

Brewarrina Shire

Local Flood Emergency Sub Plan



BREWARRINA SHIRE FLOOD EMERGENCY SUB PLAN

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

Volume 1 of the Brewarrina Shire Flood Emergency Sub Plan

Endorsed by the Emergency Management Committee

**8 May 2024
Version 3.0**

AUTHORISATION

The Brewarrina Shire Flood Emergency Sub Plan is a sub plan of the Brewarrina 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:



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Colin Jones

Date:

8-5-2024

Endorsed

Signature:



Chair, Local Emergency Management Committee

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Date:

8th May 2024

VERSION HISTORY

Version Number	Description	Date
1.0	Brewarrina Shire Local Flood Plan	February 2004
2.0	Brewarrina Shire Local Flood Plan	January 2013

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

DISTRIBUTION LIST

Available for general use and distribution on the NSW State Emergency Service website
www.ses.nsw.gov.au

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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 Brewarrina 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 Brewarrina 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 Brewarrina Shire Local 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 Brewarrina Shire LGA. The Brewarrina Shire LGA and its principal towns, villages, rivers and creeks are shown in Appendix A.

1.4.2 The council area is within the NSW SES Western Zone and for emergency management purposes, is part of the Far West Emergency Management Region.

1.4.3 The plan sets out the Brewarrina Shire level emergency management arrangements for prevention, preparation, response and initial recovery for flooding in the Brewarrina 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 tsunamis) 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 Brewarrina 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 are 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 and or the NSW SES Western Zone Office (for regional level responsibilities outside of response operations).

1.8 PLAN MAINTENANCE AND REVIEW

- 1.8.1 The NSW SES will maintain the currency of this plan by:
- a. Ensuring that all supporting emergency services and functional areas, organisations and officers mentioned in it are aware of their roles and responsibilities.
 - b. 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 The NSW SES maintains information on the nature of flooding and effects of flooding on the community in the Brewarrina Shire LGA.
- 2.1.2 Declared dams in or upstream of the Brewarrina Shire Local Government Area.
 - There are no declared storage dams in the Brewarrina Shire LGA. Upstream, the closest declared dams are at least 250km away, in Narrabri, Gwydir and Inverell.
 - There are a number of large agricultural irrigation dams, particularly on cotton farms from the Queensland border down to Bourke. These are often quite large and are anecdotally changing flood patterns downstream. If these were to fail their consequences are currently unknown.

3 PREVENTION/ MITIGATION

3.1 INTRODUCTION

- 3.1.1 The Floodplain 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 floodplain risk management into land use planning is one of the key means to limit the exposure to flood risks to our communities and help build long term resilience to future flood events.

3.2 LAND USE PLANNING

3.2.1 **Strategy:** Effective land use planning is a key focus for minimising the impacts of flooding. The 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. The 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. The 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 floodplain management program.

Actions:

- a. The 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.
- b. The NSW SES will provide advice, support, technical resources and training for NSW SES representatives to contribute effectively on local Floodplain 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:** The 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 (CMGs) 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:** The 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. The 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).
- c. The 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. The NSW SES maintains a dedicated dam failure hotline and procedures to ensure priority dissemination of dam failure warnings.
- f. The 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.
- g. Gauge owners adequately maintain flood warning gauges and systems, including those identified in the 'Service Level Specification' maintained by the Bureau of Meteorology (Bureau) and those identified in the 'Provision and Requirements for Flood Warning in New South Wales' maintained by the NSW SES.

4.5 BRIEFING, TRAINING AND EXERCISING

4.5.1 **Strategy:** Ensure the 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. The NSW SES will consult stakeholders throughout the development of plans.
- b. The NSW SES will inform stakeholders of content changes after revisions.
- c. The NSW SES will ensure their facilities and resources are maintained and operationally ready.
- d. The NSW SES will train personnel for their expected flood operation roles.
- e. The 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:** Th 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:** The NSW SES works with individuals, communities, businesses and government agencies to build flood resilience.

Actions:

- a. Partner 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. The 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 of 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. The NSW SES uses the Australasian Inter-service Incident Management System (AIIMS) to manage the flood response.
- b. Control of flood response will be at the lowest effective level and may be scaled to suit the incident.
- c. The NSW SES State Controller (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 Incident 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:

- Supporting emergency services and functional areas should provide Liaison Officers to NSW SES Incident Control Centre(s) and/or Emergency Operation Centres as required.
- NSW SES will provide Liaison Officer(s) to Emergency Operations Centres as required.
- Where possible Emergency Operation Centres 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:

- The NSW SES Incident Controller will notify agencies of potential access issues between locations, for the consideration of pre-deploying of resources.
- NSW SES may request resources and logistics support directly from a supporting emergency service or functional area.
- Wherever possible, supporting organisations are to provide their own logistic support in consultation with NSW SES where appropriate.
- 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:

- 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.
- 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.
- 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. NSW SES Incident Controllers will issue the following NSW SES Flood Warnings aligning to the Australian Warning System:
 - Advice
 - Watch and Act
 - Emergency Warning
- c. NSW SES liaises with the Bureau to discuss the development of flood warnings as required.
- d. NSW SES provides alerts and deliver flood information to affected communities using a combination of public information.
- e. NSW SES may request supporting agencies redistribute NSW SES alerts and information, including through the provision of doorknocking teams.

- f. Road closure information will be provided to the community through the following agencies/methods:
 - Local Government 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.
- g. 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.
- h. 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. Brewarrina 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 Brewarrina 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.

- 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 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 **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 the local EMPLAN.
- f. NSW Police Force will coordinate the provision of overall security for evacuated areas.

5.8.3 **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 the NSW Police Force.

5.9 EVACUEE MANAGEMENT AND WELFARE

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

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

Actions:

- a. The 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. The 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 the NSW SES in the temporary closure of schools and will coordinate with the NSW SES, Transport Services and Welfare Services Functional Areas in the management of school evacuees.
- d. Disaster Victim Registration (DVR) will be controlled and coordinated by the NSW Police Force with the assistance of the NSW SES and the Welfare Services Functional Area.
- e. The 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 State Emergency Operations Controller (SEOCN) 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 the NSW SES and the SEOCN in consultation with members of the State Emergency Management Committee (SEMC).

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.

5.10 FLOOD RESCUE

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

Actions:

- a. The 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. The NSW SES may request other supporting emergency services to undertake flood rescues on behalf of The NSW SES. Agencies must be authorised/accredited to undertake flood rescue operations in accordance with State Rescue Board requirements, as prescribed by the NSW SES. Supporting emergency services must supply information regarding rescues performed to the NSW SES. Notification arrangements with the 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. The 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, the NSW SES will establish loading points where retailers can instruct suppliers to deliver goods.
- d. The 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. The NSW SES will assist hospitals with resupply of linen and other consumables where able.
- f. The NSW SES may request resupply assistance from supporting agencies.
- g. The 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, the NSW SES will establish a resupply schedule and coordinate the resupply for isolated rural properties.
- b. The 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 safe 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. The NSW SES will facilitate the return of evacuees to their homes.

5.13 END OF RESPONSE OPERATIONS

5.13.1 **Strategy:** Conclude response operations.

Actions:

- a. Response operations will conclude when:
 - 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. The 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 Functional Area and Brewarrina Shire Council representatives.
- b. The 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. The 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 State Emergency Recovery Controller (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 the NSW SES as the lead agency to transition to the 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. The 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: The NSW SES works with relevant stakeholders and Brewarrina Shire Council on post flood data collection analysis including review of flood intelligence where necessary.

