census Description	Wollondilly (A)	Appin	Bargo	Buxton
Total Persons	**43,259**	**1,803**	**4,116**	**2,055**
Aged 0-4 yrs	3,171	154	275	182
Aged 5-14 yrs	6,815	292	659	403
Aged 65 + yrs	4,667	158	548	139
Of Indigenous Origin	1,036	42	95	73
Who do not speak English well	156	3	9	0
Have a need for assistance (profound/severe disability)	1,624	73	154	79
Living alone (Total)	2,245	73	283	119
Living alone (Aged 65+)	869	25	128	27
Residing in caravans, cabins or houseboats or improvised dwellings	164	3	40	0
Occupied Private Dwellings (Households)	**13,951**	**569**	**1,410**	**651**
No Motor Vehicle	463	9	59	20
Caravan, cabin, houseboat or improvised dwelling	91	3	31	0
Rented via State or Housing Authority	133	14	5	0
Rented via Housing Co-Op or Community Church Group	86	0	0	0
No Internet Connection	2,298	63	263	111
Unoccupied Private Dwellings	**1,087**	**21**	**115**	**56**
Average persons per occup dwelling	**3.0**	**3.1**	**2.8**	**3.1**
Average vehicles per occup dwelling	**2.2**	**2.2**	**2.2**	**2.0**

Census Description	Oakdale	Picton	Tahmoor	The Oaks
Total Persons	**1,910**	**4,363**	**4,459**	**2,439**
Aged 0-4 yrs	149	341	338	174
Aged 5-14 yrs	319	671	629	407
Aged 65 + yrs	185	495	578	232
Of Indigenous Origin	52	96	179	23
Who do not speak English well	6	6	27	3
Have a need for assistance (profound/severe disability)	85	152	216	84
Living alone (Total)	108	310	323	101
Living alone (Aged 65+)	49	115	140	27
Residing in caravans, cabins or houseboats or improvised dwellings	43	0	4	8
Occupied Private Dwellings (Households)	**628**	**1,469**	**1,572**	**777**
No Motor Vehicle	21	78	114	14
Caravan, cabin, houseboat or improvised dwelling	27	3	3	4
Rented via State or Housing Authority	0	38	68	0
Rented via Housing Co-Op or Community Church Group	0	15	24	0
No Internet Connection	133	247	336	108
Unoccupied Private Dwellings	**46**	**114**	**106**	**51**
Average persons per occup dwelling	**2.9**	**2.9**	**2.7**	**3.1**
Average vehicles per occup dwelling	**2.2**	**2.0**	**1.9**	**2.3**

Census Description	Thirlmere	Warragamba-Silverdale	Wilton	Yanderra
Total Persons	**3,086**	**4,675**	**1,445**	**683**
Aged 0-4 yrs	223	339	123	75
Aged 5-14 yrs	455	776	218	117
Aged 65 + yrs	452	395	119	57
Of Indigenous Origin	107	108	21	21
Who do not speak English well	26	9	6	3
Have a need for assistance (profound/severe disability)	206	161	21	35
Living alone (Total)	193	214	34	42
Living alone (Aged 65+)	81	70	3	10
Residing in caravans, cabins or houseboats or improvised dwellings	0	0	0	7
Occupied Private Dwellings (Households)	**1,017**	**1,471**	**458**	**216**
No Motor Vehicle	39	50	9	5
Caravan, cabin, houseboat or improvised dwelling	0	3	0	3
Rented via State or Housing Authority	0	0	0	0
Rented via Housing Co-Op or Community Church Group	32	0	3	0
No Internet Connection	184	242	54	39
Unoccupied Private Dwellings	**94**	**100**	**32**	**10**
Average persons per occup dwelling	**2.8**	**2.7**	**3.0**	**3.0**
Average vehicles per occup dwelling	**2.1**	**2.3**	**2.3**	**2.2**

