NSW STATE EMERGENCY SERVICE

Gwydir Shire

Local Flood Emergency Sub Plan

FloodSafe

GWYDIR SHIRE FLOOD EMERGENCY SUB PLAN

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

Volume 1 of the Gwydir Shire Regional Flood Emergency Sub Plan

Version 3.0

AUTHORISATION

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

Authorised

Signature: _____

NSW SES Local/Unit Commander

Print Name: Peter O'Brien

Date: 3 10 23

Endorsed

Signature: _____

Chair, Local Emergency Management Committee

Print Name: DAVID COULTON

Date: 2 - 10 - 23

VERSION HISTORY

Version Number	Description	Date
1.0	Gwydir Shire Interim Local Flood Pan	December 2010
2.0	Gwydir Shire Local Flood Plan	January 2013
3.0	Gwydir Shire Local Flood Plan	October 2023

AMENDMENT LIST

Suggestions for amendments to this plan should be forwarded to:

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

Amendment Number	Description	Updated by	Date
01	Update of references to 'Flood Development Manual' – replaced with 'Flood Risk Management Manual'	Melissa Lloyd	
02	Update of wording in section 5.4 relating to flood warnings, to reflect the change to the Australian Warning System	Melissa Lloyd	
03	Update of wording from 'DPIE' to 'DPE'	Melissa Lloyd	
04	Recovery Operations – updated 6.22 reference from Resilience NSW to NSW Reconstruction Authority	Melissa Lloyd	
05	Insertion of text under Section 5.9.4 - "The roles and responsibilities for Agriculture and Animal Services are outlined in the Agriculture and Animal Services Functional Area Supporting Plan."	Melissa Lloyd	

DISTRIBUTION LIST

Available for general use and distribution on the NSW State Emergency Service website

www.ses.nsw.gov.au

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 Gwydir 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 to the Gwydir Shire 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 Gwydir Shire 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 Gwydir Shire LGA. The Gwydir Shire LGA and its principal towns, villages, rivers and creeks are shown in Appendix A.

1.4.2 The Council area is in the NSW SES North Western Zone and for emergency management purposes, is part of the New England Emergency Management Region.

1.4.3 The plan sets out the Gwydir Shire level emergency management arrangements for prevention, preparation, response and initial recovery for flooding in the Gwydir Shire LGA.

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

1.4.5 This plan outlines the local level arrangements for the management of downstream consequences of flooding due to 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 Emergency 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 an 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.

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 NSW State EMPLAN and NSW State Flood Sub Plan.

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

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

a. The NSW SES Incident Controller (for local or zone level responsibilities during response operations).

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

1.8 PLAN MAINTENANCE AND REVIEW

1.8.1 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. Conduct a minimum of one exercise every five years or within two years of the plan being reviewed.

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 recommendations from after action reviews, reports, or inquiries.
- As determined by the NSW SES Commissioner.

d. The plan is to be reviewed no less frequently than every five years or after a significant flood event.

1.9 SUPPLEMENTARY DOCUMENTS

1.9.1 Supplementary and supporting material of the Local Flood Emergency Sub Plan is maintained on the NSW SES website at: https://www.ses.nsw.gov.au/about-us/flood-storm-and-tsunami-plans/ including:

a. Flood Plan Glossary.

b. NSW SES 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 NSW SES maintains information on the nature of flooding and effects of flooding on the community in the Gwydir Shire LGA. This is outlined in Volume 2 – Hazard and Risk in Gwydir Shire.

2.1.2 Declared dams in or upstream of the Gwydir Shire Local Government Area.

Dam Name	Owner	High Risk Dam
Copeton Dam	Water NSW	No

3 PREVENTION/ MITIGATION

3.1 INTRODUCTION

3.1.1 The Flood Risk Management 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 flood 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:** Effective land use planning is a key focus for minimising the impacts of flooding. NSW SES will work with land use planning and consent authorities to inform and influence the consideration of the risks arising from flood, storm

and tsunami, 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 to life and/or property due to flooding.

b. NSW SES will provide responses to land use planning proposal referrals that have or will create significant flood risk to life and/or property due to flooding.

3.3 FLOODPLAIN RISK MANAGEMENT

3.3.1 **Strategy**: Advocate for consideration of emergency management in decision making to reduce risks to the existing community and minimise the growth in future, continuing and residual risk due to development through input to the flood 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.

b. NSW SES will provide advice, support, technical resources and training for NSW SES representatives to contribute effectively on local Flood risk 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 Emergency Sub Plans.

Actions:

a. Develop and review this NSW SES Local Flood Emergency Sub Plan as required. Local Flood Emergency Sub Plans outline the specific arrangements for management of flood events within an LGA, and may include cross boundary arrangements.

b. Review plans as per Section 1.8.

4.2.2 Local EMPLAN Consequence Management Guides (CMG's) for flood are not required for communities covered by NSW SES Local Flood Emergency Sub Plans however may be utilised in place of Local Flood Emergency Sub Plan if agreed to by NSW SES.

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.

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 NSW State Flood Plan (see Section 1.9). Gauges of relevance within the Gwydir Shire LGA are also listed in Volume 3 of this plan.

c. NSW SES will recommend new warning services and changes to warning alert levels for gauges to the NSW and ACT 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. Dam Owners will provide Dam Emergency Plans (where required) and consult with NSW SES on alert levels and messaging. Alert level definitions are listed in Dam Emergency Plans.

f. NSW SES maintains a dedicated dam failure hotline and procedures to ensure priority dissemination of dam failure warnings.

g. NSW SES develops and maintains warning and flood information products by:

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

- Participating in the development of public information and warning systems.

h. Gauge owners adequately maintain flood warning gauges and systems, including those identified in the 'Service Level Specification' maintained by the Australian Bureau of Meteorology (Bureau) and those identified in the 'Provision and Requirements for Flood Warning in New South Wales' maintained by NSW SES.

4.5 BRIEFING, TRAINING AND EXERCISING

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

Actions:

a. NSW SES will consult stakeholders throughout the development of plans.

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

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

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

e. NSW SES will regularly brief stakeholders on the exercise arrangements contained in the NSW Flood Emergency Sub Plan.

4.6 COMMUNITY RESILIENCE TO FLOODING

4.6.1 **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.

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

Actions:

a. Partners with and engage 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.

e. Collaborate with community sector and recognise the needs of individuals within communities who have an increased susceptibility during floods.

5 RESPONSE

5.1 INTRODUCTION

5.1.1 Flood response operations will begin:

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

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

c. On receipt warnings for flash flood; or

d. On receipt of a dam failure alert; or

e. 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 NSW.

Actions:

a. 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 (or delegate) will appoint Incident Controllers and establish Incident Control Centres (see NSW SES facilities on map in Appendix A).

d. The NSW SES Incident Controller, in consultation with participating supporting emergency services and functional areas will determine the appropriate breakdown of an Area of Operations into Divisions and/or Sectors in accordance with the principles of AIIMS.

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 Request for Assistance (RFA) tasking and ensure they are actioned in a timely manner.
- Undertake response planning and determine future resourcing requirements.

- Coordinate information flow, including warnings, public information and social media.

5.2.3 **Strategy**: Provide effective liaison between 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 Centre(s) and/or Emergency Operation Centres (EOC) as required.

b. NSW SES will provide Liaison Officer(s) to

c. EOC as required.

d. Where possible EOC to be co-located with NSW SES Incident Control Centres for Flood Emergency Response.

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-deploying of resources.

b. 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 utilised, communicated and collected during and post 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 and Council 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 Emergency Operations Centre (EOC) report, or direct from agencies where an EOC has not been established.

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

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.

e. NSW SES may request Engineering to assist with the gathering of flood intelligence including (not limited to) maximum flood extents, peak flood heights, recording major flood damage at key high velocity locations and preparation of After-Flood Report.

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

Action: NSW SES will use flood intelligence, official forecasts, warnings, and flood scenario products 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 Bureau issues public weather and flood warning products before and during a flood. These may include:

- Severe Thunderstorm Warnings – Detailed - issued for all capital cities and surrounding areas when individual severe thunderstorms are within range of the capital city radars.
- Severe Thunderstorm Warnings - Broad-based - issued for the entire Australian State or territories affected highlighting broad areas where severe storms may occur within the next 3 hours.
- Severe Weather Warnings with reference to heavy rainfall and/or storm surge.
- Flood Watches.
- Flood Warnings.

b. Dam Owners will utilise the Dam Emergency Plan to provide warnings and information to NSW SES and communities (where appropriate).

c. NSW SES Incident Controllers will issue the following NSW SES Flood Warnings aligning to the Australian Waning System:

- Advice.
- Watch and Act.
- Flood Bulletins.
- Emergency Warning

d. NSW SES liaises with the Bureau to discuss the development of flood warnings as required.

e. NSW SES provides alerts and deliver flood information to affected communities using a combination of public information.

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.
- Transport for NSW 'Live Traffic' website: www.livetraffic.com or 'Transport InfoLine': 131 500. VMS messaging on roadways may also be used to advise motorists.

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

i. The Disaster Welfare Assistance Line will be established by Disaster Welfare Services where required to provide information on welfare services and assistance. Assistance line contact details will be broadcast once Disaster Welfare Services commence.

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, feasible and safe to do so) in:

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

b. The raising 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. Gwydir Shire Council will coordinate the closure and reopening of council managed roads once inspections have been carried out by the relevant authority.

b. Transport for NSW will coordinate the closure and reopening of the state road network.

c. NSW Police Force may close and re-open roads but will normally only do so if the Gwydir Shire Council or 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.

Actions:

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 suitable 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 of this NSW SES local Flood Emergency Sub 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, utility services and lifelines.

Actions:

a. The Transport Services Functional Area is to coordinate the provision of information about the assessment and restoration of transport network infrastructure.

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 Public Safety Network.

d. The Engineering Services Functional Area is to:

- Coordinate the assessment and restoration of critical public buildings for example hospitals.
- Assessment and operation of flood protection levees.
- Protection of property.
- Construction and repair of levees.
- Dam safety assessment and dam stability.
- Water supply and sewerage operations.
- Other critical infrastructure.

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

5.8 EVACUATION

5.8.1 Evacuation is 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 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.
- Evacuation of people where essential energy and/or utility services are likely to fail or where buildings have been or may be made uninhabitable.

b. 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.
- The ability for existing levees or other flood protection works to fulfil their intended function.
- Time available for evacuation.
- Evacuee management requirements.
- Resources and delivery of evacuation information.
- Length of isolation.

c. NSW SES Incident Controllers, planning and intelligence officers will carefully consider the risks involved in conducting evacuations.

d. All evacuation decisions will be made as per the current NSW SES policies and procedures, and consistent with the NSW Evacuation Management Guidelines.

e. Potential Evacuation Centres are located in Volume 3 / Local EMPLAN.

f. 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 and or locations 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 Commissioner (or delegate) will warn communities to prepare for a possible evacuation, where circumstances allow such lead time.

c. The NSW SES Commissioner (or delegate) 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 the local EMPLAN and supporting plans.

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

f. School administration offices (Government and Private) will coordinate the evacuation of schools in consultation with 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 Emergency Warning will be referred to 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. NSW SES will brief the Welfare Services Functional Area at the earliest opportunity regarding the level of assistance required.

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

c. Schools Administration (Government and Private) will manage the safety of students directly affected by flooding and will work with NSW SES in the temporary closure of schools and will coordinate with NSW SES, Transport and Welfare Services in the management of school evacuees.

d. Disaster Victim Registration will be controlled and coordinated by NSW Police Force with the assistance of NSW SES and the 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.

g. The decision to establish Major Evacuation Centres or Mass Care Facilities will be made by 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 the Health Services Functional Area.

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

Actions:

a. The 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.

b. The Agriculture and Animal Services Functional Area role will coordinate the 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.

The roles and responsibilities for Agriculture and Animal Services are outlined in the *Agriculture and Animal Services Functional Area Supporting Plan*.

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 NSW State 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 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 NSW SES. Notification arrangements with NSW Police Force are outlined in the State Rescue Board NSW State Rescue Policy.

d. Rescue agencies will conduct rescue of domestic small and large animals as per the State Rescue Board NSW State 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 the 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 support the delivery of 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.

g. NSW SES may conduct resupply operations as per the designated resupply plan for the event.

h. Where additional supplies are required Engineering Services Functional Area be requested to coordinate the supply of goods and services in response to and recovery from the emergency.

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.

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

5.12 RETURN

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

Actions:

a. The 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 ongoing risk to public safety.