6 RECOVERY OPERATIONS

6.1 INTRODUCTION

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

6.1.2 Recovery operations will be initiated and conducted as outlined in the 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:**

- The NSW SES will provide representation to Recovery Committees as required and may have an ongoing role in the Recovery phase.
- The 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.
- The NSW SES will provide information to the NSW Reconstruction Authority to support applications to Treasury for Natural Disaster Relief and Recovery Arrangements.
- The NSW SES, in conjunction with a Recovery Committee, will provide a service to support the information needs of a community immediately following a flood.
- The NSW SES and where required supporting agencies will assist with clean-up operations after floods, where possible when resources and personnel permit.

- f. The NSW SES may coordinate immediate relief in collaboration with the State Emergency Operations Controller (SEOC) and the State Emergency Recovery Controller (SERCON).

7 ABBREVIATIONS

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

8 GLOSSARY

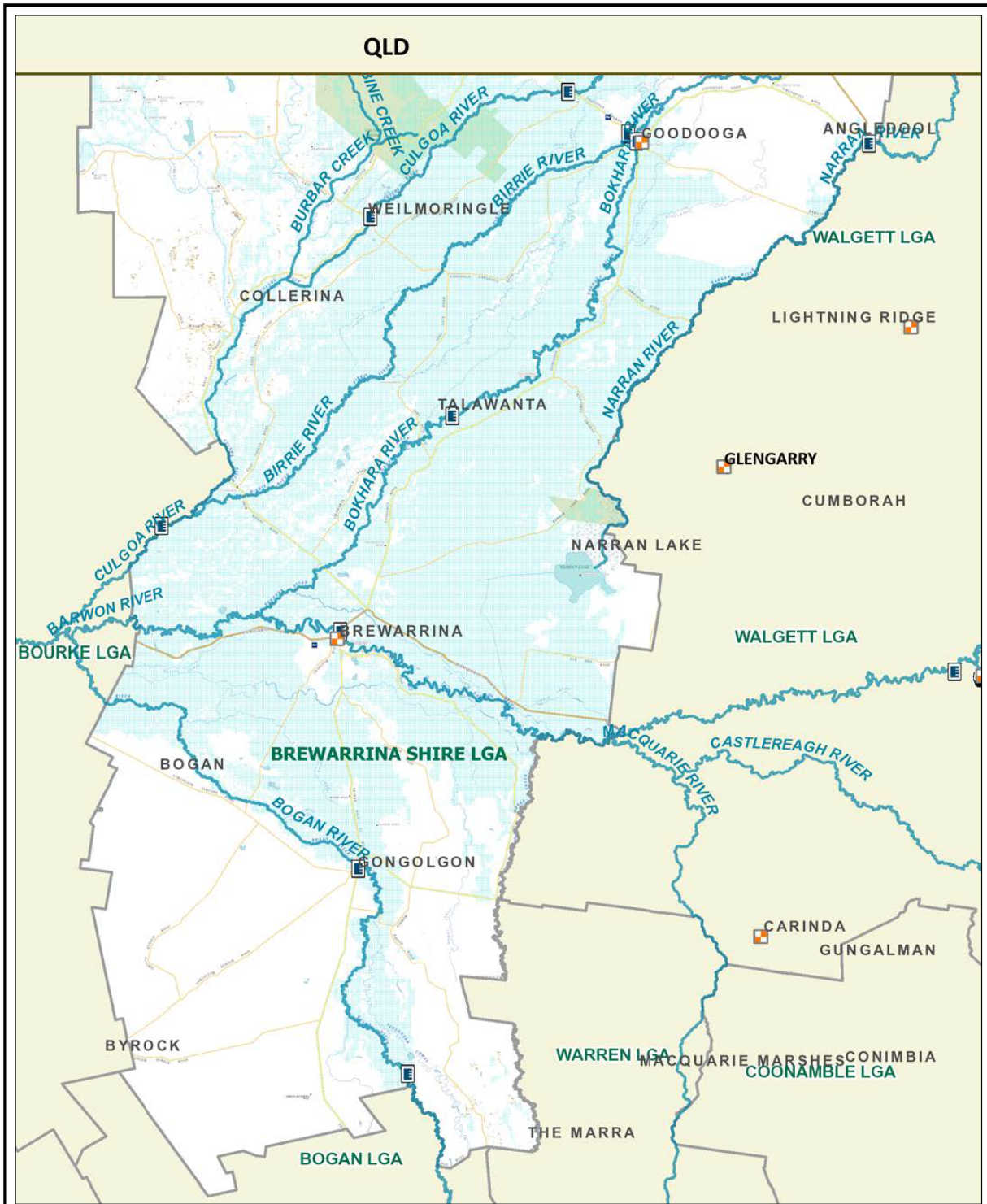
Common emergency service terminology can be found within the Australian Disaster Resilience Glossary.

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 Brewarrina Shire Council Area



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Local Government Area of Brewarrina Shire Council

- Legend
- SES Headquarters
 - Gauges (BOM Forecast)
 - Declared Dams
 - Levees
 - Rivers (Major)
 - LGA
 - Regional Towns



Printed: 2/06/2022

10 Appendix B – Roles and Responsibilities

AGENCY	RESPONSIBILITIES
NSW State Emergency Service	The NSW SES is the designated combat agency for floods, storms and tsunamis and controls response operations. The 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 Functional Area 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 (the Bureau) are outlined in the NSW State Flood Plan.
Brewarrina Shire Council	<p>Preparedness</p> <ul style="list-style-type: none"> • Establish and maintain floodplain and coastal risk management committees and ensure that key agencies are represented. • Develop and implement floodplain risk management plans in accordance with the NSW Government's Flood Prone Land Policy and the Floodplain Risk Management Manual. • Provide levee studies, flood studies and floodplain management studies to the NSW SES. • Maintain council-owned flood warning networks and flood mitigation works. • Participate in the 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. <p>Response</p> <ul style="list-style-type: none"> • Subject to the availability of council resources, assist the NSW SES with flood operations including: <ul style="list-style-type: none"> – Traffic management on council managed roads. – Provision of assistance to the NSW SES (plant, equipment and personnel where able and requested). – Property protection tasks including sandbagging. – Assist with the removal of caravans from caravan parks. – Warning and/or evacuation of residents and other people in flood liable areas. – Provision of back-up radio communications.

AGENCY	RESPONSIBILITIES
	<ul style="list-style-type: none"> – 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 the NSW SES, the NSW Police Force and people who contact the council for road information. – Assist the NSW SES to provide filled sandbags and filling facilities to residents and business in areas which flooding is expected. <ul style="list-style-type: none"> • 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 the NSW SES and the Health Services Functional Area during floods about key council managed infrastructure such as sewerage treatment and water supply. • Advise the Environmental Protection Authority of any sewerage overflow caused by flooding. • Work with the NSW SES and the NSW Department of Planning and Environment to collect flood related data during and after flood events. <p>Recovery</p> <ul style="list-style-type: none"> • Provide for the management of health hazards associated with flooding including removing debris and waste. • Ensure premises are fit and safe for reoccupation and assess any need for demolition. • Provide services, assistance and advice to State Government in accordance with the State Recovery Plan.
Caravan Park Proprietor(s)	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> – Provide the manager of the caravan park with a contact address and telephone number in case of an emergency.

AGENCY	RESPONSIBILITIES
	<ul style="list-style-type: none"> – 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: <ul style="list-style-type: none"> – 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 the NSW SES of the progress of evacuation and/or movable dwellings relocation operations and of any need for assistance in the conduct of these tasks.
Childcare Centres and Preschools	<ul style="list-style-type: none"> • When notified of possible flooding or isolation, childcare centres and preschools should. <ul style="list-style-type: none"> – Liaise with the NSW SES and arrange for the early release of children whose travel arrangements are likely to be disrupted by flooding and/or road closures. – 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	<p>The roles and responsibilities for the Energy and Utilities Services Functional Area are outlined in the Energy and Utility Services Supporting Plan (EUSPLAN).</p> <p>Roles and responsibilities in addition to the Supporting Plan are:</p> <ul style="list-style-type: none"> • Assist the NSW SES with identification of infrastructure at risk of flood damage where resources are available.