Census Description	Douglas Park	Menangle	Couridjah	Mount Hunter
Total Persons	**1,469**	**507**	**1,386**	**808**
Aged 0-4 yrs	78	20	93	57
Aged 5-14 yrs	199	61	180	134
Aged 65 + yrs	139	171	173	76
Of Indigenous Origin	27	0	39	12
Who do not speak English well	6	0	9	0
Have a need for assistance (profound/severe disability)	63	72	32	15
Living alone (Total)	62	35	81	49
Living alone (Aged 65+)	15	26	25	12
Residing in caravans, cabins or houseboats or improvised dwellings	3	0	5	0
Occupied Private Dwellings (Households)	**459**	**164**	**479**	**248**
No Motor Vehicle	6	8	25	4
Caravan, cabin, houseboat or improvised dwelling	3	0	3	0
Rented via State or Housing Authority	0	0	0	0
Rented via Housing Co-Op or Community Church Group	0	3	8	0
No Internet Connection	57	26	101	39
Unoccupied Private Dwellings	**50**	**24**	**60**	**19**
Average persons per occup dwelling	**3.0**	**2.8**	**2.8**	**3.3**
Average vehicles per occup dwelling	**2.4**	**1.8**	**2.1**	**2.6**

2.2 SPECIFIC RISK AREAS - FLOOD

NEPEAN RIVER VALLEY

STONEQUARRY CREEK (PICTON)

2.2.1 Picton is a small historic town located approximately 80km south west of Sydney, and is the administrative centre of Wollondilly Shire.

2.2.2 It has a population of approximately 3400 (3). Sixteen percent of the population do not have access to the internet (3).

Cultural and Linguistic Diversity

2.2.3 Picton has a large proportion of aged person (11%) and persons aged under 14 (23%) (3). There are a small percentage of people who do not speak English well (0.1%) or have need for assistance (3.5%) (3).

Schools and childcare centres

2.2.4 The following schools and childcare centres are at risk of flooding and/or isolation.

a. **Schools**

- St Anthony's Catholic Primary School, Menangle Street, Picton – at risk of inundation from a 20% AEP flood (approximately 17.81m on the Menangle gauge) by up to 1.5m (2).

b. **Childcare centres**

- No childcare centres are at known risk of flooding.

Facilities for the aged and/or infirm

2.2.5 No facilities are at known risk of flooding and/or isolation.

Utilities and Infrastructure

2.2.6 No utilities or infrastructure are at known risk of flooding.

2.2.7 Caravan Parks are listed in Volume 3, Chapter 4 of this Local Flood Plan (SES Caravan Park Arrangements).

Classification of Floodplain

2.2.8 Rising Road Access up to and including the PMF (2).

Inundation

2.2.9 Although Picton has a gauge located in the town (212053), the Bureau provide warning to the Menangle gauge (212904).

2.2.10 Flash flooding occurs in the area of the bridge on Argyle Street in the centre of the Business District and surrounding residential area where about 20 premises can be affected by inundation (4), including Argyle St, Menangle St

and Menangle St West, Elizabeth St, Davies Pl, Coull St, Cliffe St, Barkers Lodge Rd and Picton Ave (1).

2.2.11 Some residential properties in Menangle Street West and Menangle Street can also be affected (4).

2.2.12 Approximately 58 residential and 48 commercial properties dwellings may be subject to inundation (14) with approximately 22 flooded overfloor in a 1% AEP flood (10).

Isolation

2.2.13 Isolation may occur if Stonequarry Creek Bridge and Victoria Bridge are inundated or damaged.

Characteristics of flooding

2.2.14 The concentration time for the catchment is short and heavy rainfall results in flash flooding along Stonequarry Creek as it flows through Picton.

2.2.15 The properties affected within Picton are generally within the high hazard area, however the properties to the south of Picton and to the West of Picton Road (Dunlop Rd, Hills St, Wild Street etc) are within the extreme hazard area (1).

Flood Mitigation Systems

2.2.16 In 1971, collapsible flood rails were installed on the Argyle Street Bridge in Picton to reduce the amount of debris trapped by floodwaters, reducing the flooding impacts upstream (1).