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

- Not suitable for access; or
- Limited access by emergency services and response agencies; or
- Limited access by residents and/or business operators; or
- Full access.

c. The NSW SES Incident Controller will issue an 'Advice Warning advising "Reduced threat: Return with Caution" when the immediate danger to life and property has passed for areas.

d. 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:

- There is a reduced likelihood of additional flooding within the Area of Operation and flood waters have receded.
- All requests for assistance related to the flood have been completed.
- The need for warning and evacuation no longer exist.
- There is no further likelihood 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).
- All affected areas have had an 'Reduced Threat: Return with Caution' 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, Welfare Services and Gwydir Shire Council representatives.

b. NSW SES will conduct After Action Reviews, at the conclusion of response operations, which will involve all stakeholders. Findings will be shared and incorporated into improved disaster resilience planning.

c. NSW SES will provide information and data throughout the emergency response to inform community recovery. A report will be developed at the request of the SERCON at the conclusion of the response within an area. Should a response summary report be required it will include the following:

- The emergency action plan in place at conclusion of the response emphasising any continuing activities including community meetings/ engagement activities.
- Resources allocated to the emergency response and associated exit strategies.
- Details of any areas or situations with potential to re-escalate the emergency.
- A recommendation for the conclusion of NSW SES as lead agency to transition to NSW Reconstruction Authority as the lead agency for Recovery.
- Any actions that are incomplete or outstanding.
- Damage Assessment Data and Information obtained throughout the response phase which will further support the long-term recovery of communities.

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 works with relevant stakeholders and Gwydir Shire Council(s) 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 NSW State EMPLAN and as further detailed in the NSW Recovery Supporting Plan.

6.2 NSW SES RECOVERY ROLE

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

6.2.2 **Actions**:

a. NSW SES will provide representation to Recovery Committees as required and may have an ongoing role in the Recovery phase.

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 and or expert.

c. NSW SES will provide information to NSW Reconstruction Authority to support applications to Treasury for Natural Disaster Relief and Recovery Arrangements.

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

e. NSW SES and where required supporting agencies will assist with clean-up operations after floods, where possible when resources and personnel permit.

f. NSW SES may coordinate immediate relief in collaboration with SEOCON and SERCON.

7 ABBREVIATIONS

For a full list of abbreviations refer to the NSW State Flood Plan - Abbreviations

8 GLOSSARY

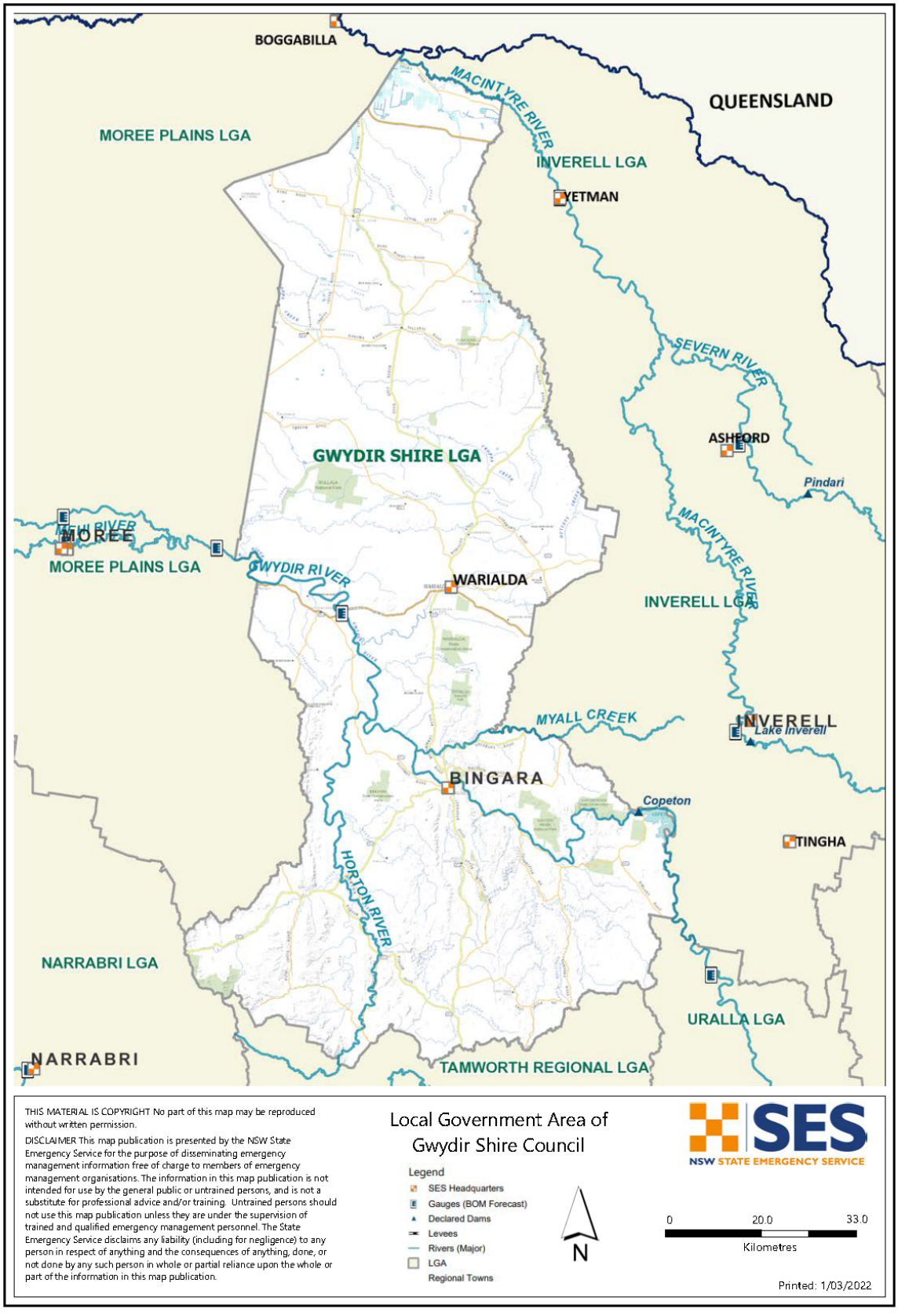
Common emergency service terminology can be found within the Australian Disaster Resilience Glossary.

Readers should refer to EMPLAN Annex 9 – Definitions.

Refer to the NSW State Flood Plan for a complete glossary of terminology used throughout this plan and within NSW SES Flood Plans.

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

9 Appendix A – Map of Gwydir Shire Council Area



10 Appendix B – Roles and Responsibilities

AGENCY	RESPONSIBILITIES
NSW State Emergency Service	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 outlined in the NSW 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 and NSW State Flood Plan.
Australian Government Bureau of Meteorology	The roles and responsibilities for the Australian Government Bureau of Meteorology are outlined in the NSW State Flood Plan.
Caravan Park Proprietor(s)	• Prepare a flood emergency plan for the Caravan Park. • 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. – 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. – Prepare for evacuation and movable dwelling (cabins) 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. • Inform 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.
Childcare Centres and Preschools	• When notified of possible flooding or isolation, childcare centres and preschools should. – Liaise with NSW SES and arrange for the early release of children whose travel arrangements are likely to be disrupted by flooding and/or road closures. – Assist with coordinating the evacuation of preschools and childcare centres.
Dams Safety NSW	The roles and responsibilities for 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).
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 NSW SES of any need to disconnect power/gas/water/wastewater supplies or of any timetable for reconnection. – Advise 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 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 and NSW State Flood Plan.
Environmental Services Functional Area	The roles and responsibilities for Environmental Services are outlined in the Environmental Services (ENVIROPLAN) Supporting Plan.

Floodplain Management Australia	The roles and responsibilities for Floodplain Management Australia are outlined in the NSW State Flood Plan**.**
Fire and Rescue NSW	The roles and responsibilities for Fire and Rescue NSW are outlined in the NSW State Flood Plan.
Forestry Corporation of NSW	The roles and responsibilities for Forestry Corporation of NSW are outlined in the NSW State Flood Plan.
Gwydir Shire Council	**Preparedness** • Establish and maintain floodplain and coastal risk management committees and ensure that key agencies are represented. • Develop and implement flood risk management plans in accordance with the NSW Government's Flood Prone Land Policy and the Flood Risk Management Manual. • Provide levee studies, flood studies and flood risk management studies to NSW SES. • 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 NSW SES with flood operations including: – Traffic management on council managed roads. – Provision of assistance to 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. – Technical advice on the impacts of flooding. – Close and reopen council roads (and other roads nominated by agreement with Transport for NSW) and advise NSW SES, NSW Police Force and people who contact the council for road information. – Assist 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 domestic pets and companion animals of evacuees during evacuations. • Operate flood mitigation works including critical structures such as detention basins and levees and advise NSW SES regarding their operation. • Manage and protect council-owned infrastructure facilities during floods. • Provide advice to 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 Authority of any sewerage overflow caused by flooding. • Work with NSW SES and NSW Department of Planning and Environment 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.
Health Services Functional Area	The roles and responsibilities for Health Services are outlined in the Health Services (HEALTHPLAN) Supporting Plan and NSW State Flood Plan.
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.
Marine Rescue NSW	The roles and responsibilities for Marine Rescue NSW are outlined in the NSW State Flood Plan.
NSW Ambulance	The roles and responsibilities for NSW Ambulance are outlined in the Health Services (HEALTHPLAN) Supporting Plan and NSW State Flood Plan.
NSW Department of Education, Association of Independent Schools of NSW, and National Catholic Education Commission	The roles and responsibilities for NSW Department of Education, Association of Independent Schools of NSW, and National Catholic Education Commission are outlined in the NSW State Flood Plan.

NSW Department of Planning and Environment (Environment and Heritage Group)	The roles and responsibilities for NSW Department of Planning and Environment (Environment and Heritage Group) are outlined in the NSW State Flood Plan (referred to as DPIE EES).
NSW Department of Planning and Environment (Water)	The roles and responsibilities for NSW Department of Planning and Environment (Water) are outlined in the NSW State Flood Plan.
NSW Food Authority	The roles and responsibilities for NSW Food Authority are outlined in the Food Safety Emergency Sub Plan.
NSW National Parks and Wildlife Services	The roles and responsibilities for NSW National Parks and Wildlife Services are outlined in the NSW State Flood Plan.
NSW Police Force	The roles and responsibilities for NSW Police Force are outlined in the NSW State Flood Plan.
NSW Reconstruction Authority	The roles and responsibilities for NSW Reconstruction Authority are outlined in the NSW State Flood Plan.
NSW Rural Fire Service	The roles and responsibilities for NSW Rural Fire Service are outlined in the NSW State Flood Plan.
Owners of Declared Dams within or upstream of the LGA	The roles and responsibilities for Owners of Declared Dams are outlined in the NSW State Flood Plan.
Public Information Services Functional Area	The roles and responsibilities for Public Information Services are outlined in the Public Information Services Supporting Plan and NSW State Flood. Plan**.**
SEOCON/SEOC	The roles and responsibilities for the SEOCON/SEOC are outlined in the NSW State Flood Plan**.**
Surf Life Saving NSW	The roles and responsibilities for Surf Life Saving NSW are outlined in the NSW State Flood Plan.
Telecommunications Services Functional Area	The roles and responsibilities for Telecommunications Services are outlined in the Telecommunications Services (TELCOPLAN) Supporting Plan.
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 in conjunction will assist NSW SES with the evacuation of at-risk communities by maintaining access and egress routes. • Assist NSW SES with the communication of flood warnings and information provision to the public through Live Traffic and Social Media according to the VMS protocols and procedures.

	• Assist NSW SES with identification of road infrastructure at risk of flooding.
Transport Services Functional Area	The roles and responsibilities for Transport Services are outlined in the Transport Services Functional Area Supporting Plan and NSW State Flood Plan.
VRA Rescue NSW	The roles and responsibilities for VRA Rescue NSW are outlined in the NSW State Flood Plan.
Water NSW	The roles and responsibilities for Water NSW 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 and NSW State Flood Plan.

11 Appendix C – Community Specific Roles and Responsibilities

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. • Be involved in local emergency planning processes. **Recovery** • Assist with community clean-up if required and able to do so. • Participate in After Action Reviews if required.
Aboriginal organisations or groups	• Act as the point of contact between NSW SES and the Kamilaroi community. • Inform the NSW SES Unit Commander about flood conditions and response needs. • Disseminate flood information, including flood and evacuation warnings, to the Kamilaroi community. • Moree Local Aboriginal Land Council LALC – 02 6751 1127
Cross-border assistance arrangement	• A local cross-border mutual assistance arrangement exists in which the NSW SES Gwydir Shire Units and the Goondiwindi SES Unit (Queensland) deploy resources as necessary to support each other and the community.
Travellers and Visitors	• Many visitors and travellers utilise the free camping areas located along the Gwydir river which can be inundated during flood events. People in these locations need to be warned in a timely manner of any potential flooding so that they can relocate to a safe area.