AGENCY	RESPONSIBILITIES
	<ul style="list-style-type: none"> • Facilitate local utility service distribution providers (electricity, gas, water, wastewater) to: <ul style="list-style-type: none"> – Provide advice to the NSW SES of any need to disconnect power/gas/water/wastewater supplies or of any timetable for reconnection. – Advise the NSW SES of any hazards from utility services during flooding and coastal erosion/inundation. – Advise the public with regard to electrical hazards during flooding and coastal erosion/inundation, and to the availability or otherwise of the electricity supply. – Clear or make safe any hazard caused by power lines or electricity distribution equipment. – Reconnect customers' electrical/ gas/ water/wastewater installations, when certified safe to do so and as conditions allow. – Assist the NSW SES to identify infrastructure at risk of flooding for incorporation into planning and intelligence.
Engineering Services Functional Area	The roles and responsibilities for the Engineering Services Functional Area are outlined in the Engineering Services Supporting Plan and NSW State Flood Plan.
Environmental Services Functional Area	The roles and responsibilities for the Environmental Services Functional Area 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 the Forestry Corporation of NSW are outlined in the NSW State Flood Plan.
Health Services Functional Area	The roles and responsibilities for Health Services Functional Area are outlined in the Health Services (HEALTHPLAN) Supporting Plan and NSW State Flood Plan.
Local Emergency Operations Controller (LEOCON)	<ul style="list-style-type: none"> • Monitor flood operations. • If requested, coordinate support for the NSW SES Incident Controller.
Local Emergency Management Officer (LEMO)	<ul style="list-style-type: none"> • If requested by the NSW SES Incident Controller, advise appropriate agencies and officers of the start of response operations.
Manly Hydraulics Laboratory (MHL)	The roles and responsibilities for Manly Hydraulic Laboratory are outlined in the NSW State Flood Plan.
Marine Rescue NSW	The roles and responsibilities for Marine Rescue NSW are outlined in the NSW State Flood Plan.

AGENCY	RESPONSIBILITIES
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.
State Emergency Operations Controller (SEOCN) / State Emergency Operations Centre (SEOC)	The roles and responsibilities for the State Emergency Operations Controller (SEOCN) / State Emergency Operations Centre (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.

AGENCY	RESPONSIBILITIES
Transport for NSW	<ul style="list-style-type: none"> • 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 the 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 the NSW SES with identification of road infrastructure at risk of flooding.
Transport Services Functional Area	The roles and responsibilities for the Transport Services Functional Area 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 the Welfare Services Functional Area are outlined in the Welfare Services Functional Area Supporting Plan and NSW State Flood Plan.

11 Appendix C – Community Specific Roles and Responsibilities

<p>Community Members</p>	<p>Preparedness</p> <ul style="list-style-type: none"> • 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. <p>Recovery</p> <ul style="list-style-type: none"> • Assist with community clean-up if required and able to do so. • Participate in after action reviews if required.
<p>Service and Sporting Clubs</p>	<p>Brewarrina RSL - Brewarrina Sports and Recreation Oval</p> <p>Assist with;</p> <ul style="list-style-type: none"> – Lifting and/or moving household furniture and commercial stock. – Sandbagging. – Doorknocking.
<p>Aboriginal Organisations or Groups</p>	<p>Brewarrina Aboriginal Land Council, Goodooga Aboriginal Land Council and the Weilmoringle Aboriginal Land Council:</p> <ul style="list-style-type: none"> • Act as the point of contact between the NSW SES and the Goodooga Pulkurra Development Corporation, Weilmoringle Housing Cooperative Council and Northern Star and the Ngemba Housing Cooperative community. • Inform the Brewarrina SES Unit Commander (NSW SES) about flood conditions and response needs. • Disseminate flood information, including flood and evacuation warnings, to the Goodooga Pulkurra Development Corporation, Weilmoringle Housing Cooperative Council and Northern Star and the Ngemba Housing Cooperative community.
<p>Cross-border Assistance Arrangement</p>	<ul style="list-style-type: none"> • A local cross-border mutual assistance arrangement exists in which the NSW SES and Queensland Fire and Emergency Services (QFES) will deploy resources to support each other.

HAZARD AND RISK IN BREWARRINA SHIRE

Volume 2 of the Brewarrina Shire Local Flood Plan

Last Update: August 2017

AUTHORISATION


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

Approved



Manager Emergency Risk Management
Date: 2/8/17

Approved



NSW SES Far West Region Controller
Date: 29/06/2017.

Tabled at LEMC

Date:

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VERSION LIST

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

Description	Date
Brewarrina Local Flood Plan – Annex A and B	February 2004

AMENDMENT LIST

Suggestions for amendments to this Volume should be forwarded to:

The Brewarrina Local Controller

NSW State Emergency Service

PO Box 116, BREWARRINA NSW 2839

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

Amendment Number	Description	Updated by	Date

Document Issue: Version 3-02052016

1 THE FLOOD THREAT

1.1 OVERVIEW

- a. The Brewarrina Shire LGA is located in the central north of NSW bordering Queensland. It is surrounded by the NSW local government areas of Walgett, Warren, Bogan and Bourke. The shire includes the towns and villages of Brewarrina, Goodooga, Weilmoringle, Angledool and Gongolgon.
- b. The Brewarrina LGA is bisected by the Barwon River which becomes known as the Darling River further downstream at Bourke. The northern half of the LGA lies within the Condamine-Culgoa River Basin (Maps 1 and 2) whilst the southern half lies within the Macquarie-Bogan River Basin (Map 3). The major rivers feeding into the Barwon River near Brewarrina include from the:
 - i. Macquarie-Bogan River Basin: the Macquarie and Bogan Rivers;
 - ii. Condamine-Culgoa River Basin: the Narran, Bokhara, Birrie, Culgoa Rivers and Burbar and Nebine Creeks.

1.2 LANDFORMS AND RIVER SYSTEMS

Condamine-Culgoa River Basin, Macquarie-Bogan River Basin

- a. The Barwon River takes its name at Mungindi on the NSW/QLD border, at which point the streams which make it up (the Macintyre, Dumaresq and Weir rivers and their tributaries) have already drained a total catchment of approximately 27,300 square kilometres (1).
- b. Several major tributaries originating to the north, join the Barwon River between Mungindi and the western edge of the Brewarrina Shire. The Moonie River, the Big Warrambool and the Culgoa, Birrie, Bokhara and Narran rivers join the Barwon on the after draining extensive areas of southern Queensland. The Culgoa, Birrie, Bokhara and Narran rivers constitute effluent streams from the Balonne River. Flow from these streams, although intermittent, enters the Barwon River through a defined system of meandering channels. The Narran River normally terminates in the Narran Lake, about 48 kilometres north east of Brewarrina, but in extreme floods its flows can reach the Barwon River (1).
- c. From the east and south east, the Gwydir, Namoi, Castlereagh, Macquarie and Bogan Rivers join the Barwon River between Mungindi and the point at which the Barwon River leaves the Brewarrina Shire. Significant flow contributions from these streams usually occur only during flood periods. At other times much of their runoff is lost in the marshes and effluent streams of their lower reaches (1).

- d. The Barwon River enters the Brewarrina Shire about halfway between Walgett and Brewarrina and leaves it a few kilometres upstream of its confluences with the Culgoa and Bogan rivers. At the Culgoa River junction, 50kms west of Brewarrina, the Barwon River officially becomes the Darling River for the remaining 1,448 kilometres to the confluence with the Murray River (1).
- e. To the point at which it leaves the Brewarrina Shire, the Barwon River and its tributaries have drained a total catchment area of 380,900 square kilometres (1).