Dams

2.2.17 There is no known risk of dam failure in Picton.

2.2.18 There are a number of farm dams in the area, which are unlikely to have a significant impact on flooding.

Other Considerations

2.2.19 This area has a significant amount of agricultural land. This area has also been identified as having mine subsidence.

NEPEAN RIVER – ABOVE MENANGLE (MENANGLE, DOUGLAS PARK)

2.2.20 Douglas Park and Menangle are located immediately west of the Hume Highway approximately 80km southwest of Sydney.

2.2.21 The populations are approximately 1300 and 900 persons respectively (3), and approximately 130 people requiring assistance (4).

2.2.22 There is a significant proportion of people aged over 65 in Menangle (34%) (4).

Cultural and Linguistic Diversity

2.2.23 There are few cultural and linguistically diverse persons (<1%) in Menangle and Douglas Park (4).

Schools and childcare centres

2.2.24 There are no schools and childcare centres at known risk of flooding and/or isolation.

Facilities for the aged and/or infirm

2.2.25 There are no facilities are at known risk of flooding and/or isolation.

Utilities and Infrastructure

2.2.26 There are no utilities or infrastructure at known risk of flooding.

2.2.27 Caravan Parks are listed in Volume 3, Chapter 4 of this Local Flood Plan (SES Caravan Park Arrangements).

Classification of Floodplain

2.2.28 Rising Road Access.

Inundation

2.2.29 There is little inundation data available for Douglas Park and Menangle.

Isolation

2.2.30 The flood threat in this area is limited to the cutting of roads and bridges (4).

2.2.31 Douglas Park Drive can be cut at the Nepean Causeway by relatively low levels of flooding (4).

2.2.32 The Menangle Road Bridge deck height is 5.2 m. This height signifies the start of Minor flooding for the area downstream of this bridge. The most severe flooding this century at the Menangle Bridge was in 1978 when the river peaked at a gauge height of just above 17.3 m (4).

Characteristics of flooding

2.2.33 The concentration time for the catchment is short and heavy rainfall results in flash flooding.

Flood Mitigation Systems

2.2.34 Menangle Weir (and others) operates to control the flow of water and maintain riparian rights to landowners.

Dams

2.2.35 Properties are at risk in a Sunny Day failure of Avon Dam, Cataract Dam or Cordeaux Dam at Menangle (24 properties). This includes the Post Office, Menangle Railway Station, Menangle Park Railway Station, South Western Freeway Bridge, Menangle Road Bridge, Southern Railway Bridge in Menangle (2).

2.2.36 Failure of Cordeaux Dam could damage or destroy 6 residences, the South Western Freeway Bridge, the Southern Railway Line Bridge and Menangle Bridge downstream of Menangle (3).

Other Considerations

2.2.37 This area has a significant amount of agricultural land.

NEPEAN RIVER – BELOW COBBITY WEIR (THERESA PARK, BENT'S BASIN, WALLACIA)

2.2.38 Bent's Basin is located on the north eastern border of Wollondilly Shire.

2.2.39 Wallacia crosses over into Penrith City Council (for further details, refer to the Penrith Local Flood plan), and has a population of 1689 and approximately 570 occupied dwellings (5).

2.2.40 Theresa Park is located approximately 10km south of Wallacia.

Cultural and Linguistic Diversity

2.2.41 There are few persons that do not speak English well (10 persons). The most common languages to be spoken other than English at home are Italian and Arabic (19).

2.2.42 There is a significant number of households that do not have access to internet (121) (5).

2.2.43 Between 2.3% to 4.1% of the population (60 persons) require assistance with basic activities (19).

Schools and childcare centres

2.2.44 No schools or childcare centres are at known risk of flooding and/or isolation.

Facilities for the aged and/or infirm

2.2.45 No facilities are at known risk of flooding and/or isolation.

Utilities and Infrastructure

2.2.46 The Wallacia STP is above the PMF flood level however there are some potential flood impacts to the sewage pipelines and pumping station (21).