NSW STATE EMERGENCY SERVICE

HAZARD AND RISK IN GWYDIR SHIRE

Volume 2 of the Gwydir Shire Local Flood Plan

Last Update: December 2010

FloodSafe

ANNEX A - THE FLOOD THREAT

Landforms and River Systems

1. Two river systems flow through Gwydir Shire LGA: the Gwydir and the Macintyre Rivers.

   The river systems are the major northern NSW contributors to the Murray-Darling drainage system.

   a) **The Gwydir River Valley** (Basin No. 418) has a total area of 25,900 square kilometres. Ground elevations in the valley vary from over 1200 metres above sea level near the headwaters in the Great Dividing Range and in the Nandewar Range to less than 150 metres in the extreme west where the Gwydir River joins the Barwon.

   The Gwydir River Valley is well-defined in its eastern half by the Great Dividing Range, the Nandewar Range to the south and the Mastermans Range to the north. However, the western half of the valley is ill-defined, with the lack of definition highlighted by the exchange of floodwaters that take place between the Gwydir system and the Barwon/Macintyre system to the north and Namoi system to the south. Land slopes of more than 15 degrees are found in isolated areas of the upper reaches and in the Horton River and Halls Creek catchments. However, the majority of the valley above Gravesend has land slopes of 3-8 degrees. West of Gravesend, the valley flattens quickly and slopes of less than one degree persist to the catchment's western edge.

   The Gwydir River flows in a generally north-western direction past Bundarra towards Bingara. During its passage downstream to this point, significant tributaries, including the Copes, Moredun, Georges and Laura Creeks, join the river. Copeton Dam now regulates flows from this upper portion of the catchment. The Gwydir's main tributary, the Horton River, joins it 25km downstream of Bingara having risen in the Nandewar Range north-west of Barraba. Below Bingara and Gravesend, the Gwydir River enters the plains and flows generally westward through Moree Plains Shire to eventually enter the Barwon River about 20km upstream of Collarenebri.

   b) **The Macintyre River** rises on the western slopes of the Great Dividing Range, south of Glen Innes, before travelling through Inverell Shire and eventually forming the northern border of Gwydir Shire before merging with the Dumaresq River near Toomelah. The Macintyre River is a comparatively slow-moving stream, inundating large areas of open plains country in Gwydir Shire's northern area (Warialda Sector) as it moves west towards the Whalan Creek system and eventually into the Barwon River. Notice of flooding is generally significantly extended for most events in this area of the shire.

Storage Dam

2. **Copeton Dam**

Copeton Dam is a large earth and rock-filled structure, with a capacity of 1,364,000ML, located on the Gwydir River about 25km south west of Inverell in northern NSW. It is the fifth largest storage in NSW (nearly three times the volume of Sydney Harbour) and is situated upstream of several townships including Bingara and Gravesend (Gwydir Shire LGA) and Moree (Moree Plains LGA).

The dam was completed in 1976 and was built primarily to provide water for irrigation in the Gwydir Valley. The dam wall was constructed with local materials, comprising and earth and rock-filled embankment with a central core of impervious clay. The wall is 113 metres high and the base is 427 metres wide. The embankment at the left abutment continues along a ridge from the main fill, giving a total crest length of 1484 metres. The crest width is 10.7 metres.

Designed in 1967, construction of the dam was undertaken in three stages, beginning in March 1968 and completed in 1976 with the installation of nine radial gates in the spillway, increasing the storage to its current capacity.

Constructed for conservation storage, Copeton Dam can have a mitigating effect on flooding, however this may depend on storage levels at the time. This effect would be most noticeable close below the dam and would diminish in downstream areas due to the large contributing catchment below the dam and the natural flattening of flood waves as they move downstream.

The dam will have a significant reduction in Bingara township flood heights. For example, it is estimated that the 1955 flood height (the flood of record) would have been reduced from 10.7 metres to below the minor flood height of 5.5 metres had the dam existed at that time (Water Resources Commission NSW 1979).

The degree of reduction in flood height will depend largely on the level of water in storage in the dam at the time a flood commences. A substantial reduction occurred in 1974 as the storage was almost empty before the flood. The flood height reached 4.6 metres at Bingara, but is expected to have reached 6.6 metres without the mitigating effects of the dam.

However, lesser reductions are more likely in future floods as the storage will usually be fuller than it was in 1974 – except for periods of prolonged drought.

When the dam is at, or near, full holding capacity during heavy rainfalls, management of the dam water levels will be crucial in relation to flood levels in Bingara. There is little flood mitigation effect from the dam in this situation.

Copeton Dam does not have significant flood mitigation effect beyond the Horton River confluence.

Weather Systems and Flooding

3. There are two meteorological systems that lead to flood producing rains in the Gwydir LGA and they can be classified into summer and winter events. Both systems can lead to flooding events in both the Gwydir and Macintyre Rivers.

On average, the catchment receives over 60 per cent of its annual rainfall in period November to March. A short secondary wet period can occur during June-July when a further 14 per cent of the annual rainfall is received. These two wet "seasons" are separated by two relatively dry periods, April-May and August-September, each of which received about 12 per cent of the annual average.

Summer storms have historically produced the most severe flooding in the Gwydir Valley. Most floods occur in January/February resulting from formations of depressions to the north of the catchments in a trough extending from south eastern Australia to the continent's north. These depressions cause a very moist north to east air stream to occur west of the Great Dividing Range. Under these conditions, falls of nearly 125mm in 24 hours have been recorded in the driest parts of the catchments. Two most notable examples are February 1955 and February 1976.

Winter storms are distinctly different to summer storms and have tended to lead to less serious flood events. Similar to summer storms, a moisture-laden low pressure system from tropical regions moves into the valley from the north west, but the triggering mechanism for rainfall is a cold air mass that moves in from the south or south west at a high altitude. As the cold air passes over the warm, moist tropical air, instability and rainfall result. The most notable examples of this weather pattern occurred in August 1949 and July 1950.

Characteristics of Flooding

4. Major floods are most common in the summer months, particularly in January and February when the Gwydir and Macintyre Rivers usually receive their highest rainfall.

Gwydir Valley Locations	Time (hours)
Copeton to Pinegrove	7 - 10
Pinegrove to Gravesend	8 - 12
Rider to Gravesend	4 - 8
Gravesend to Pallamallawa (Moree Plains Shire)	5 - 8
Pallamallawa to Yarraman (Moree Plains Shire)	12 - 16

Table A-1 Flood Peak Travel Times, Gwydir River, Copeton Dam to Yarraman (Moree Plains Shire). Note: Times may vary from the above

5. Flooding on the Gwydir River upstream of Bingara can result in backup flooding in a number of gullies and cut the road between the town and Copeton Dam. This type of flooding can isolate the small locality of Keera (six dwellings, approx. 20 people). Normal flooding at Gouron and Borah Creeks and Keera can also cut the Bingara-Copeton Dam road.

6. The Gwydir River can flood an area of terraces (river flats) to the south between Bingara and the locality known as Eaglehawk, approximately 1.5km north west

of Bingara. These river flats can also be cut off by a billabong 3km downstream of Bingara when the river height exceeds 5.0m.

7. Table A-2 shows the recurrence intervals of flood heights measured at the Gwydir River Bridge at Bingara. It should be noted that floods more rare than the 100 year ARI can and will occur.

Recurrence Interval (Years)	Gauge Height (Metres)
100	10.0
50	9.0
20	7.4

Table A-2 Recurrence intervals and flood heights, Gwydir River Bridge at Bingara (following construction of Copeton Dam, completed 1976)

8. High flows on the Horton River where it joins the Gwydir River can make the Gwydir Reverse its flow and flood across Horseshoe Bend, which is just above the junction. The Horton River has the capacity to contribute substantially to flooding in the Gwydir River. Communication between residents on the Horton River and the Bingara SES HQ Operations Centre is vital for the development of early warnings for Biniguy, Pallamallawa and Moree.

9. Just below Bloomsbury, the Myall Creek can cut the road to Inverell. Over-bank flooding then occurs below this point to the junction with the Gwydir River.

Flood History

10. In Bingara, the most severe flood since records began in 1915 occurred in February 1955 when the river rose to 11.53 metres at the Bingara gauge (418010).

The largest recent flood occurred in January 1971, reaching a height of 7.16 metres on the gauge.

Local anecdotal information in Bingara suggests that a major flood occurred in Halls Creek in 1910, which coincided with medium flows in the Gwydir River and caused floodwaters to break from the creek, pass down Maitland Street and through the town. No specific records are available for this event.

After beginning in 1915, daily records at the Bingara gauge ceased in 1951 when a gauging station was established at Pinegrove, about 12km upstream. However, flood height readings have continued to be collected at the Bingara gauge.

The following table indicates peak heights in metres. The Bundarra readings are from the bridge gauge.

Gauge	1955	1964	1971	1974	1976	1984	1996	1998	2000	2001
Bundarra (418900)	12.90	10.74	7.92	8.53	9.16	8.68	8.75	9.85	-	-
Pinegrove (418012)	14.04	10.82	8.50	5.50	5.53	5.87	-	-	2.54	2.34
Bingara (418010)	11.53	8.64	7.16	4.72	4.57	5.00	2.00	1.42	1.00	0.91
Gravesend (gauge #)	17.50	13.87	16.03	15.54	16.02	14.13	9.73	12.87	-	11.31

Table A-3 Peak flood levels Bundarra, Pinegrove, Bingara, Gravesend gauges

Flood Mitigation Systems

11. Refer to Storage Dams - Copeton Dam (2). No formal flood mitigation levees exist in the Gwydir Shire LGA, although individual rural landholders have constructed protective embankments for residences, amenities and farm buildings.

Extreme Flooding

12. With severe weather events predicted to become a more frequent occurrence, extreme floods greater than those already experienced in the Gwydir Shire LGA must be considered. A PMF height for such an event is difficult to determine at this time without a current Flood Study of the Gwydir Shire LGA.

    In the February 1955 flood, the Gwydir River at Bingara reached 10.67 metres (308.2m AHD) and 17.34 metres at Gravesend (271.5m AHD).

    However, State Water has data in its Dam Safety Emergency Plan for Copeton Dam with levels based on a dam break flood in the Gwydir Valley downstream from Copeton Dam. The data has been compared to 1955 flood levels.

    The dam break levels, as an indicator of an extreme flood event, show that at Bingara, an extreme flood could be 38.0 metres higher than the 1955 PMF. At Gravesend, 106.8km downstream, an extreme flood event could increase the height 17.8 metres above that recorded in 1955. However, the floodwater should not enter Gravesend, but would inundate rural areas surrounding the village and continue westwards along the Gwydir Valley, entering Moree Plains Shire near the village of Biniguy.

    Extreme flooding is not expected to occur in the township of Warialda, but local and overland flooding events may impact both the town and rural areas in the north of the Gwydir Shire LGA (Warialda Sector).

ANNEX B - EFFECTS OF FLOODING ON THE COMMUNITY

Community Profile

Census Description	LGA	Bingara	Warialda	Gravesend
Total Persons	5311	1206	1544	276
Total Dwellings	2738	600	729	125
Total persons aged 65 years and over	1033	406	295	35
Total persons aged below 15 years	1057	165	300	57
Total persons of indigenous origin	134	29	34	11
Total persons using Internet (NB: statistic not available). Dwellings connected used	947 dwellings	154 dwellings	261 dwellings	n/a
Single parent families	184	63	58	13
Persons living alone	538	165	167	24
Total persons who do not speak English well	27	7	13	n/a
Total persons who lived at a different address 5 years ago				n/a
Households without vehicles	140	85	36	n/a
Total persons residing in caravans, cabins or houseboats	57	25	12	n/a
Mean household size	2.4	2.1	2.4	2.5

Table B-1 Census of Housing and Population Data (2006).

Specific Risk Areas

Bingara

1. Bingara is affected by flooding from both the Gwydir River and Halls Creeks and is located on the banks of the Gwydir River immediately downstream of its confluence with Halls Creek. Flood behaviour depends mainly on the volume of water the Gwydir River carries. The Halls Creek catchment comprises only 3 per cent of the total catchment above Bingara and only on very rare occasions

would the creek inundate any part of the town (WRC 1979). The most significant effect would occur if a peak in Halls Creek coincided with a major flood in the Gwydir River. Local information suggests that a major flood occurred in Halls Creek in 1910 while the Gwydir River was in flood. Floodwaters broke from Halls Creek and passed down Maitland Street through the town. No specific records could be located for this event.

Most of the town is usually flood-free, with only a part of the area to the north of Finch Street subject to periodic inundation (WRC 1979).

The Gwydir River initially inundates the low lying river flats to the north of the main channel and downstream of the Link St Bridge. When the flooded area has widened to approximately 300m and at a gauge height of approximately 6.5m a flood runner is formed through the golf course north of Gwydir Terrace and Keera Streets. Flooding of the urban area begins at a gauge height of approximately 7.4m then Keera Street is cut at a low point near the corner of Frazer Street. Increasing flood levels further inundates the low lying area around Frazer Street with the first house floor level inundated at approximately 9.0m. After this flood waters spread throughout the area north of Finch St and around Bowen, Herbert and Faithful Streets on the western side of the town. The steep bank confines the flood extent on the northern side of the river with depressions north of White St and at the eastern end of Gwydir St the first to be affected. The only properties on the northern side of town that are flood prone are those in White Street and on the west side of East Street but only in an event exceeding 9.0m on the Bingara Gauge (Cameron McNamara, 1982).