1.3 STORAGE DAMS

- a. There are no prescribed storage dams in the Brewarrina Shire LGA. Upstream, the closest prescribed dams are at least 250km away, in Narrabri, Gwydir and Inverell.
- b. There are a number of large agricultural irrigation dams, particularly on cotton farms from the Queensland border down to Bourke. These are often quite large and are anecdotally changing flood patterns downstream. If these were to fail their consequences are currently unknown.

1.4 WEATHER SYSTEMS AND FLOODING

- a. Floods in the Brewarrina Shire generally originate from heavy rains over (1):
 - i. The Darling Downs in south eastern Queensland, entering the area along the weir on the Moonie river or via distributaries of the Balonne River (the Culgoa, Bokhara, Birrie and Narran rivers);
 - ii. The catchment of the Gwydir River (to the east), flowing through the Moree area and joining the Barwon River before entering the shire;
 - iii. The catchment of the Namoi River (to the south east), joining the Barwon River near Walgett before entering the Brewarrina Shire.
 - iv. The catchment of the Macquarie and Castlereagh rivers, which merge just before entering the Brewarrina Shire.
 - v. The catchment of the Bogan River.

1.5 CHARACTERISTICS OF FLOODING

- a. In the Brewarrina Shire, large tracts of rural land are inundated during floods by both riverine flooding and from overland flooding from numerous watercourses. This has a major impact on stations involved in agricultural production (1).
- b. Flooding in the Brewarrina Shire has five main characteristics:
 - i. **Origins:** Floods in the Brewarrina Shire generally originate from heavy rains over several large catchments (Darling, Gwydir, Namoi, Barwon, Macquarie,

- Castlereagh and Bogan Rivers) (1). It can also occur as a result of localised heavy rainfall.
- ii. **Long Warning Times:** The Brewarrina Shire is contained completely within the Barwon / Darling River valley and most floods in the area originate some distance away. Therefore, there is usually adequate warning time to prepare the community and to check the adequacy of structural mitigation measures in advance of flooding. In some floods, two weeks' notice can be provided in Bureau of Meteorology flood warnings (1).
 - iii. **Merging of Flood Waters:** The Brewarrina Shire is generally flat and is intersected by a number of significant rivers and creeks plus numerous smaller tributaries and distributaries that flow only intermittently. Together they form a network with flood water from different sources merging. This can result in over 75% of the Brewarrina Shire being inundated during significant flood events, with most roads cut and isolation being a significant problem (1).
 - iv. **Low Velocities:** Flood waters usually flow through the valley at low velocities, often taking over a month to pass a particular location. Although this causes little structural damage, it means that protective levees are required around settlements and many rural properties (1).
 - v. **Duration of Inundation:** The shire is mainly comprised of level 'black soil' alluvial plains that render many roads impassable after only 10 mm of rain. Properties, villages and the town of Brewarrina can be isolated by flood waters for weeks at a time. This requires resupply operations for long periods (1).
- c. Flooding behaviour for specific rivers is:
- i. **The Barwon River:** Inundation of the principally flat open country along the main stem of the Barwon River is mainly caused by overflow from the Barwon, because of its limited channel capacity, rather than from its tributaries. Inundation can last many months (1).
 - ii. **The Culgoa River:** The Culgoa River, which is fed by the Balonne River system in Queensland, floods an extensive area down the western side of the Brewarrina Shire before joining the Barwon River. Inundation can last for up to 6 months. The extent and depth of flooding depends very much on the relative flow of the Birrie and Barwon river systems, but is generally confined between sand ridges. The numerous properties and some villages can become isolated (1).
 - iii. **The Narran River:** The Narran River floods an area running down the eastern side of the Brewarrina Shire from the NSW/QLD border through the Narran Lake to the Barwon River. This isolates a number of rural properties and closes a number of roads (1).

- iv. **The Bokhara River:** Flows from near Hebel, Queensland Border, to join the Barwon River north of Brewarrina. An extension of the Balonne River the Bokhara flows past Goodooga and numerous rural properties. Flooding can cause inundation of the area lasting for considerable months (2).
- v. **The Birrie River:** Flows from the Bokhara River near Goodooga into the Culgoa River north of Brewarrina. The Birrie River when flooding has an influence on the Culgoa River. Extended flood periods have been known to occur in the area (2).
- vi. **The Bogan River:** Flows into the Darling River near Beemery Point 50kms west of Brewarrina. Flooding of the Bogan River at Gongolgon and Mulgawarrina affects rural properties stock and water pump heights. The Bogan at various heights flows into creeks causing inundation for many properties (2).

Table 1: Indicative Flow Travel Time for Barwon and Darling Rivers (1)

Stream	From	To	Travel Time (Days)
Barwon River	Mungindi	Mogil	3
Barwon River	Mogil	Collarenebri	1
Barwon River	Collarenebri	Walgett	5
Barwon River	Walgett	Brewarrina	7-14
Darling River	Brewarrina	Bourke	7

1.6 FLOOD HISTORY

- a. Table 2 below shows the flood history for Brewarrina Shire for floods above major level, referenced to heights from Brewarrina gauge (422002). The flood of record was in 1974 (10.68m), followed by 1976 (10.62m) and 1890 (10.57m). Recent floods of significance are Aug – Oct 1998 (10.08m) and Dec 2011 – May 2012 (9.97m).

Table 2: Flood History for Brewarrina Shire referenced to Brewarrina Gauge 422002

Min: 6.4 Mod: 7.0 Maj: 9.5 (1), (3)

Date	Peak height	Description
18/04/1890	10.57m	<ul style="list-style-type: none"> Estimated Peak height
12/07/1920	9.88m	<ul style="list-style-type: none"> Prior to the construction of the levee
24/07/1921	10.05m	<ul style="list-style-type: none"> Prior to the construction of the levee
18/08/1950	10.16m	<ul style="list-style-type: none"> Prior to the construction of the levee
13/12/1950	9.78m	
14/03/1956	9.63m	<ul style="list-style-type: none"> Prior to the construction of the levee
25/07/1956	9.75m	
28/02/1971 Feb-Mar 1971	9.93m	<ul style="list-style-type: none"> Very heavy rain over much of north & central western NSW from late Jan – first week of Feb 1971. Flood waters on the Bogan, Bokhara, Birrie, Culgoa, Narran and Warrego rivers, together with record / near-record floods on the Macintyre, Gwydir, Namoi, Castlereagh and Macquarie rivers. Levees were constructed and surveys undertaken to ensure adequate supplies would be available. 2 extra flood boats were deployed at Brewarrina, an RAAF helicopter was based at Bourke. Barwon River at Brewarrina peaked at 9.93 m on 28 Feb. Levees kept flood waters out of the town, surrounding areas were flooded for some weeks.
24/01/74 Jan-Feb 1974	10.68m (Flood of record).	<ul style="list-style-type: none"> Inland low pressure system moved from northern Australia to SW QLD in early Jan, caused flooding in northwest and far west NSW. Heavy rain 4-9 Jan, 200-380mm rainfall over wide areas, 250-360mm over 24hrs in some areas. During 1973 most inland areas had above average rainfall, resulting in little absorptive capacity and rapid run-off. Heaviest rain and worst flood damage was in Barwon and Culgoa/Bokhara basins, lower and middle reaches of Namoi, Gwydir and Macintyre rivers. By mid-January, thousands of km² were submerged. An area from Qld border to Bourke was a virtual ocean of flood water. Major flooding along the Macquarie, Gwydir, Namoi, Castlereagh and Barwon river systems resulted. The towns of Walgett, Brewarrina and Bourke were isolated for almost a month. Brewarrina, Goodooga and outlying areas were supplied by air for periods of up to a month.