2.2.47 It is also possible that electricity, telephone and mobile phone services will be impacted.

2.2.48 Caravan Parks are listed in Volume 3, Chapter 4 of this Local Flood Plan (SES Caravan Park Arrangements).

Classification of Floodplain

2.2.49 The majority of the area has rising road access (5).

2.2.50 Properties located on Greenfields Place and McKee Road may become low trapped perimeters, where able bodied people may be able to escape by climbing hills to the west (3).

Inundation

2.2.51 Properties along Bent's Basin Road, McKee Road, Terry Road, Wattle Creek Road, Belle Anglea Dr are at risk of flooding within a 1% AEP flood, and Taylor Place and Stanhope Road within the PMF (5).

2.2.52 During a PMF most properties along Bents Basin Road are expected to be flooded.

Isolation

2.2.53 A number of properties may be isolated by major flooding (4). Bents Basin Road is cut early during flooding near its junction with Silverdale Road, as well as various other locations isolating all properties along this road to the south.

Characteristics of flooding

2.2.54 The concentration time for the catchment is short and heavy rainfall results in flash flooding.

Flood Mitigation Systems

2.2.55 Warragamba Dam has a mitigating effect on downstream areas.

2.2.56 Cobbity Weir (and others) operates to control the flow of water and maintain riparian rights to landowners.

Dams

2.2.57 There are five dams that could potentially impact upon the floodplain should they fail. However all dams have been built to withstand a probable maximum flood and dam failure is considered unlikely (12) (22) (23) (7) (8).

2.2.58 The floodplain is located upstream of the Warragamba River and Warragamba Dam. However, failure of Warragamba dam would result in a flood wave travelling 8km upstream along the Nepean River and impacting the area (8).

2.2.59 Nepean Dam is located approximately 94km upstream. If Nepean Dam were to fail the dam break flood wave could potentially reach the Wallacia floodplain but would diminish downstream of this (7).

2.2.60 Avon Dam is located approximately 99km upstream. Failure of the Avon Dam during a PMF could potentially result in parts of the Wallacia floodplain being flooded affecting around 30 properties (12).

2.2.61 Cataract Dam is located around 80 km upstream. Failure of the Cataract Dam during a PMF could result in flooding of the Wallacia Floodplain, however by this time the dam break flood wave will have substantially dissipated (22).

2.2.62 Cordeaux Dam is located around 106 km upstream of Wallacia. Failure of the Cordeaux Dam during a PMF could potentially flood parts of the Wallacia floodplain but it is unlikely that any property would be affected (23).

2.2.63 Properties are also at risk in a Sunny Day failure of Avon Dam, Cataract Dam or Cordeaux Dam between Bents Basin and Wallacia (2 properties) including the Blaxlands Crossing Bridge in Wallacia (2).

Other Considerations

2.2.64 Refer to the Hawkesbury-Nepean State Flood Plan for further information.

2.2.65 This area has a significant amount of agricultural land.

2.3 ROAD CLOSURES

2.3.1 Table 5 lists roads liable to flooding in the Wollondilly Shire LGA, shown on MAP 2 - Picton Town Map.

Table 5: Roads liable to flooding in Wollondilly Shire LGA.