Halls Creek flooding is confined mainly to the channel and the flats associated with the meander pattern just above the confluence with the Gwydir. Floods larger than a 50 year ARI (9.0m on the Bingara Gauge) begin to break out of the defined watercourse and cause shallow flooding at the lower end of Cunningham, Junction and Heber Streets. The extent of flooding from Halls Creek is dependent upon the level in the Gwydir (Cameron McNamara, 1982). Before records began in 1915, Halls Creek broke its banks and flooded through the centre of town (down Maitland St) while the Gwydir was in flood.

2. In a dam failure situation, the entire town of Bingara will likely be inundated by fast flowing, debris laden flood water. See Annex J for details.

Warialda

3. Flooding on Reedy Creek (also known as Warialda Creek) can affect some parts of Warialda township, in particular the lower end of Hope Street and low backyards on the creek's northern side.

   At the locality of Warialda Rail (8km south of Warialda on Fossickers Way) low-lying property along the creek named The Gully may be affected by localised flooding. Both the township and locality may become isolated for a short period of time if road closures occur.

Gravesend

4. Flooding can isolate Gravesend village, but it is not directly inundated, even in a PMF event.

5. In a dam failure situation, some low-lying properties on the outskirts of the town may be inundated. If failure of Copeton Dam was to occur, Gravesend

would be isolated; Maps from current dam break modelling (State Water, 2006) show most of the town to be located above the PMF extent.

Rural Areas

6. Flooding in Gwydir Shire may isolate up to 56 rural properties (approximately 140 people) for two to three days in moderate and major flood events and may enter some residences. A PMF event from a dam failure situation would severely impact all 56 properties and cause further widespread destruction of buildings and infrastructure throughout the Gwydir Valley.

   Flooding on the Gwydir River upstream of Bingara can result in back-up flooding in a number of gullies and watercourses and also cut the road to Copeton Dam. This type of flooding can isolate the locality of Keera, comprising six residences, farm buildings and approximately 20 people.

   Six properties (approximately 15 people) along Halls Creek may be isolated for 2-5 days, with some 4WD access available.

   Between Bingara and "Eaglehawk" property, the Gwydir River can flood an area of terraces to the south of the river. These river flats can be cut off by a billabong 3km downstream of Bingara when the river height in the town exceeds 5 metres. Three properties (approximately 7 people) may be affected.

   The Horton River joins the Gwydir River near Horseshoe Bend in the Shire's south-western corner. High flows at this point can make the Gwydir reverse its flow and flood across Horseshoe Bend, which is just above the junction. This may isolate one property. The Horton River has the capacity to add substantially to flooding in the Gwydir River from this point to Gravesend and beyond.

   Flooding can cut the Gwydir Highway either side of Gravesend, isolating the town. The approaches to Gravesend Bridge east of the town were washed away in 1956 and 1974, but have since been raised although still subject to some flooding. West of the town, the highway can be cut at Biniguy village in Moree Plains Shire.

   Local overland flooding and flooding from Mosquito Creek downstream of Warialda towards Pallamallawa can isolate up to nine properties for about 48 hours.

   Ottleys Creek flows along much of the Shire's north eastern border near Coolatai village and local flooding can cut roads for some days. The village remains accessible for nearby rural residents, but may be isolated for short periods (1-2 days) if roads are cut as floodwater moves downstream.

   A small section of the Shire's northern boundary is along the Macintyre River between Yetman and Boggabilla. Flood water from that river can link with flows from Ottleys Creek, creating a vast inundation moving west through farmland and eventually joining the Whalan Creek system in Moree Plains Shire. Landholders in the area are aware of the potential isolation and are usually well-prepared.

Camping Reserves

7. Local residents and visitors to the Shire utilise numerous accessible camping and recreational fishing areas along the Horton and Gwydir Rivers and at Yagobie Crossing (west of Gravesend off the Gwydir Highway). Some areas are

well identified and known but others are selected for their remoteness. It may not be possible to warn all campers if a flood event occurs.

Road Closures

8. Numerous roads in the Shire can be closed by flooding. Some closures can be of short duration, but others may be closed for some days. In the event of flooding the following significant local roads may be temporarily impassable or closed for some time.

Road	Usual point of closure
SR1 Copeton Dam Road (locally known as Keera Road)	Upstream of Bingara when minor flooding in Gouron Creek, Borah Creek or at Keera
MR134 Bingara to Inverell	Just below Bloomsbury from Myall Creek
SR35 Wallangra Road at Coolatai	Ottleys Creek
RR63 Warialda to Yetman	Back Flat Bottom or Gournama Creek Paddys Weir Culvert Crawford Arms Creek (aka Stevensons Bridge) Coxs Creek Boundary Gully, just south west of Coolatai Kia Ora Causeway
RR7705 Warialda to Boggabilla via North Star **(Continued)** **RR7705** Warialda to Boggabilla via North Star	Crawford Arms Creek Un-named causeway 200m north of Postmans Creek Coxs Creek Church Plain Causeway Hugheys Arm Creek Mobbin Dry Creek, south of North Star Mobbin Dry Creek at North Star Village Mobbin Dry Creek, north of North Star Back Creek, north of North Star Forest Creek
SR14 Mosquito Creek Road from Warialda	Racecourse Creek Un-named causeway 25km west of Warialda, in the vicinity of properties “Nunga” to “Yatterdon” Mosquito Creek east of Pallamallawa
SR283 Airstrip Road	Kennedy Gully

Road	Usual point of closure
Hope Street, Warialda	At the lower end of Reedy Creek
SR3 Elcombe Road	All causeways
SR7 Croppa Creek to North Star	All causeways Croppa Creek
SR5 Croppa Creek to Moree	All causeways Croppa Creek
SR41 Country Boundary Road, Pallamallawa to Boggabilla	All causeways Gil Gil Creek
SR63 Mosquito Creek Road via Crooble to Country Boundary Road	All causeways Gil Gil Creek
SR4 Baroma Downs Road	Croppa Creek Hugheys Arm Creek
SR13 Oregon Road, Warialda to Crooble	All causeways Mosquito Creek

As previously noted, Gravesend becomes isolated when flooding cuts the Gwydir Highway either side of the town.

Effects on Utilities and Infrastructure

9. Minor flooding in the Gwydir Shire LGA has minimal effect on utilities and infrastructure and most should continue to operate. At Warialda, flooding is not expected to have an impact on utilities and infrastructure due to elevation and most flood events being of short duration.

Moderate and Major flooding

Localised flooding in towns, villages and rural areas may impact on power supply if damage occurs to sub-stations or power poles, causing temporary failure of the system. Health-related infrastructure and utilities may also be affected.

10. In the event of the failure of Copeton Dam, extreme flooding would inundate the town of Bingara, agricultural areas and rural localities such as Keera downstream of Copeton Dam along the Gwydir Valley. Significant damage would be sustained to all major infrastructure, including electricity supply and telephone facilities and Gwydir Shire Council utilities. Evacuation routes would be cut.

NSW STATE EMERGENCY SERVICE

SES RESPONSE ARRANGEMENTS FOR GWYDIR SHIRE

Volume 3 of the Gwydir Shire Local Flood Plan

Last Update: December 2010

FloodSafe

ANNEX C - GAUGES MONITORED BY THE BINGARA AND WARIALDA SES LOCAL HEADQUARTERS

Gauge Name	Type	AWRC No	Stream	Flood Classification		
				Min	Mod	Maj
Pinegrove (12km upstream Bingara)	Telemetric	418012	Gwydir River	NA	NA	NA
‡ Bingara *	Manual	418010	Gwydir River	5.50	7.60	9.10
Bingara (Halls Ck)	Telemetric	418025	Halls Creek			
Bundarra Bridge *	Telemetric	418900	Gwydir River	8.00	9.10	10.70
Caroda (Horton River)	Manual	418905	Horton River			
Caroda (Rocky Creek)	Manual	418903	Rocky Creek			
Copeton	Manual	418003	Gwydir River			
Copeton Dam D/S	Telemetric	418026	Gwydir River			
Copeton Dam W/L	Telemetric	418035	Gwydir River			
Horton Dam site	Manual	418027	Horton River			
Keera	Manual	418018	Keera Creek			
Molroy	Telemetric	418017	Myall Creek			
Rider	Telemetric	418015	Horton River			
Coolatai	Telemetric	416020	Ottleys Ck			
‡ Gravesend *	Telemetric	418013	Gwydir River	6.10	9.40	12.00

Notes:

1. The Bureau of Meteorology provides flood warnings for the gauges marked with an asterisk (*).
2. SES Local Flood Advices are provided for the gauges marked with a single cross (†).
3. The SES holds a Flood Intelligence Card for the gauges marked with a double cross (‡).

ANNEX D - DISSEMINATION OF SES FLOOD BULLETINS

The North West SES Region Headquarters distributes SES Flood Bulletins and other flood related information (including Flood Warnings) to the following regional media outlets:

Television Stations:

Station	Location
ABC TV	Sydney
NBN TV	Newcastle/Tamworth
Prime TV	Tamworth
Southern Cross Ten	Tamworth

Radio Stations:

Station	Location	Frequency	Modulation
2NZ	Inverell	1188	AM
GEM	Inverell	95.1	FM
ABC New England/North West	Tamworth	648	AM
2VM	Moree	1530	AM
NOW FM	Moree	98.3	FM
2TM	Tamworth	1287	AM
2TM	Tamworth	92.9	FM

Newspapers:

Name	Location
The Warialda Standard	Warialda
The Bingara Advocate	Bingara
The Northern Daily Leader	Tamworth
The Moree Champion	Moree

Other Agencies:

- Flood Bulletins will be distributed to all other agencies listed under this plan and the Local DisPlan.

ANNEX E - TEMPLATE EVACUATION WARNING MESSAGE FOR GWYDIR SHIRE LGA

Evacuation Warning

[###] Region Headquarters

[Enter Address]

Issued *[day] [date]* at *[time in civilian format (am,pm)]*

Telephone: (02) [#########]

Fax: (02) [##########]

Email: [############]

Radio stations are asked to immediately read this message to listeners and repeat it often.

Evacuation Warning for [Enter locations]

Authorised By: [ ]

The Bureau of Meteorology has predicted a flood level of [ ] metres at [ ] *(place)* at [ ] *(time).* This means that [enter areas] may become flooded by [enter time].

The State Emergency Service recommends that residents within these areas maintain a vigilant watch on the situation and to prepare to evacuate [enter time if necessary].

The State Emergency Service is monitoring the situation and will advise you if it is necessary to leave your property.

If flooding does occur in your area, remaining within your home or business will be dangerous and your life maybe placed at risk. Even if your home or business is raised it may become a refuge for vermin, snakes and spiders. There may be no water, sewerage, power, telephone or other services and you may be unable to call for help in an emergency.

If evacuation becomes necessary evacuation centres will be established at [ ] *(specify route if appropriate)*. At these centres assistance will be available to meet your needs including, temporary accommodation, financial help, personal support, refreshments and meals, clothing and personal needs and help in contacting friends and family. You may also choose to go to a friends or relatives house.

To prepare for possible evacuation you should:

- Raise belongings by placing them on tables, beds and benches. Put electrical items on top. You may be able to place light weight items in the roof space.
- Collect together medicines, personal and financial documents, mementos and photos
- If possible, check to see if your neighbours need help
- Make arrangements for care of pets or other animals, you may take your pets with you when you evacuate

If you have to evacuate:

- Turn off the electricity, gas and water.
- Take three days' supply of clothing and medicines
- Take any important documents, mementos and photos with you
- Continue to listen to a local radio station for updates

Don't walk or drive through floodwaters – this is the main cause of death and injury during flooding

If you require assistance contact the SES on 132 500

End

[enter update and currency details]

For further information contact:

The worst in nature
the best in us

ANNEX F - TEMPLATE EVACUATION ORDER MESSAGE FOR GWYDIR SHIRE LGA

Evacuation Order

[###] Region Headquarters

[Enter Address]

Telephone: (02) [#########]

Fax: (02) [##########]

Email: [############]

Issued *[day] [date]* at *[time in civilian format (am,pm)]*

Radio stations are asked to immediately read this message to listeners and repeat it often. Please use the Standard Emergency Warning Signal with this message

Evacuation Order for [Enter locations]

Authorised By: [ ]

The Bureau of Meteorology has predicted a flood level of [ ] metres at [ ] ***(place)*** at [ ] ***(time).*** This means that [enter areas] will become flooded.