Date	Peak height	Description
		<ul style="list-style-type: none"> Barwon River at Brewarrina peaked at 10.68m on 24 Jan. It remained above major level for 16 days and above minor level for 31 days. Brewarrina was not flooded because of levees built as the flood approached. However, a part was breached, then strengthened with sandbags by army personnel. About 150 people were evacuated from Goodooga to Brewarrina.
03/03/76 Feb-Mar 1976	10.62m	<ul style="list-style-type: none"> Extensive rain from tropical cyclone David caused serious flooding in north and NW of NSW in late Jan. In early Feb, a complex low formed in central Australia and moved into north NSW and south QLD, bringing further heavy rainfalls. Widespread flooding isolated Brewarrina, Goodooga and the outlying areas for about 5 weeks. About 100 people were evacuated from West Brewarrina to a 'tent city' at Geoff New Oval. Barwon River at Brewarrina peaked at 10.62 m on 3 Mar. It was above major level for 22 days and above minor level for 54 days. This flood lasted much longer than the slightly higher 1974 flood.
17/08/1998 22/09/1998 Aug-Oct 1998	9.55m 10.08m	<ul style="list-style-type: none"> Originated on the Moonie, Weir, Gwydir, Namoi, Castlereagh and Macquarie Rivers in Jul - Aug, the Namoi had the major effect with 5 peaks over 2 months. In mid-Sep the situation worsened with flooding in the north along the Culgoa, Birrie, Bokhara, Narran system and in the south along the Bogan River. Virtually the whole shire was flood affected, with many roads cut and resupply by helicopter and flood boat. Brewarrina was isolated by road for 9 days in late Sep and resupplied by fixed-wing aircraft to the aerodrome, from where supplies were moved by helicopter to town and farms. This required fuel dumps to be established there. A ferry operated between West Brewarrina and the town for more than 6 weeks, and to Barwon Four and North Brewarrina for shorter periods. Barwon River at Brewarrina peaked at 9.55 m in mid-August and then 10.08 m in late Sep. This was the highest peak since 1976 and 5th highest in the town's recorded history. Parts of the levees required repair with earth, sandbagging and steel sheeting.
12/12/2000	8.74m	
Dec 2011 – May 2012	9.97m	<ul style="list-style-type: none"> Brewarrina was isolated for 9 days by road on both occasions. During 2012 Brewarrina experienced issues with its town sewerage system. Public Works arranged for trucks to be transported to Brewarrina before its isolation to assist in the removal and pumping of treated sewerage from the communities holding ponds. NSW SES and the LEMC instigated the town resupply plan. All items were transported by road to Gongolgon to the south of Brewarrina and airlifted to Brewarrina Show grounds before distribution.

1.7 FLOOD MITIGATION SYSTEMS

- a. There is one levee system at Brewarrina, made up of 3 levees, which are shown on the Brewarrina town map, Map 4 and described in section 2.2.7.
- b. There is an informal, unmaintained levee at Weilmoringle, described in section 2.3.7.
- c. There are no prescribed detention basins within the Brewarrina Shire LGA.

1.8 EXTREME FLOODING

- a. No studies have been conducted to estimate the extent of the PMF, however larger floods that have been seen in the past should be expected.
- b. Most areas in the Brewarrina Shire are relatively flat and floodwater spreads widely across the floodplain, so that additional depths of flooding for bigger events are not anticipated to be large. For example, the estimated height of the 1% AEP event is 10.7m on the Brewarrina gauge (422002) and only increases to 10.8m for the 0.1% AEP event (4).
- c. Soil colour from aerial photographs can also provide an indication of previous flood events as areas that have been inundated with the fine silts from the river appear grey instead of red (eg. Maps 4-7).
- d. Extreme flooding of the shire leads to long term isolation requiring resupply delivered by Air assets.
- e. The large distances involved and the fact that roads become impassable when wet, means that resupply has to be done by air rather than by roads or flood boats.

2 EFFECTS ON THE COMMUNITY

2.1 COMMUNITY PROFILE

- a. The Brewarrina Shire covers an area of 19,200 km² and includes the town of Brewarrina and the villages of Goodooga, Weilmoringle, Angledool / New Angledool and Gongolgon. Over half of the population of the shire resides in Brewarrina and the remainder live in small villages or on rural properties. About 60% of the population are of indigenous origin (1).

Table 3: Census of Housing and Population data (2011)

Census Description	Brewarrina LGA 2011	Brewarrina LGA 2016	Brewarrina Town 2016	Goodooga 2016	Weilmoringle 2016
Total Persons	1,766	1,651	1,143	247	77
Aged 0-4 yrs.	179	124	92	21	4
Aged 5-14 yrs.	270	255	176	38	17
Aged 65 + yrs.	176	176	107	21	8
Of Indigenous Origin	1,043	1,011	740	183	55
Who do not speak English well	0	0	0	0	0
Have a need for assistance (profound/severe disability)	74	73	63	4	0
Living alone (Total)	165	162	107	29	9
Living alone (Aged 65+)	42	46	28	7	0
Residing in caravans, cabins or houseboats or improvised dwellings	9	17	8	0	0
Occupied Private Dwellings (Households)	575	553	369	93	27
No Motor Vehicle	134	126	93	19	11
Caravan, cabin, houseboat or improvised dwell	3	3	0	0	0
Rented via State or Housing Authority	59	63	60	6	0
Rented via Housing Co-Op or Community Church Group	117	147	83	44	21
No Internet Connection	269	215	149	44	3
Unoccupied Private Dwellings	152	106	59	4	0
Average persons per occupy dwelling	2.6	2.6	2.6	2.5	2.6
Average vehicles per occupy dwelling	1.4	1.4	1.2	1.4	1.1

Note: In the 2016 Census, Town and Locality counts are based on Mesh Block Data. Populations will be more precise for small localities than in previous Census. Hence some counts may increase and others may decrease.

SPECIFIC RISK AREAS - FLOOD

Condamine-Culgoa River Basin

2.2 BREWARRINA

2.2.1 Community Overview

- a. The town of Brewarrina is located on the south side of the Barwon River, on the Kamlaroi Hwy, 105km east of Bourke (Map 4). It has a population of 1143 with 369 occupied dwellings. There are approximately 90 business and public/institutional premises. The town is protected by several levees.
- b. About 65% of the population is of indigenous origin. Brewarrina is situated at the boundary of the traditional areas occupied by several language groups including the Ngemba, Murrawarri, Ualarai, Weilwan and the Baranbinga people (1).

2.2.2 Characteristics of Flooding

- a. Primarily Riverine Flooding from the Barwon River. However localised heavy rainfall can also contribute to flooding or cause pooling of water that can take some time to evaporate (referred to as Orphan Water).

2.2.3 Flood Behaviour

- a. There are major overflow systems from both the left and right banks of the Barwon River commencing about 10km downstream of the Marra Creek junction. Overflows to the south are conveyed via Tarrion Creek to join the Bogan River about 30km south-west of Brewarrina. Overflows to the north are conveyed via Cato Creek to join the Bokhara River about 10km north of Brewarrina. There are extensive floodplains associated with the Tarrion Creek and Cato Creek flows as well as the Barwon River flows upstream and downstream of Brewarrina (5).
- b. The interaction of Barwon River flows with Bokhara River and Culgoa River inflows from the north and Bogan River inflows from the south also leads to an extensive floodplain area (5).
- c. Floodwaters tend to accumulate to the north of Brewarrina on the Barwon River side as well as in low lying land south of the southern disused levee.

2.2.4 Classification of Floodplain

- a. The following flood classifications are based on known flood history. PMF flood classifications are unknown due to lack of flood studies for these areas. Gauge heights refer to Brewarrina gauge 422002 (6) (1).