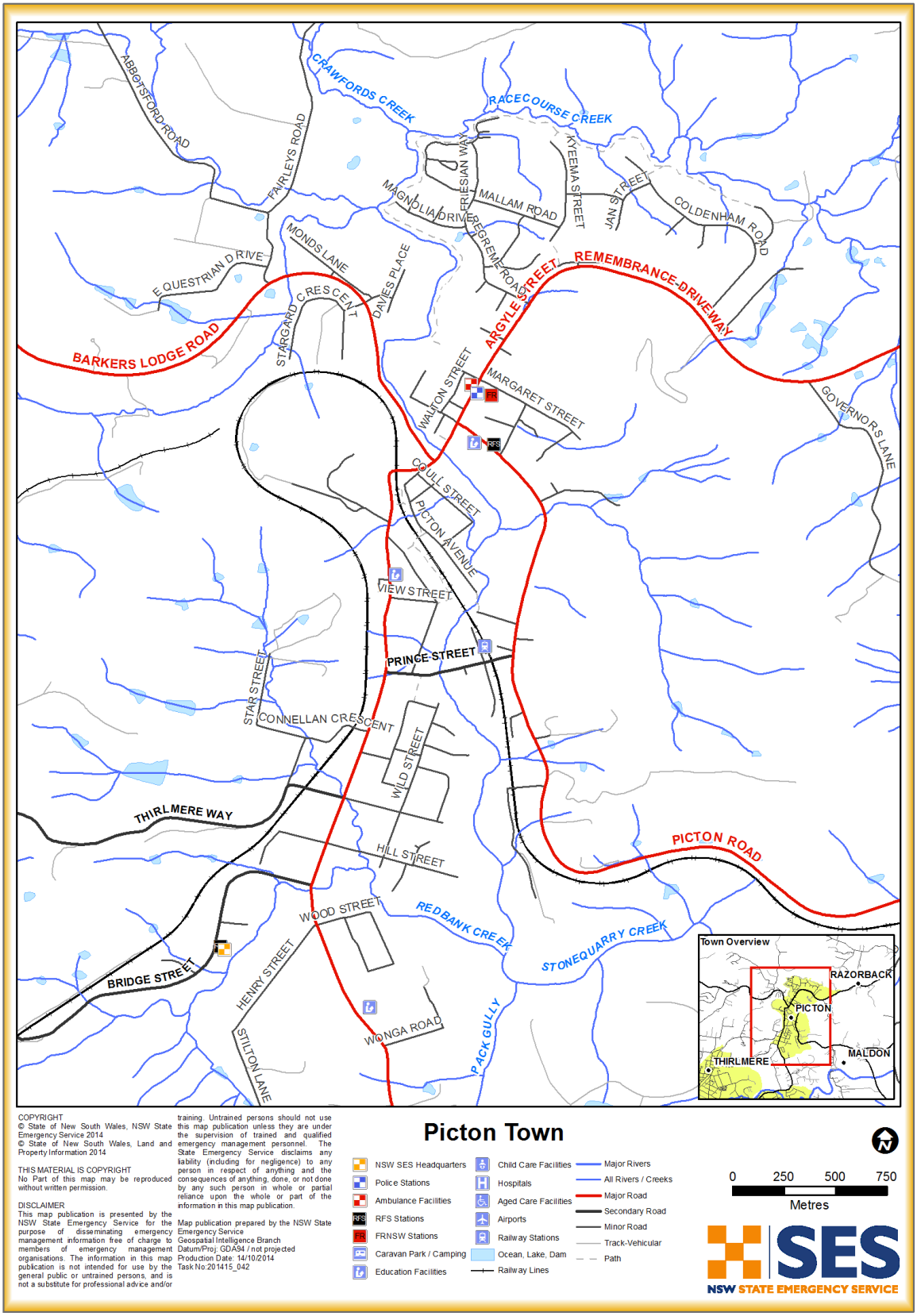
Road	Closure location	Consequence of closure	Alternate Route	Indicative gauge height
	Menangle Bridge	Impacting local traffic	Via M5 or Camden	n/a
Douglas Park Drive	Nepean Causeway	Impacting local traffic	Via Hume Highway	2.5m
Burragorang Road	Mount Hunter Rivulet	Impacting local traffic	Via Camden Bypass	n/a
Werombi Road	Mount Hunter Rivulet at Theresa Park	Impacting local traffic	Via Brownlow Hill and Silverdale Road	n/a (below 1% AEP/18.53m)

2.4 SUMMARY OF ISOLATED COMMUNITIES AND PROPERTIES

2.4.1 Although limited isolation is expected, information presented here may not reflect the duration of isolation expected in larger and extreme events.