The State Emergency Service directs residents within these areas to evacuate within the next [ ] hours. If you delay your evacuation, roads may be congested or closed and you could become trapped and need to be rescued. Remaining in flooded areas is dangerous and may place your life at risk.

When you evacuate you may go to the house of a friend or relative. Alternatively, if you go to an evacuation centre, accommodation and other assistance can be arranged for you.

If you do not attend an evacuation centre it is important to inform emergency services of your location by calling [enter number]

You can drive to an evacuation centre located at [ ] ***(specify route if appropriate)***.

If you don't have a car, buses may operate where possible on normal routes. Special transport can also be provided on request if necessary, telephone [ ].

Before evacuating, you should prepare yourself and your property for flooding:

- Raise belongings by placing them on tables, beds and benches. Put electrical items on top. You may be able to place some light-weight items in the roof space
- Collect together important documents, mementos and photos to take with you
- If possible, check to see if your neighbours need help
- Make arrangements for care of pets or other animals or take pets with you to an evacuation centre
- Turn off the electricity and gas
- Take three days' supply of clothing and medicines with you
- Do not drive or walk through floodwater
- Continue to listen to a local radio station for updates

End

This Evacuation Order remains current until the All Clear has been issued

For further information contact:

The worst in nature
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ANNEX G - EVACUATION ARRANGEMENTS FOR THE GWYDIR SHIRE LGA

Background

1. The Gwydir Shire LGA includes:

    a) The Gwydir, Horton and Macintyre Rivers.

    b) Part of Copeton Waters State Park and Copeton Dam.

    c) Bingara, Keera, Upper Horton and Cobbadah areas.

    d) Warialda, Gravesend, Yallaroi, Coolatai and North Star areas.

    Potentially, the most severe flood problem in the LGA would be in the Gwydir River Valley downstream of Copeton Dam in a dam crest flood (DCF) or dam failure incident. In either situation, the entire CBD, residential properties and community facilities in Bingara are liable to flooding. A DCF or dam failure situation has to be considered for risk assessment and management, but the potential for a DCF or dam failure is considered minimal. Details of the dam failure warning system and an evacuation plan for such an event is included in Annex J.

    Normally, moderate or major flood events in either Bingara or Warialda only impact on a small number of residences in the lower areas of the towns with only some evacuations required. A major flood event should not impact on residential properties in Gravesend.

    Flooding can isolate rural properties and communities and localised flood water may enter some villages. Evacuations may be required in some circumstances.

Arrangements

2. **Control.** During floods, evacuations will be controlled by the NSW SES. Small-scale evacuations will be controlled by the Gwydir SES Local Controller. Should the evacuations operations escalate beyond the capabilities of local resources, control may be handed over to the North West SES Region Controller.

3. **Conduct.** Evacuations controlled by the SES will be conducted in four phases:

    a. Phase 1 - Warning.

    b. Phase 2 – Withdrawal.

    c. Phase 3 – Shelter.

    d. Phase 4 – Return.

4. **Groupings and Tasks.**

    For the purpose of managing flood response operations and evacuations during severe events, the Gwydir Shire LGA may be divided into two operational sectors based on the Bingara and Warialda SES Unit boundaries. The Gwydir SES Local Controller will initiate the sectors and advise the North West Region SES Controller.

Phase 1 – Decision to Evacuate

5. **The decision to evacuate.** The responsibility for issuing any general evacuation warning or evacuation order during flooding rests with the Gwydir SES Local Controller who exercises his/her authority in accordance with Section 22(1) of The State Emergency Service Act 1989. However, the decision to evacuate will usually be made after consultation with the Local Emergency Operations Controller and the North West SES Region Controller.

6. **When evacuation should occur.** As far as possible, evacuation will be carried out before inundation occurs.

7. **Self-motivated evacuation.** Some people will make their own decision to evacuate earlier and move to alternative accommodation using their own transport, particularly in rural areas of the LGA. These evacuees will be advised, via the media, to inform the Police or SES of their evacuation and their temporary address.

8. **Evacuation triggers.**

   Bingara: A BoM Flood Warning predicted to reach or exceed a minor flood level of 7.0 metres in the Gwydir River at Bingara will alert the Gwydir SES Local Controller to potential evacuations.

   A BoM Flood Warning predicted to reach or exceed a major flood level of 9.10 metres in the Gwydir River at Bingara will alert the Gwydir SES Local Controller to initiate progressive evacuations. At 8.53 metres, flood water has been recorded entering West and Faithful Streets, Bingara (1955) and began impacting on residential properties at 9.79 metres.

   Gravesend: A major flood event in the Gwydir River should not impact on residential properties in Gravesend.

   Warialda: Localised flooding in Warialda Creek may impact on residential property at the low, western end of Long Street. There is no gauge to monitor creek levels and provide predictions.

9. Dam Failure: receipt of Red Alert

Phase 2 – Warning

10. **Evacuation warnings.** Upon receipt of a BoM Flood Warning predicting a peak height of 7.0 metres and above at the Bingara gauge on the Gwydir River, the Gwydir SES Local Controller will consult as necessary to determine the level of the threat and the need to consider evacuations.

    As soon as possible after the decision to evacuate is made, the Gwydir SES Local Controller will issue evacuation warnings to the 'at risk' residents, indicating what people should do before evacuating and when actually doing so.

11. **Content of Evacuation Warnings.** A template guide to the content of evacuation warning messages is at Annex E. These are disseminated via:

    - The radio and TV stations listed in Annex D.
    - Door-knocks by emergency service personnel.

- Public address systems from emergency service vehicles.
- Telephone.
- Two-way radio.
- Direct access to Radio Station. Refer Annex D.
- SES Flood Bulletins.

Phase 3 – Withdrawal

12. **Introduction.** Withdrawal involves the actual removal of the community/individuals from dangerous or potentially dangerous areas to safer areas.

13. **Movement.** Evacuees are to be encouraged to move using their own transport where possible. The Gwydir SES Local Controller will arrange transport for those people without their own vehicles.

14. **Phasing**. Should only be required in extreme flood inundation events.

    - **Bingara:** Evacuations, if required, are usually undertaken systematically street by street from the lowest point of inundation in Faithful Street then progressively from West, Gwydir, Keera then Finch Streets.
    - **Warialda**: Evacuations, if required, would usually only occur at the lower, western, end of Long Street.

15. **Evacuation routes.** Normally, evacuation would be undertaken by private vehicle to pre-arranged accommodation/meeting points/evacuation assembly areas in higher parts of the towns affected by flooding in the Shire.

    The following sites will be used as evacuation assembly areas for a major flood event:

    Bingara: Gwydir Oval

    Warialda: Showground

16. **Large-scale evacuations**

    - **Bingara:** Upon advice of a DCF or probable dam failure flood inundation event in Bingara, residents will be directed to immediately attend evacuation assembly areas at Two Mile Hill or All Nations Hill.
    - **Warialda:** It is not anticipated that large-scale evacuations will be required in Warialda during a localised flood event due to the hilly topography.

17. **Special Needs Groups.** Bingara Multi Purpose Health Service and Touriandi Lodge aged care facility will be advised by the Gwydir SES Local Controller of current flood warnings to initiate their appropriate flood response plans.

18. **Animals.** Assistance animals (guide dogs, hearing assistance animals, etc) will remain in the care of their owners throughout the evacuation. This includes transport and access into evacuation centres etc.

Due to safety restrictions, it may not be possible to allow companion animals to accompany their owners when being transported via aircraft or flood rescue boats. The Department of Industry and Investment in conjunction with Gwydir Shire Council will make separate arrangements for the evacuation and care of companion animals.

19. **Doorknocking.** Field teams conducting doorknocks will record and report to the Operations Centre the following information:

    - Addresses and locations of houses doorknocked and/or evacuated.
    - The number of occupants.
    - Details of support required (such as transport, medical evacuation, assistance to secure house and/or property and raise or move belongings).
    - Details of residents who refuse to comply with the evacuation order.

20. **Refusal to evacuate.** Field teams will not waste time dealing with people who are reluctant or refuse to comply with any evacuation order.

    These cases will be referred to the Local Emergency Management Operations Controller who will arrange for Police to ensure their evacuation.

21. **Security.** The NSW Police Force will provide security for evacuated areas.

22. **Transport and storage**. Transport and storage of furniture from flood threatened properties will be arranged as time and resources permit.

    Such assistance will be limited in scale in the more severe events.

Phase 4 – Shelter

23. **Evacuation centres.** The usual purpose of evacuation centres is to meet the immediate needs of victims, not to provide them with accommodation. Evacuees will be advised to go to, or be taken to, the nearest accessible evacuation area, which may initially be established at the direction of the Gwydir SES Local Controller but managed as soon as possible by Community Services to enable evacuees to be directed to an appropriate Evacuation Centre.

    The following sites will be used as evacuation assembly areas in Bingara if a dam failure warning is issued for Copeton Dam:

    - Two Mile Hill (north towards Warialda on Fossickers Way).
    - All Nations Hill (southern entrance to town on Fossickers Way).

    In the event of isolation at Gravesend, evacuees from rural areas will be directed to the Gravesend Public School.

24. **Action on arrival.** On arrival at Evacuation Centres, evacuees will be:

    a. registered;

    b. medically checked, if necessary; and

    c. provided with their immediate welfare needs.

25. **Registration.** The NSW Police Force will ensure that all evacuees are registered on arrival at the designated evacuation centres or emergency assembly points.

26. **Animal shelter compounds**. Animal shelter compounds will be set up for the domestic pets and companion animals of evacuees. These facilities will be operated by the Department of Industry and Investment and Gwydir Shire Council at its animal compounds.

Phase 5 – Return

27. Once it is considered safe to do so, the Gwydir SES Local Controller will authorise the return of evacuees to their normal or alternative place of residence. This decision will be made in consultation with appropriate officers in regard to matters such as the electrical safety of buildings, prevailing health conditions for residents and security.

28. The return will be controlled by the Gwydir SES Local Controller and may be conducted, at his/her request, by Community Services.

ANNEX H - ARRANGEMENTS FOR THE EVACUATION OF CARAVAN PARKS AND THE RELOCATION OF CARAVANS

General Overview

1. The following caravan park in Gwydir Shire may be flood liable:

   - Bingara Riverside Caravan Park, Keera Road, Bingara.

     The Caravan Park, which may have permanent residents in on-site vans at various times, is located at the recorded major flood peak level (11.53 metres) in Bingara. To ensure the safety of residents and guests, vans and their contents will be moved to higher ground when a BoM Major Flood warning is issued. SES and council resources may not be available at this time to assist with removal.

   According to current studies, the Gwydir Shire Council Caravan Park, Geddes Street, Warialda should not be inundated by riverine flooding due to the hilly topography of the town.

Advising Procedures

2. The Caravan Park proprietor/manager will ensure that the owners and occupiers of caravans are:

   a. Made aware that the caravan park may be flood liable by:

      - Handing a printed notice to occupiers taking up residence. The notice will indicate that the caravan park may be liable to flooding and outline the evacuation and van relocation arrangements as detailed in this Annex.
      - Displaying this notice prominently in each van.

   b. Made aware that if they are expecting to be absent from their vans for extended periods, they must:

      - Provide the manager with a key; in a sealed envelope; to the van.
      - Provide a contact address and telephone number.
      - Inform the manager if a vehicle will be required to relocate the van during flood time.
      - Leave any mobile van in a condition allowing it to be towed in an emergency (i.e.: tyres inflated, jacks wound up, personal effects secured and annexes and lines for water, sewer, electricity and gas readily detachable).

   c. Informed when a flood is rising. At this time, occupiers will be advised to:

      - Ensure that they have spare batteries for their radios.
      - Listen to a local radio station for updated flood information.
      - Prepare for evacuation and van relocation.

3. The Gwydir SES Local Controller will ensure that the managers of the caravan park are advised of flood warnings and the details of any evacuation order.

Evacuation of Occupants and Relocation of Vans

4. The Caravan park manager/proprietor shall be encouraged to install flood depth indicators and road alignment markers within the caravan park.

5. When an evacuation order is given:

   a. Occupiers of non-movable vans should:

      - Secure their vans by tying them down to prevent flotation.
      - Isolate power to their vans.
      - Collect personal papers, medicines, a change of clothing, toiletries and bedclothes.
      - Lift the other contents of their vans as high as possible within the van.
      - Move to a designated evacuation centre in Bingara if they have their own transport, or move to the caravan office to await transport.

   b. Where possible, vans that can be moved will be relocated by their owners. Park managers will arrange for the relocation of mobile vans whose owners do not have a vehicle. Council and SES personnel, if available, will assist if required and may be able to provide additional vehicles. Vans are to be moved to the following locations:

      - Higher ground at the direction of Council staff or SES personnel.