Table 4: Classification of Floodplain in Brewarrina LGA

Area	Flood Classification	Description
Brewarrina	Rising Road access outside of Brewarrina to the local Airport	Brewarrina CDB is totally isolated at 10.4m due to the closure of the Brewarrina Gongolgon Road. However access to the airport is available. South Brewarrina is protected by a levee to 12.0m; however a low point of 11.1m is located along the western side of Doyle Street.
West Brewarrina (The Dodge)	High Flood Island	Small aboriginal community, about 50 people, 16 houses. Situated outside town levee, about 1km west of Brewarrina on the Bourke road. Located on high ground but becomes isolated at 9.8m.
Barwon Four	High Flood Island	Aboriginal community of 130 people, 38 residences. Located outside the levee north west of Brewarrina, across the river. The majority is located on high ground, however several homes on the river frontage inundated by flood water. Becomes isolated from Brewarrina at 9.70m when access to North Brewarrina is closed.
North Brewarrina (The Billabong)	Low Flood Island	Small residential area with about 70 people, 20 residences. Located between Brewarrina and the Barwon River. Isolated from Brewarrina at 9.70m. Protected by a ring Levee to 12.0m. However if the levee were to overtop only the North eastern corner would be flooded.

2.2.5 Isolation

- a. Barwon Four is isolated from Brewarrina during major flooding. Of the 38 houses, 18 are new houses which have floor levels above 10.7m at the Brewarrina gauge (1% AEP flood height). Some are over a metre higher. Constructing levees around houses can provide protection, whether individually or in small groups. (1).
- b. West Brewarrina is located on high ground but minor flooding of the low ground between Brewarrina and West Brewarrina cuts the main road into Brewarrina. The NSW SES has historically operated a ferry service during times of flooding. Road access for 4WD vehicles is available via the airport-Red Hill track then onto Charlton Road (1).
- c. The whole of Brewarrina is usually isolated by road for 2-3 weeks. This can be up to 3-5 weeks during periods of major flooding depending on which rivers are in flood (7).
- d. See Section 2.2.6 below for specific heights of isolation for Brewarrina.

2.2.6 Inundation

- a. The table below lists of flood effects at Brewarrina, relative to Brewarrina gauge 422002 (3). Design flood heights are also listed (4).

Table 5. Effects of Flooding in Brewarrina, relative to Brewarrina gauge 422002

Min: 6.4, Mod: 7.0, Maj: 9.5 (1), (3)

Gauge Height (m)	Description
6.70	Water breaks out of the Barwon River at Brewarrina; billabong flows
7.00	Brewarrina - Bourke road (SH29) may close between Brewarrina and West Brewarrina, cutting off access to aerodrome. Alternative access may still be possible via Tarcoon road and Red Hill. This alternative closes at 9.8m
7.4	Brewarrina – Bourke road (SH29) may close at Bogan River Bridge; detour still available via Gongolgon.
8.3	Properties along Barwon River west of Brewarrina begin to experience isolation
8.62	18/06/83 peak height, about 50 homesteads isolated from Brewarrina for 8 weeks.
8.8	Brewarrina-Yarrowin, Brewarrina-Carramar and Brewarrina-Charlton roads closed; 30-35 properties in south of shire cut off from Brewarrina. Extensive flooding of farmlands in southern parts of shire.
9.0	Water starts to flow over the Cato Bridge
9.4	10% AEP design flood level Flood Barriers in the North Brewarrina Levee installed.
9.45	Brewarrina - Walgett road (MR 68) closes to cars at the Barwon Bridge. Access to the Barwon Four residential area is restricted to high clearance 4WD vehicles.
9.5	Cato Bridge closes to all traffic; access from Brewarrina to the north of the shire is lost.
9.7	Access to North Brewarrina (Billabong) is restricted to high clearance 4WD vehicles, due to water over Bridge Road just north of the Billabong Bridge. All road access to Barwon Four is lost.
9.8	West Brewarrina isolated from Brewarrina due to water over Brewarrina-Bourke Rd SH29
10.00	Floodwaters divide Brewarrina into four areas: Brewarrina CBD, North Brewarrina, Barwon Four and West Brewarrina. North Brewarrina is isolated. Possibly over 100 rural properties north and south of the shire are cut off from Brewarrina.
10.2	5% AEP design flood level
10.4	Tarrion Creek closes Brewarrina-Gongolgon road (MR 70) (was 10m before upgrade work to road); access to Nyngan via Gongolgon is lost and Brewarrina is completely isolated by road. Gongolgon and Brewarrina Yetta Dhinnakkal Centre are cut off from Brewarrina by road.
10.6	2% AEP design flood level
10.62	3/03/76. Peak height, all roads were closed for 4-5 weeks. 100 residents evacuated from West Brewarrina to Geoff New Oval tent city.
10.68	24/01/74. Peak height (Flood of Record).
10.7	1% AEP design flood level (117.4m AHD)
10.8	0.1% AEP design flood level
11.1	Design crest height of the concrete part of the main town levee, which runs along the western side of Doyle Street. This is the low-point of the upgraded levee.
12	Design crest height of main Brewarrina Levee upgrade (Town levee, North Brewarrina levee, South levee)

2.2.7 Flood Mitigation Systems

- a. The Brewarrina Levees are a three part levee system with a total length of approximately 5.40 km (8):
 - i. Southern Levee – Chainage 0 to 470 m
 - ii. Town Levee – Chainage 500 to 4,390 m
 - iii. Northern Ring Levee – Chainage 4,400 to 5,380 m
- b. The Brewarrina Levee was reported to have been originally designed and constructed to the 1% AEP flood level with a 0.5 m freeboard. Subsequent upgrades have raised the crest level to 12m. The overall levee construction and upgrade history can be summarised as follows (8):

1974 - Town Levee was a temporary levee constructed prior to major flood event;

1976 - Town Levee “reconstructed” by Council into a permanent levee;
Construction history of Northern Ring Levee and Southern Levee (also called Tarrion Creek Road Levee) is unclear;

1996 - Maintenance works done – addition and compaction. It is unclear which levee this was.

2000 – Levee upgrade design completed to address structural deficiencies and extension of Town levee.

2001-02 – New levees created around North Brewarrina, along the Brewarrina-Charlton road and to the south of the town across Tarrion Creek. These were intended to provide access to Brewarrina Airport and give protection up to the 1% AEP flood level (1).

2002-03 – Construction works 75% complete when work halted for legal dispute over deficiencies in construction.

2005-07 – GHD identified 32 vulnerable points. Council carried out minor remedial works on sections of the levee (2).

2007 – Funding allocated for more remedial works.

2009-10 – Major remedial works scheduled (Grose pollution traps, filters and pumps, erosion control along Northern Levee, reconstruction of Charlton Road Levee) (2).

2012 – Remedial works completed.
- c. Details for each of the three Brewarrina levees are given in the following tables.

Table 6: Summaries for Brewarrina Southern levee, Town levee and Northern Ring levee (8).

Brewarrina Southern Levee (Tarrion Creek Road Levee also known as the “Southern disused levee”)	
Location	West end of Brooks Rd, Brewarrina. Barwon River.
Type of Levee	Earth-fill embankment type levee with a bitumen road surface, length 470m. Ties together the higher ground to the west end of Brooks Rd and nearby property. Helps to protect the southern side of Brewarrina. The construction of the Charlton Street flood gates have minimised the amount of water flooding into this area. Is known locally as the “Southern disused levee” because it hasn’t flooded up to the levee since 1999 due to the installation of these gates.
Owner	Brewarrina Shire Council
Design Height and freeboard	There are discrepancies in the quoted levee height: The original design level of 1% AEP, i.e. 10.2m on Brewarrina gauge (422002) with 1m freeboard (4). Council has suggested that the current freeboard is 0.5m (8). A height of 9.98m on the Brewarrina gauge was reached during the 2012 flood event, during this event water was not sitting up against this levee due to the presence of the Charlton Street Flood gates (7).
Overtopping Height	NA. No spillways
No. of properties protected	This levee helps to protect the Southern side of Brewarrina (Approx. 10-15% of town)
Known low points	NA.
Inundation	NA.
Overtopping / failure	NA.
Deficiencies	Considered to be in acceptable condition. No river bank stability issues have been reported by Council. GHD’s identified levee vulnerable points were rectified in 2012 (road pavement cracking, structural issues with a discharge culvert).