MAP 1 - HAWKESBURY-NEPEAN RIVERBASIN

MAP 2 - PICTON TOWN MAP



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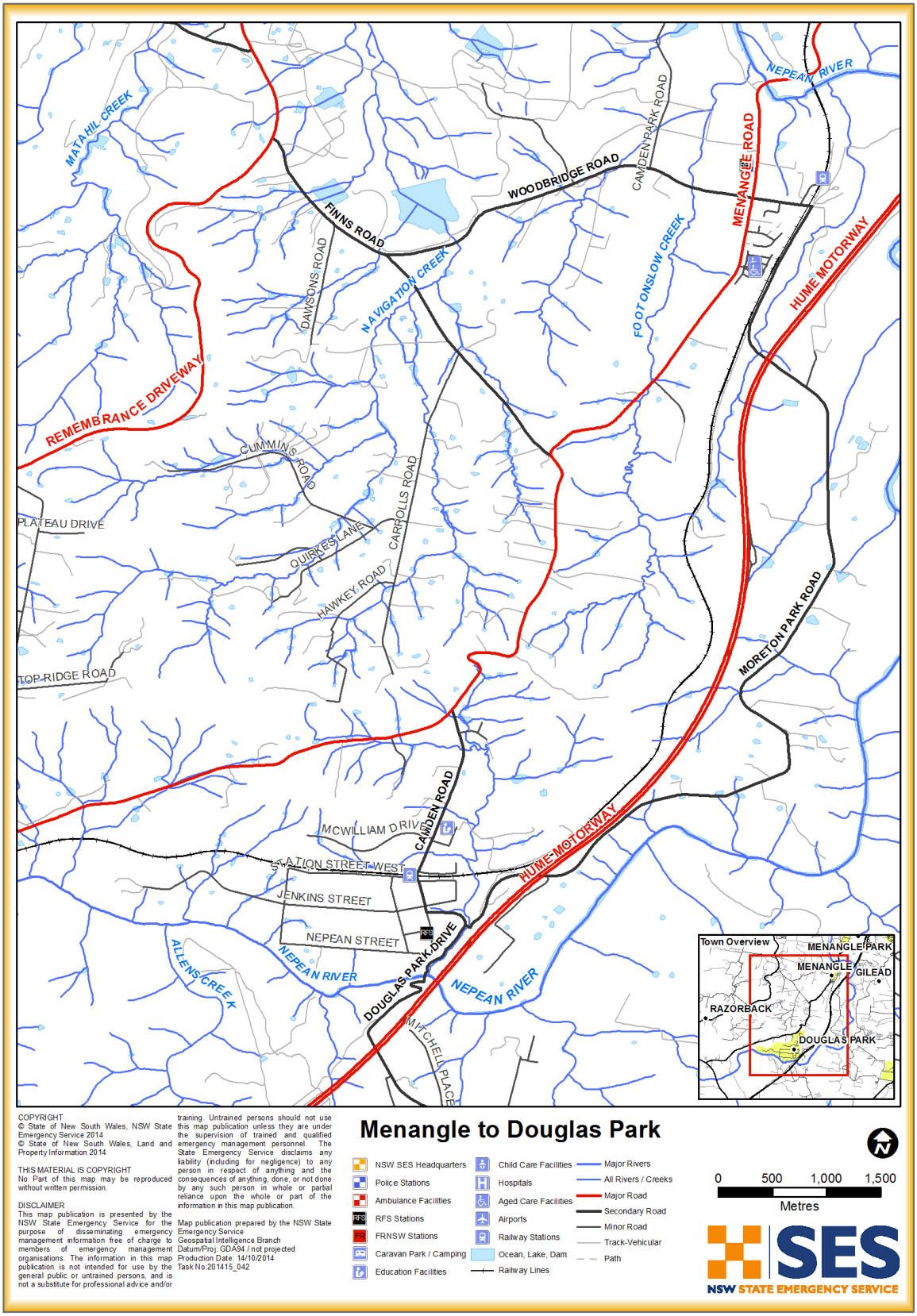
MAP 3 - MENANGLE AND DOUGLAS PARK TOWN MAP