6. Caravan park proprietors/managers will be encouraged to:

   a. Ensure that their caravan park is capable of being evacuated within one hour.

   b. Advise the Gwydir SES Local Controller of:

      - The number of people requiring transport.
      - Details of any medical evacuations required.
      - Whether additional assistance is required to effect the evacuation.

   c. Check that no people remain in non-removable vans that are likely to be inundated.

   d. Inform the Gwydir SES Local Controller when the evacuation of the caravan park has been completed.

   e. Provide the Gwydir SES Local Controller with a register of people that have been evacuated.

Return of Occupants and Vans

7. The Gwydir SES Local Controller, acting on Gwydir Shire Council advice and using council resources as necessary, will advise when it is safe for the caravan parks to be re-occupied.

8. Vans will be towed back to the caravan park(s) by van owners or by vehicles and drivers arranged by the park manager/proprietor. Again, Council and SES personnel will assist if available.

ANNEX I - RE-SUPPLY REQUIREMENTS AND OPERATIONS

Background

1. A moderate or major flood event along the Gwydir River in Gwydir Shire, reaching heights above 7.60 metres at Bingara could result in up to 50 farm residences isolated for a varying length of time, usually up to three days, but potentially for much longer in a severe inundation event.

2. A major flood event in the Gwydir Shire's northern or Warialda Sector could result in approximately 60 farm residences isolated as floodwater moves along streams and overland from the Macintyre River. This may take some days to pass through a locality.

Re-supply of Isolated Towns and Villages

3. Towns, villages and rural communities may become isolated during some localised or overland flooding events. In the southern area of the shire (Bingara Sector) the duration of major flooding is usually brief and re-supply is rarely required. Isolation may occur at Upper Horton and Upper Bingara.

   Various locations in the shire's northern area, or Warialda Sector, may be isolated for some days in a major flood event and ongoing re-supply operations may be required as floodwater moves overland. They include Gravesend and the villages of Croppa Creek, North Star, Coolatai and Crooble which, although not necessarily directly affected by flooding, can be isolated for some days.

4. The SES is responsible for the coordination of the re-supply of isolated communities. If flood predictions indicate that areas are likely to become isolated, the Gwydir SES Local Controller should advise businesses (normally through the Gwydir Shire Council) that they should stock up.

5. When isolation occurs, storekeepers will be expected to place orders on suppliers where they have a line of credit and to instruct those suppliers to package their goods and deliver them to loading points designated by the SES.

6. Where practicable the Gwydir SES Local Controller will arrange for the delivery from normal suppliers of essential foodstuffs, fuels or urgent medical supplies required by an isolated property or community. This may be undertaken using high clearance vehicles, flood-boats or, on occasions, aircraft.

7. The Gwydir Shire Council will establish and chair a vetting committee to ensure that only essentials are ordered.

8. Where supplies are not available within the council area, the Gwydir SES Local Controller may request them through the North West SES Region Headquarters. The Region Headquarters will usually arrange for them to be delivered to the Gwydir SES Local Controller for further distribution within the council area.

9. The SES is prepared to deliver mail to isolated communities but may not be able to do so according to normal Australia Post timetables.

10. The SES will assist the Bingara and Warialda hospitals with re-supply of linen and other consumables if required.

Re-supply of Isolated Properties

11. Individual rural properties may become isolated during flooding events. In the southern area (Bingara Sector), of the Gwydir Shire LGA, the duration of flooding is usually brief and re-supply rarely required. Six properties on Halls Creek upstream of Bingara may be isolated for up to a week, with access only by 4WD vehicle. About seven properties along the Horton River have been isolated in the past and re-supply may be required for some days. The six residences at Keera may be isolated for some days due to road closures.

    About 20 properties along Ottleys Creek and the Macintyre River in the shire's northern area (Warialda Sector) can be isolated for some days and ongoing re-supply operations may be required as floodwater moves overland. Downstream of Warialda, flooding can isolate about 10 properties for up to two days along Mosquito Creek.

12. The re-supply of isolated properties is a common requirement during floods and coordination can be difficult because requests can emanate from a variety of sources.

    Property owners should call their suppliers direct or place their orders through DoCS or through their own social networks and arrange delivery to the appropriate SES Unit for despatch.

13. The principles to be applied when planning for the re-supply of isolated properties are:

    a. The SES will coordinate re-supply and establish a schedule.

    b. DoCS will liaise with the SES concerning property holders who place orders with them. They will include people in dire circumstances who receive re-supply at no cost. DoCS have a well developed system for this situation, including a standard list of approved re-supply items.

    c. If a property holder seeks re-supply from the SES and claims to be, or is considered to be, in dire circumstances, he/she will be referred to DoCS.

    Local suppliers will liaise with the SES regarding delivery of re-supply items to the designated loading point. Suppliers are responsible for packaging re-supply items for delivery.

14. The flow chart below illustrates the resupply arrangements described above.

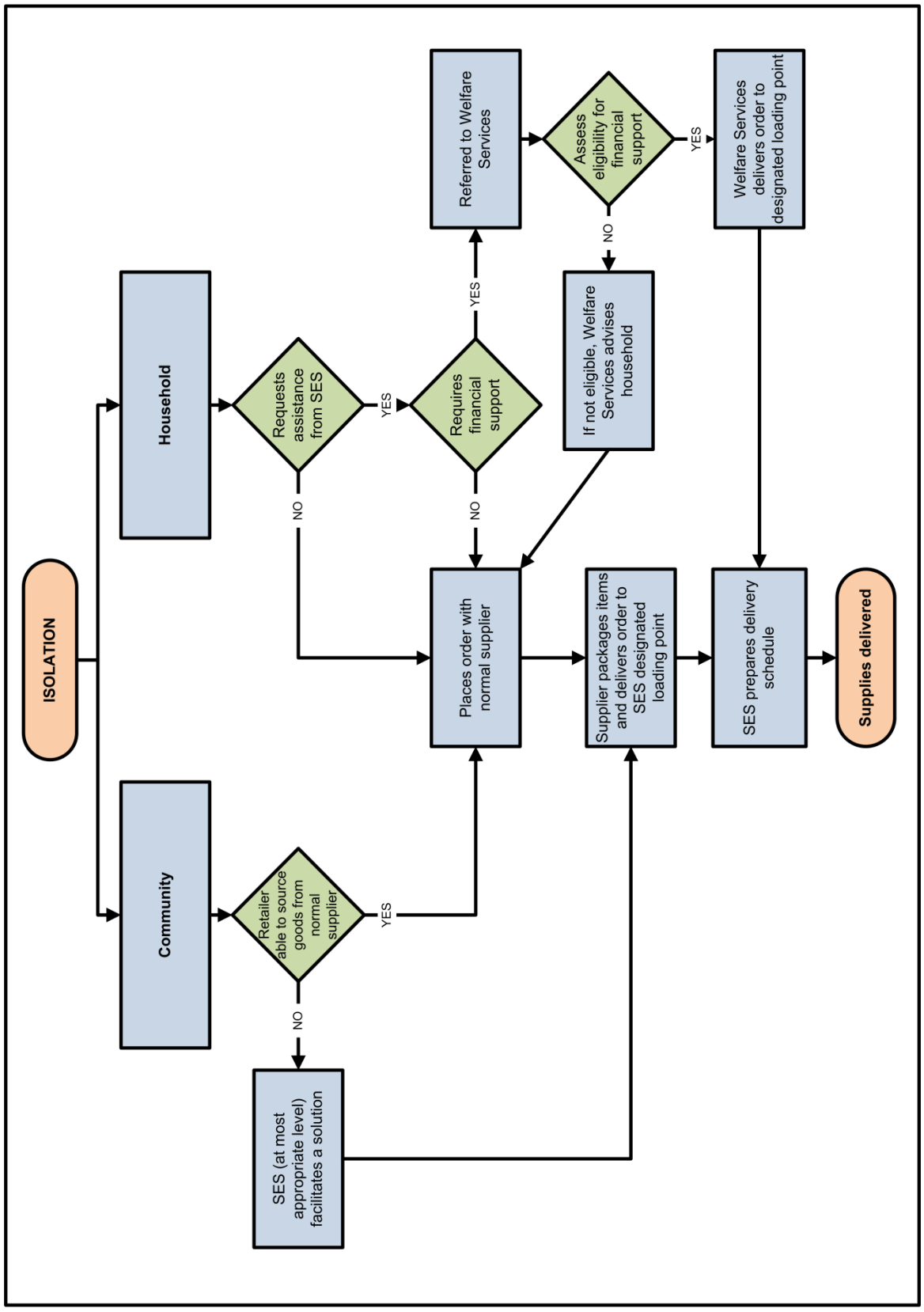


Figure I-1: Flowchart of resupply arrangements

Periods of Isolation

Table I-1 outlines the estimated periods of isolation that may occur during flooding.

Area	Approx. period	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Croppa Creek	2-3 days								
North Star	3-5 days								
Eaglehawk	5-6 days								
Keera	2-3 days								
Warialda	7-10 days								
Bingara	2-7+ days								
Halls Creek area	1 day								
Ottleys Creek area	1 day								
Horton Creek area	1 day								
Macintyre River area	1 day								
Coolatai	1 day								
Crooble	2-3 days								

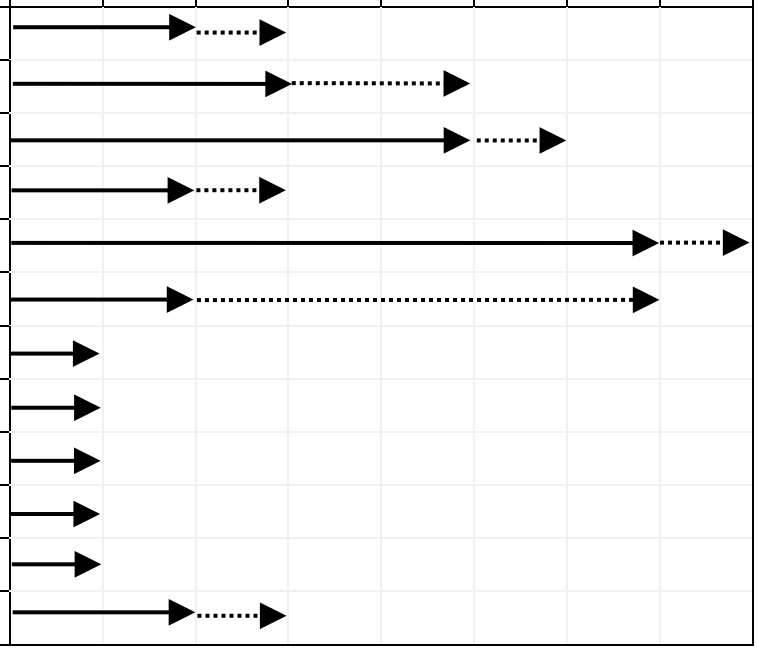


Table I-1: Potential periods of Isolation

ANNEX J - DAM FAILURE WARNING SYSTEM FOR COPETON DAM AND PROCEDURES IN A DAM FAILURE

Introduction

1. Copeton Dam is currently in good condition, however, it is recognised that an unsafe or emergency condition could occur at any time due to extreme natural events.

   Failure from a cause not related to extreme natural events is always a possibility although the risk is considered extremely low.

   The two most likely causes of dam failure would be due to:

   a. extreme flood levels overtopping the embankment; or

   b. a "sunny day failure" (i.e. not induced by an inflow flood) resulting from a rapidly deteriorating structural deficiency such as may be induced by an extreme earthquake, internal erosion, landslide or sabotage.

2. Copeton Dam is estimated to be able to withstand a flood volume up to 65-80% of that in the PMF (Probable Maximum Flood) at the dam site. However, it should be noted that this would result from an extreme event with a probability of about 1:25,000 AEP. The flow in such a flood would be vastly greater than has ever been recorded there and would be extremely rare.

3. If a failure were to occur the effects would be very severe and result in a flood of extreme proportions in the Gwydir River. The flood would be of great severity to Bingara, the Gravesend district and beyond, and the rural areas in between.

   Under such circumstances, the Gwydir Shire local government area would experience its worst flooding in recorded history. The highest known flood level (1955) would be significantly exceeded.

Emergency Action

4. The prime means of detecting the development of a potential emergency condition is through the daily visual inspection of the dam by the Officer-in-Charge, Assistant Officer-in-Charge, and inspection and monitoring activities of the Asset Services Branch, State Water.

5. The Dam Safety Emergency Plan (DSEP) details two emergency actions - Action 1 and Action 2.

Action 1 (Red Alert)

6. Action 1 is known as the Emergency Action and is used to advise appropriate emergency services and authorities of a potential dam failure due to:

    a. uncontrolled seepage through the embankment, abutments or foundations;

    b. cracking or instability of the embankment caused by earthquakes or other factors;

    c. the flooding and storage level reaching 575.4m AHD with an expectation that it will exceed RL 577.532m AHD; or

    d. rapid and massive progression of spillway outlet channel erosion towards the gate structure.