Brewarrina Town Levee	
Location	Brewarrina township. Barwon River.
Type of Levee	Total length 3890m. Chainage Type 500 – 2550 m: Earthen with bitumen road surface; 2550 – 3000 m Earthen, crest with no covering; 3000 – 3350 m: Concrete wall with drop-board type flood gates; 3350 – 4390 m: Earthen, crest with no covering.
Owner	Brewarrina Shire Council
Design Height and freeboard	There are discrepancies in the quoted levee height: The original design level of 1% AEP, i.e. 10.2m on Brewarrina gauge (422002) is confirmed by audit Freeboard 0.5m, may be greater as a 2013 Public Works survey indicates general crest level higher than 10.7m (8). However the levee was upgraded in 2011-12 to a design crest height of 12.0m on the Brewarrina gauge, however there is no documentation available confirming this height The concrete section which runs along the western side of Doyle St is 11.1m (7).
Overtopping Height	Crest level survey carried out by NSW Public Works in May 2013. No spillway.
No. of properties protected	Protects residential and commercial areas of Brewarrina township.
Known low points	Permanently retained levee road openings at chainages 2800 and 3750m requires construction of temporary earth dams before flood events. Concrete wall section requires installation of drop-board type flood gates.
inundation	NA
Consequences of levee overtopping or failure	If the levee failed, inundation of properties above floor level would be (4): 1% AEP event (10.7m) 50 residential 15 Commercial 0.1% AEP event (10.8m) 66 residential 22 Commercial
Deficiencies	Considered to be in acceptable condition. Council advised that minor river bank erosion has taken place in the vicinity of Chainage 2,900m, at the rear of the aboriginal cultural centre. It was observed that the erosion is currently not causing any imminent threat to the levee. GHD's identified levee vulnerable points were rectified in 2012 (installation of dry batter filters, reconstructing road pavement, minor raising of level crest and rectification of existing culvert seals).

Brewarrina Northern Ring Levee	
Location	North of Brewarrina township. Barwon River.
Type of Levee	Earth fill embankment type levee, length 980m.
Owner	Brewarrina Shire Council
Design Height and freeboard	There are discrepancies in the quoted levee height: The original design level of 1% AEP, i.e. 10.2m on Brewarrina gauge (422002) with 0.5m freeboard is confirmed by audit (8). However the levee was upgraded in 2011-12 to a design height of 12.0m on the Brewarrina gauge, but there is no documentation available for this height (7).
Overtopping Height	Crest level survey carried out by NSW Public Works in May 2013. No spillway.
No. of properties protected	Protects an isolated residential village located to the south and west of the Barwon River protecting around 70 people in 20 properties.
Known low points	The north east corner of the levee closest to the river is the lowest point in the levee. If it were to fail or overtop these properties would flood first, other properties inside the levee to the west are positioned on higher ground.
Inundation	NA
overtopping / failure	NA
Deficiencies	No river bank stability issues have been reported by Council. GHD's identified levee vulnerable points were rectified in 2012 (installation of dry batter filters, overlay on wet batter, reduce shrinkage of fill)

- d. There are flood gates installed beneath Darling Street (which becomes Charlton Rd) which can be used to control the flow of water from Tarrion Creek into the Barwon River, or else to prevent backflow from the Barwon River into Tarrion Creek. They were designed to minimise water flow from the Barwon flowing back behind the Southern disused levee. Water can be stored in a swamp area to the south west of Brewarrina. Brewarrina Shire Council manages these flood gates.

2.2.8 Dams

- a. There are no prescribed storage dams in the Brewarrina Shire LGA. Upstream, the closest prescribed dams are at least 250km away, in Narrabri, Gwydir and Inverell.
- b. There are also numerous non-prescribed agricultural dams upstream of Brewarrina which influence flooding within the LGA.

2.2.9 At Risk Facilities

- a. The facilities that are at risk of flooding and/or isolation within Brewarrina are shown in Annex 2. If the town levee fails this includes 2 educational facilities, 2 childcare

facilities, 2 hospital / nursing homes and one Caravan Park. Outside the levee, there are 2 at risk caravan parks / camping grounds.

2.2.10 Other Considerations

- a. June long weekend – Brewarrina Big Fish fishing competition attracted over 400 anglers in 2014. Camping areas may have higher than normal occupancy.
- b. Late September - Brewarrina rodeo attracts an extra 500-600 people.

2.3 WEILMORINGLE

2.3.1 Community Overview

- a. Weilmoringle is a mostly aboriginal community with a population of about 77 people, of which about 71% are of indigenous origin (9). However the population of Weilmoringle is quite transient and can vary from time to time. It consists of about 27 private dwellings, a Community Centre a school and a General Store/Post Office. Weilmoringle is located about 110km north of Brewarrina, near the intersection of Jobs Gate Rd and West Culgoa Rd. Weilmoringle is divided into two separate locations 900 metres apart (Map 5).
 - i. To the north is Weilmoringle containing the School, Post Office, Airstrip and a few residential buildings.
 - ii. 350 metres south is Weilmoringle Station a rural grazing property. To the south is the main settlement and is referred to by locals by its Aboriginal name of Whytabalah.
- b. The community is often referred to as North Weilmoringle and South Weilmoringle (Whytabalah).
- c. Weilmoringle is on the western bank of the Culgoa River (Map 5).
- d. The Community Centre is the main hub of Whytabalah utilised for numerous community events and designated as the Rural Transaction Centre
- e. South Weilmoringle (Whytabalah) Aboriginal village is protected by a ring levee that has not been well maintained (1).

2.3.2 Characteristics of Flooding

- a. Riverine flooding from the Culgoa River. Localised heavy rainfall can also contribute to flooding or cause pooling of water that can take some time to evaporate (referred to as Orphan Water).

2.3.3 Flood Behaviour

- a. Once the Culgoa River overtops its banks floodwaters can fill the area between the Whytabalah levee and the river, with the highest depths experienced to date being 6.1m on the Weilmoringle gauge (422017). The West Culgoa Road forms part of the ring levee surrounding Whytabalah. Water can flow through culverts under this road flooding the western side to shallower depths.
- b. North Weilmoringle is located on higher ground and has not historically flooded. However it becomes isolated on a High Flood Island.

2.3.4 Classification of Floodplain

- a. The following flood classifications are based on known flood history. PMF flood classifications are unknown due to lack of flood studies for these areas. Gauge heights refer to Weilmoringle gauge (422017) (6).

Table 7: Classification of Floodplain in Weilmoringle / Whytabalah

Area	Flood Classification	Description
North Weilmoringle	High Flood Island	Weilmoringle is located on high ground, however becomes isolated at 5.7m.
South Weilmoringle (Whytabalah)	Low Flood Island	Whytabalah becomes isolated at 5.7m. Is protected by a ring levee to 6.2m

2.3.5 Inundation

- a. Table 8 below lists the effects of flooding in Weilmoringle, relative to the Weilmoringle gauge (422017). Major roads start closing at 5.5m and by 5.7m South Weilmoringle (Whytabalah) is isolated. In major events, evacuations of Whytabalah have been ordered due to concerns about the condition of the levee.

Table 8: Effects of flooding in Weilmoringle / Whytabalah, relative to the Weilmoringle gauge 422017.