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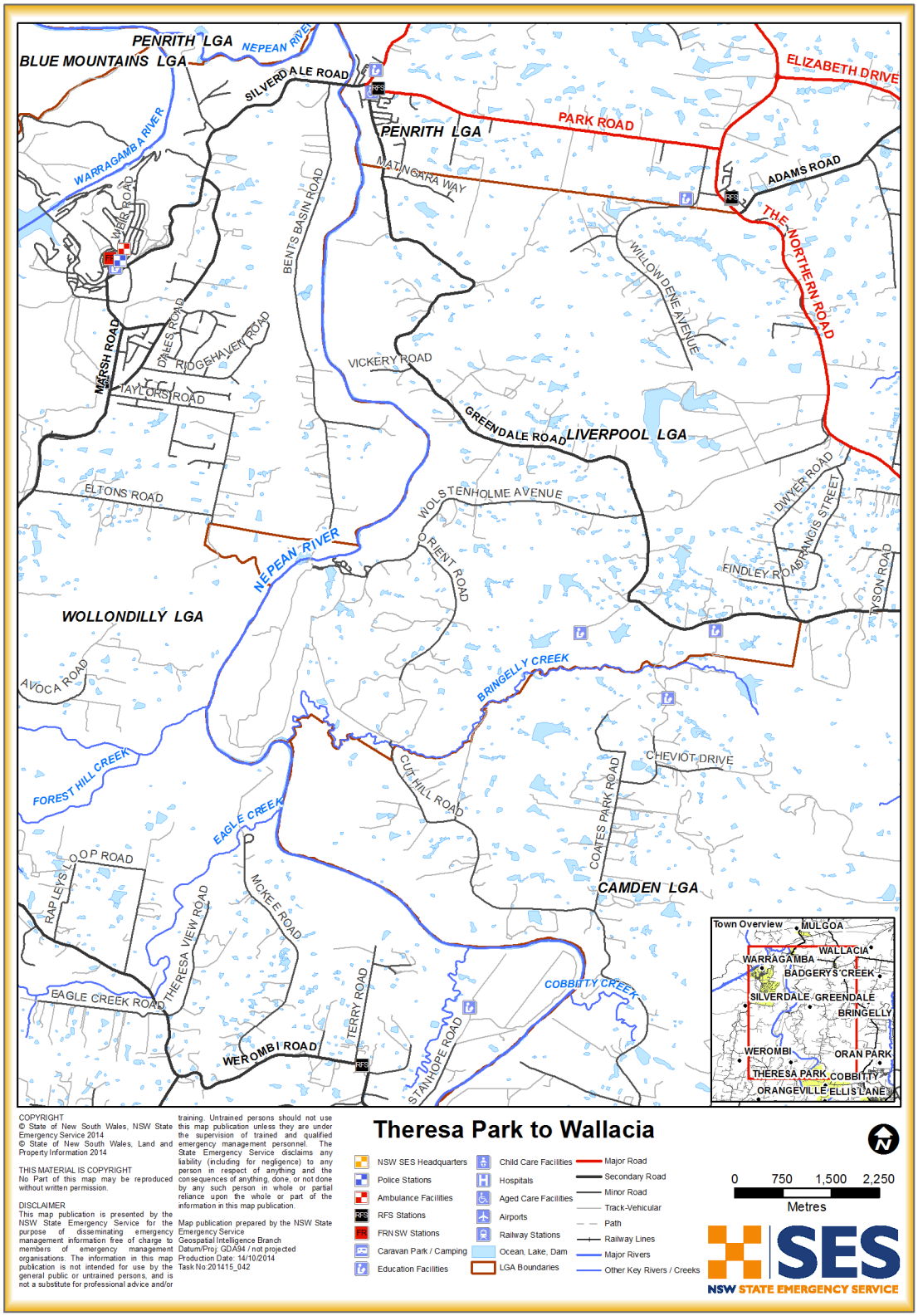
Production Date: 14/10/2014
Task No:201415_042

MAP 4 - THERESA PARK TOWN MAP



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