7. When Action 1 is activated, the SES is to make the necessary arrangements to evacuate at risk residents without delay. The extreme flood event that would cause a flood-induced failure would mean that many downstream residents should already have been evacuated before Action 1 is reached.

Action 2 (Amber Alert)

8. Action 2 is activated when a significant incident occurs but immediate dam failure is unlikely and does not pose immediate danger. Action 2 may be activated because of significant incidents such as:

    a. slips, cracking, increase in turbidity or volume of seepage flow or earthquake;

    b. storage level reaches RL 575.40m AHD;

    c. major electrical or mechanical equipment failure or damage;

    d. erosion of spillway outlet channel; and/or

    e. sabotage or terrorist action (e.g. bomb threat).

9. The main aim of Action 2 is for the dam staff to closely monitor the condition of the dam and implement preventative measures to return it to a safe condition as soon as possible.

Flood Operation

10. Under normal conditions, the operation of the storage is controlled from the dam. During flooding events, the dam will be continuously manned and dam staff will receive instructions for operating the spillway gates from the Manager, Management Systems Unit.

The principal storage behaviour indicator is a Telemeter, which can be interrogated by telephone. The storage water level is also recorded continuously on an automatic recorder in the storage level recorder house. Visual checks can be undertaken if recording appears suspect.

The Duty Officer, Copeton Dam will keep the SES informed of the discharge through the spillway and ensure that the warning alerts in Operations and Procedures are sent.

Inundation Area

11. **Introduction.**
Where dam failure is brought about by an extreme flood, there would already be unprecedented flooding downstream of the dam due to spillway discharge and flow in the Gwydir River. Downstream flood inundation could occur as the result of a failure due to an extreme flood or a “Sunny Day” failure.

12. **Failure Due to Extreme Flood.**
It is extremely unlikely that a flood would occur that would overtop the Copeton Dam Main Embankment and lead to dam failure by erosion of the dam’s crest and downstream face.

An overtopping failure may occur if an extreme flood event overtops the dam embankment because the spillway cannot cope with the flood flow involved. However, before this form of failure occurs, considerable areas of the downstream valley will already be inundated by river flood flow and emergency authorities would be either on standby or in action due to the flood.

It is possible, though unlikely, that during an extreme flood, erosion of the spillway outlet channel could migrate back to the spillway concrete gate structure and undermine it leading to its failure. If this were to occur, storage release would be limited to the depth of erosion at the gate structure.

13. **"Sunny Day" Failure.**
In the unlikely event of the dam failing under normal inflow conditions, downstream flood inundation would result from water held in the storage.

It is extremely unlikely that any earthquake-induced settlement of the dam would exceed the height of the flood mitigation storage plus freeboard. However it is likely that some of the dam's ancillary structures may be severely damaged by an extreme earthquake.

A non-flood failure may occur due to an incident when the reservoir is at normal operating levels. In this scenario, all downstream inundation is due to the dam failure event. "Piping" erosion through the embankment or its foundations and earthquake are possible causes of a non-flood failure.

The non-flood failure is considered to have the most potential for loss of life as it is likely to occur when there are no flood warnings and hence emergency services are not on standby and the public is unprepared.

14. **Inundation Mapping.**
Dam break flood inundation mapping has been prepared for Copeton Dam.

Information on possible flood depths, velocities and travel times at various locations is recorded in State Water's Dam Safety Emergency Plan for Copeton Dam. Copies are held at North West SES Region and SES State Headquarters.

It should be noted that the travel times listed relate to only one component of the lead-up time before downstream flooding commences, and therefore of the possible warning time.

The other components are listed below:

a. Rainfall duration, flood travel times upstream of the storage, and time to fill the storage (for flooding events).

b. The lag time between the occurrence of an extreme earthquake and initiation of a consequential dam failure.

c. For other events not related to natural flooding, the lag between first observing a problem, and its development into a dam failure event.

15. **Effects of Dam Failure Flooding.**
Extreme flooding would inundate the town of Bingara, agricultural areas and rural localities, such as Keera downstream of Copeton Dam, along the Gwydir Valley.

Whilst not inundated by such a flood event, Gravesend would be isolated and become the evacuation point for rural residents in the area.

In Bingara, significant damage would be sustained to all major infrastructure, including electricity supply, telephony facilities, Gwydir Shire Council utilities, businesses and residential buildings. Evacuation routes would be cut.

It should be noted that a dam break resulting from extreme rainfall would be preceded by flooding many times more destructive than from a flood equivalent to the 1955 flood of record in the Gwydir Valley.

Consequently, it can be assumed that areas downstream of Copeton Dam would already have been evacuated.

Purpose of System

16. The dam warning system provides information on water levels at Copeton Dam and on any conditions that may endanger the dam or lead to dam failure.

Operation and Procedures

17. The monitoring and triggering arrangements are as follows:

Water Level (metres AHD)	Alert or Action
Storage exceeds RL 572.655m.	**WHITE ALERT:** Flood passing through the spillway
Storage reaches RL 575.4m.	**AMBER ALERT:** Flood has reached the spillway design level—implement Emergency **ACTION 2**.
Storage reaches RL 575.4m and is expected to exceed RL 577.532m.	**RED ALERT:** Flood will exceed the spillway design level—implement Emergency **ACTION 1**.
RL 577.532m.	Storage at Embankment Design Crest Level (critical safety level)—Imminent Failure Flood Level.

Copeton Dam Alerts

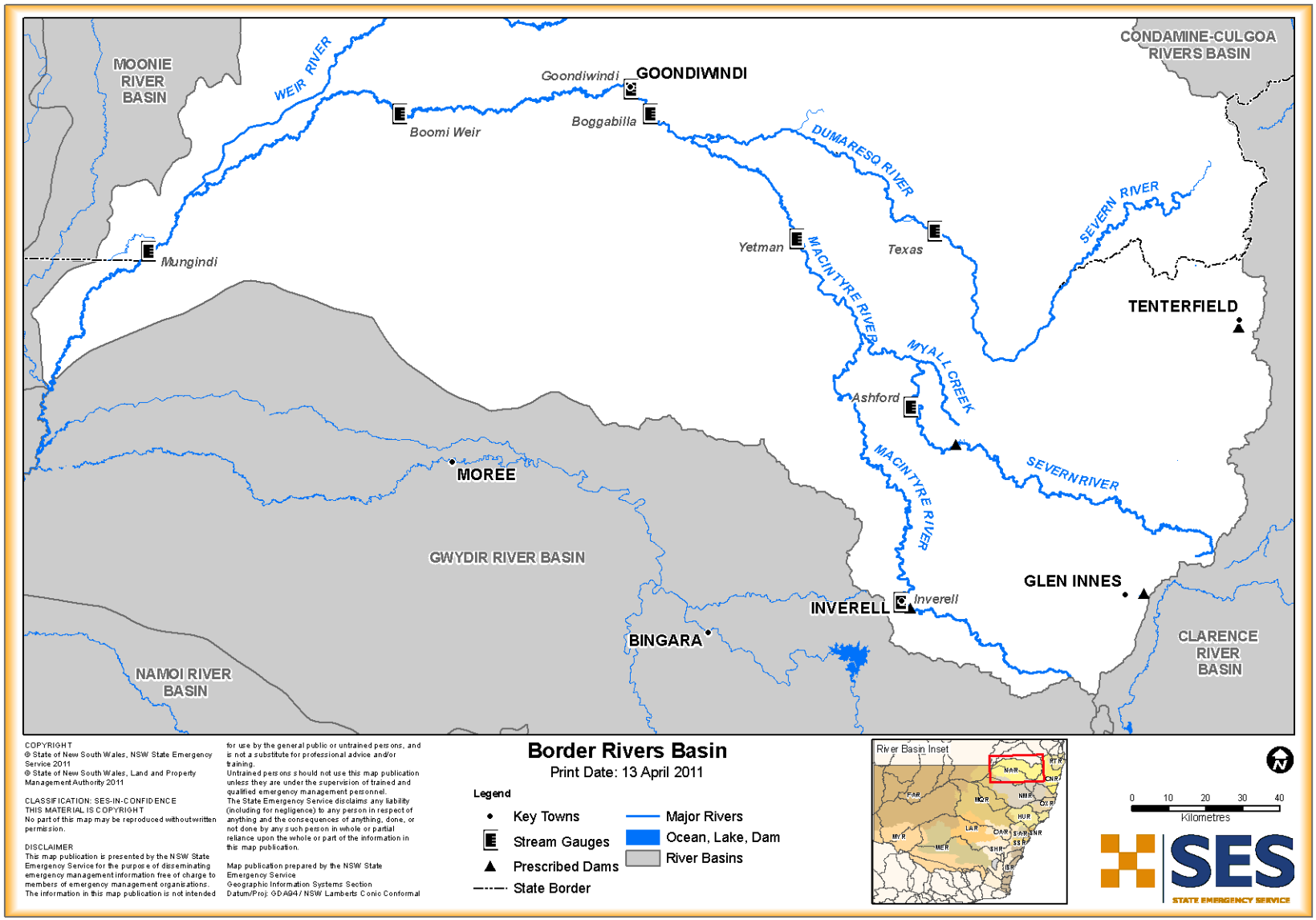
Prior Advice to People Potentially at Threat

18. To issue appropriate warnings and advice, State Water maintains a register of neighbours potentially at threat downstream of Copeton Dam. A "Flood Event Checklist" (Pg 84, Dam Safety Emergency Plan) confirms downstream neighbours will be notified prior to notification of a "White Alert" to the NSW State Emergency Service (discharge reaches 50,000Ml/day).

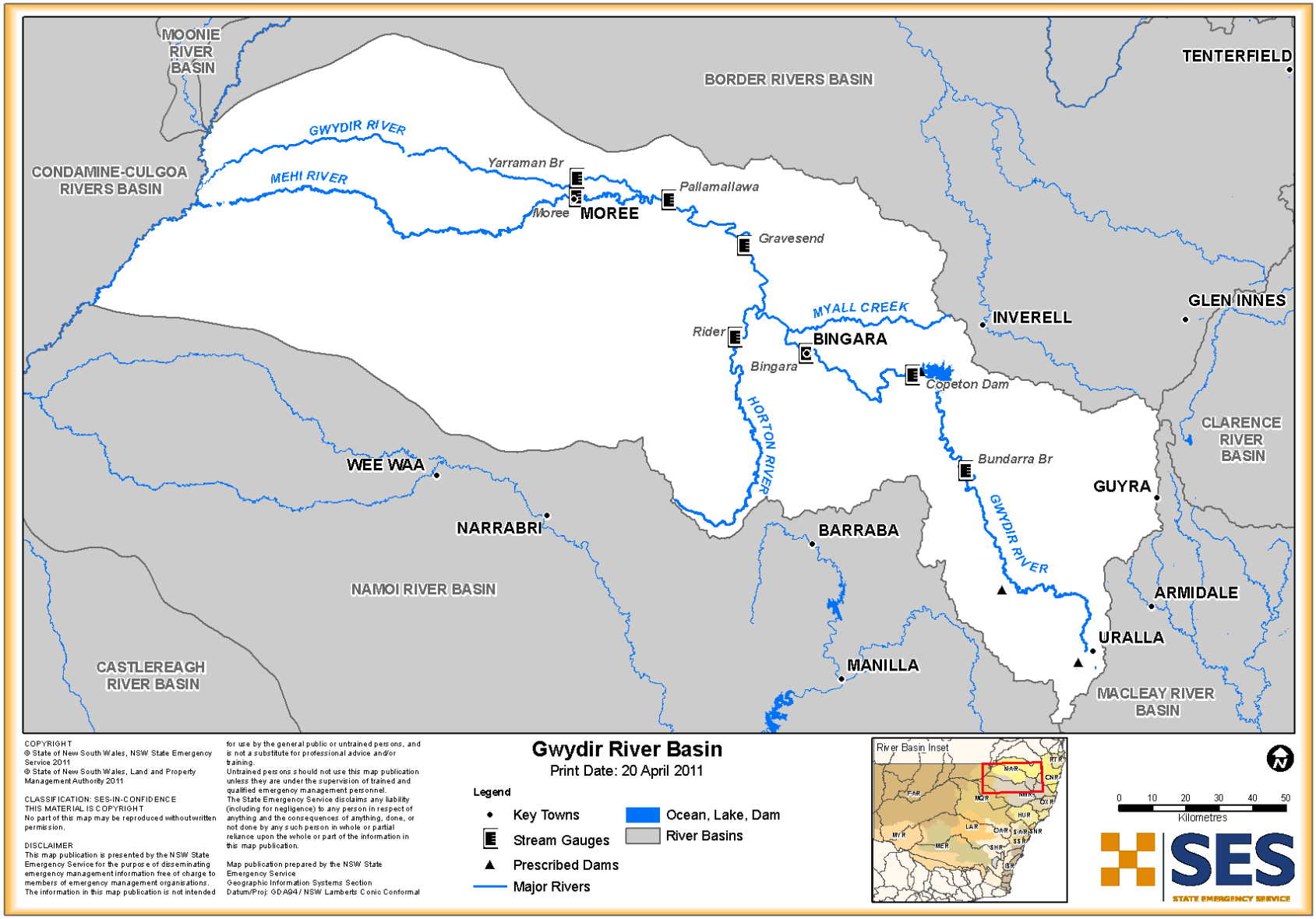
    An "Amber Alert" is notified to the NSW State Emergency Service if storage reaches RL 575.4 metres AHD.

ANNEX K - MAPS

MAP 1 - BORDER RIVERS BASIN



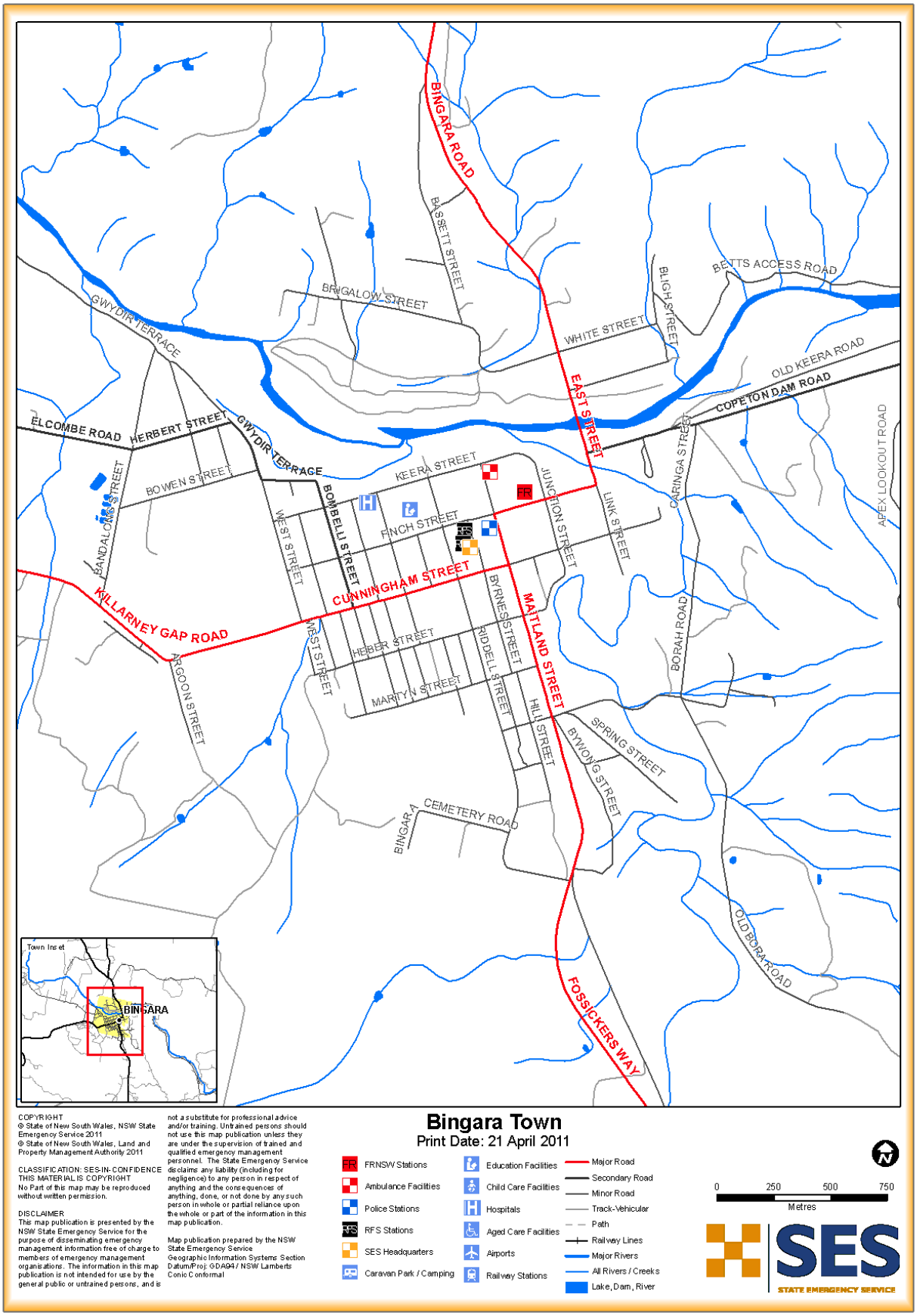
MAP 2 - GWYDIR RIVER BASIN



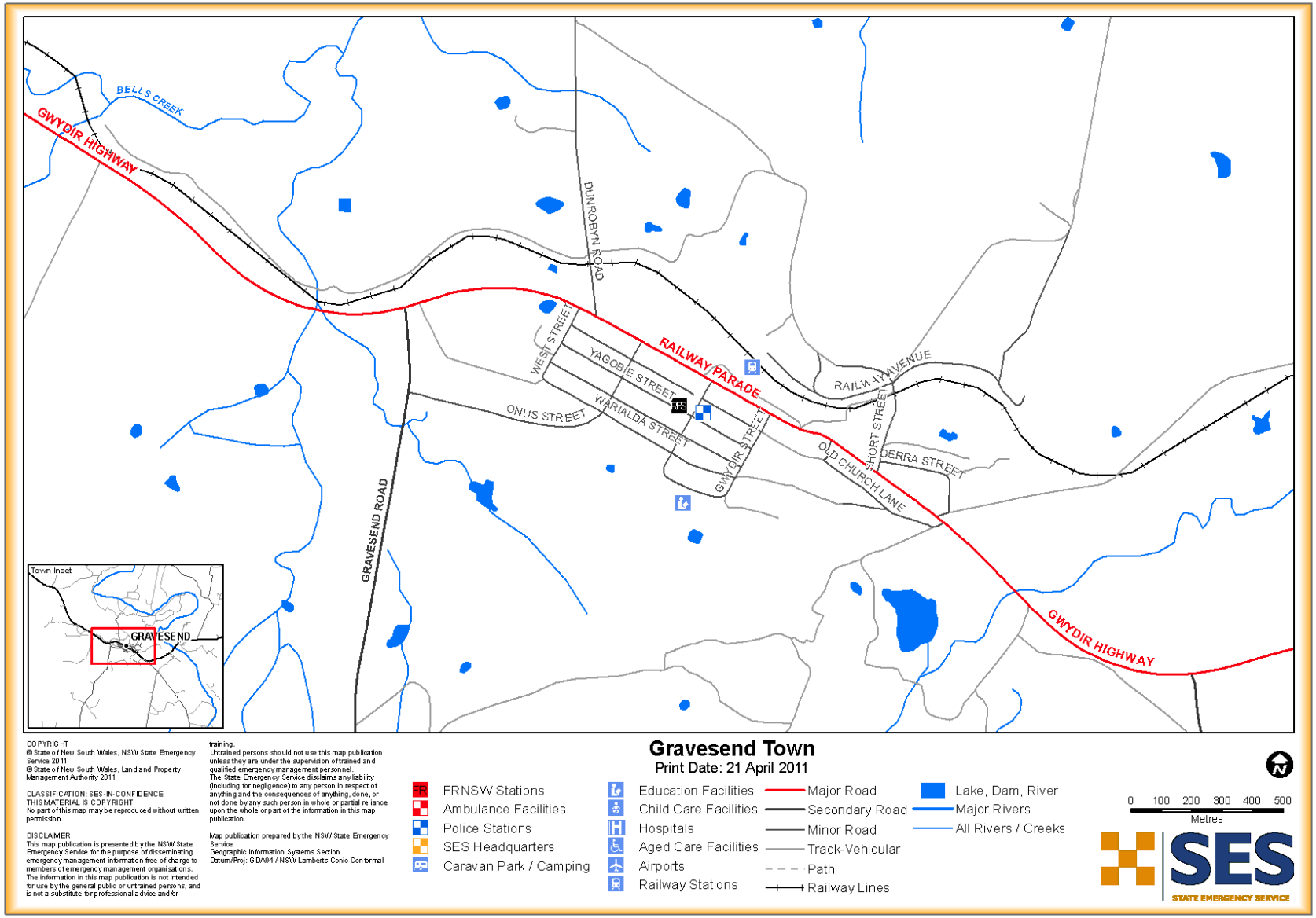
MAP 3 - GWYDIR SHIRE COUNCIL AREA

Map publication prepared by the NSW State Emergency Service
Geographic Information Systems Section
Datum/Proj: GDA94 / NSW Lamberts Conic Conformal

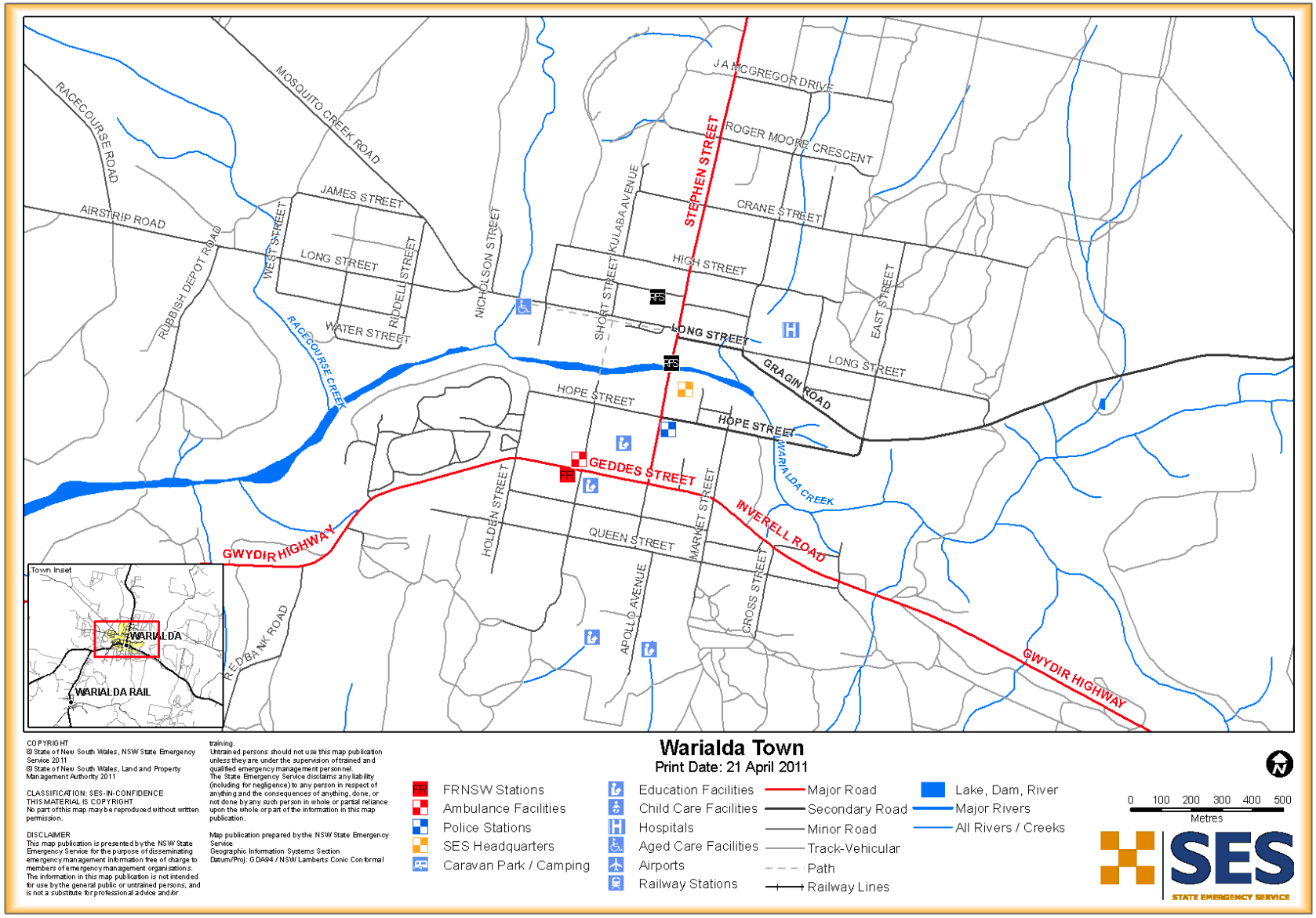
MAP 4 - BINGARA



MAP 5 - GRAVESEND



MAP 6 - WARIALDA



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Note: Information regarding flooding events and their impact in the Gwydir Shire was further gathered through anecdotal notes, photographs and historical data from community sources, including SES personnel and Council staff and information from historical documents, publications, region plans and operating procedures held at the North West Region SES Headquarters.