Min: 5.2m, Mod: NA, Maj: 5.8m (3)

Height	Description
5.2	Minor flooding begins and about half the population needs to be evacuated to high ground and temporary accommodation. In past floods the community has been reluctant to evacuate and preferred to sit the flood out. (1). However power has been disconnected due to levee concerns and local rain has caused the septic system to fail (3).
5.5	The eastern causeway closes to low clearance vehicles.
5.5	The main Weilmoringle to Bourke road closes between Weilmoringle and "Woollahra". Alternative access is available via Job's Gate road.
5.7	The eastern causeway closes to high clearance vehicles. Weilmoringle is cut off by road. In previous events, a tractor has been utilised to transport goods and personnel across the river.
5.7	Whytabalah Aboriginal Village is isolated by road due to widespread inundation of the surrounding area.
5.99	1983 Peak height. Whytabalah Aboriginal Village was isolated for about 8 weeks.
6.0	Airstrip has some water on the lower end. However it remains useable (1).
6.01	2012 Peak height. South Weilmoringle (Whytabalah) evacuated due to levee issues.
6.2	Nominal levee height for Whytabalah Aboriginal Village, however levee is in poor condition, see Table 9 for details. During 2010 and 2011 the village was evacuated.
6.50	Peak height 1956. Highest recorded flood level.

2.3.6 Isolation

- a. Weilmoringle and Whytabalah Aboriginal village are both isolated at 5.7m when Jobs Gate Road is cut at its eastern causeway.

2.3.7 Flood Mitigation Systems

Table 9: Levees in Weilmoringle / Whytabalah (3)

Weilmoringle (Whytabalah) Levee	
Location	Southern end of Weilmoringle (Whytabalah), Culgoa River
Type of Levee	Ring levee constructed mid-1970s
Owner	Aboriginal Land Council
Design Height and freeboard	No levee plan available (7).
Overtopping Height	6.2m (3)
No. of properties protected	24 properties within the ring levee with approximately 77 people
Known low points	5.6m the south eastern corner of the levee was shored with dirt and sandbagged in the 2012 flood event (7).
Inundation	Whytabalah at risk of flooding should the levee overtop or fail.
Consequences of levee overtopping or failure	The properties within the levee would be flooded.
Deficiencies	<p>The levee is in poor condition and requires major works. Due to its condition and possible failure of the levee structure, the NSW SES has issued Evacuation Orders in past floods (3).</p> <p>Major repairs were completed to the levee during Jan 2011 due to an expected peak of 6.2m. Shoring of the levee and major sandbagging was completed at various chainage points around the levee structure (3).</p> <p>Tenders have been submitted for investigation and design of a levee upgrade (9), but no major upgrade works have yet been done (7).</p>

2.3.8 Dams

- a. There are no prescribed storage dams in the Brewarrina Shire LGA. Upstream, the closest prescribed dams are at least 250km away, in Narrabri, Gwydir and Inverell.

2.3.9 At Risk Facilities

- a. The North Weilmoringle primary school is at the edge of historical flood extents. It is unlikely to flood, however can be affected by isolation (Note the School is situated 900m to the north of South Weilmoringle (Whytabalah)).

- b. An electricity sub-station is located within South Weilmoringle (Whytabalah) which is at a height of 5.7m. This is considered to be dangerous if the levee were to fail and has led to evacuations in the past.
- c. The sewage system within South Weilmoringle (Whytabalah) is also shut down at 5.6m.
- d. The facilities that are at risk of flooding and/or isolation within the Brewarrina Shire LGA are further detailed in Annex 2.

2.3.10 Other Considerations

- a. When major flooding is expected, weekly meetings are held on site to keep the community informed. During 2011 and 2012 the NSW SES also put out an information bulletin to keep the community informed regarding flooding. These initiatives were well received by the community. Approximately 85 percentage of the community will evacuate if requested to do.
- b. Note: Most families from Weilmoringle will refuse to be evacuated to Brewarrina, this must be taken into consideration when evacuating family members.

2.4 GOODOOGA

2.4.1 Community Overview

- a. The village of Goodooga is situated in the northern part of the Brewarrina Shire about 120km northeast of Brewarrina, and about 20km by road from the Queensland border (Map 6). The closest town is Lightning Ridge, 75km to the south east. It has a population of about 247 and about 97 private occupied dwellings. About 74% of the population are of indigenous origin.
- b. Goodooga lies on the eastern bank of the Bokhara River, 8km south of the confluence with the Birrie River.
- c. Goodooga Reserve is situated 1km northeast of Goodooga. There are 12 residential properties with a population of approximately 20 situated on the east bank of the Bokhara River (3).

2.4.2 Characteristics of Flooding

- a. Goodooga is affected by riverine flooding from three rivers, the Bokhara, Birrie and the Narran within the Condamine-Culgoa River Basin. Localised heavy rainfall can also contribute to flooding or cause pooling of water that can take some time to evaporate (referred to as Orphan Water).

2.4.3 Flood Behaviour

- a. The Bokhara River flows into the Barwon River whilst the Birrie River flows into the Culgoa River. The Narran River flows into Narran Lake. During large flood events Narran Lake can overflow into the Barwon River, however this is rare.
- b. Often the Bokhara, Birrie and the Narran all flood at similar times as they are all essentially sourced from the same river within Queensland, the Balonne River.
- c. Water tends to flood out of the Bokhara River to the north of Goodooga and into swamps near One and Three Mile causeways to the east of town. This cuts the Goodooga Lightning Ridge Road access isolating the town.
- d. The Birrie River runs parallel to the Bokhara River and flows from it approximately 10km upstream from Goodooga. Floodwaters from the Birrie River join with floodwaters from the Bokhara River west of Goodooga.
- e. The Narran River is located approximately 45km to the west of Goodooga. In past flood events it has often flooded slightly after the Birrie and Bokhara Rivers. Prior to entering Narran Lake, floodwaters cut the Weetalibah causeway preventing access to Lightning Ridge. When the gauge at New Angledool on the Narran River (422928) reaches 2.6m, a further 48 hours later this causeway is cut. Floodwaters in this area can be reasonably fast flowing with the potential to wash away cars and the road surface (7).

2.4.4 Classification of Floodplain

- a. The following flood classifications are based on known flood history. PMF flood classifications are unknown due to lack of flood studies for these areas. Gauge heights refer to Goodooga gauge on the Bokhara River (422014) (6).

Table 10: Classification of Floodplain in Goodooga

Area	Flood Classification	Description
Goodooga	High Flood Island	Goodooga is mostly located on high ground. However may require small temporary levee in the north east corner to redirect flood water away from the hospital grounds. Goodooga becomes isolated at 3.70m
Goodooga Reserve	High Trapped Perimeter	Properties are located on high ground, however they lose essential services (Electrical and Sewerage) and become isolated at 3.40m

2.4.5 Inundation

- a. Goodooga has a low-lying area near the hospital (referred to as the Goodooga Health Service). During historical flood events a small dirt wall (temporary levee) has been placed at rear of the hospital to minimise water entering the hospital grounds.
- b. Table 11 below lists the effects of flooding in Goodooga, relative to the Goodooga (Bokhara) gauge (422014). The majority of roads are closed by 3.3m and isolations begin soon after (see section 2.4.6).

Table 11: Effects of Flooding in Goodooga, relative to the Goodooga (Bokhara) gauge 422014.
Min: 2.7m, Mod: 3.4m, Maj: 4.2m (2), (3)

Gauge Height (m)	Description
2.7	Town is isolated from the airstrip to the west by the Bokhara and Birrie Rivers (1).
3.3	Majority of roads in the Goodooga area will close at this height. Goodooga-Brewarrina road (MR70) closed
3.4	Goodooga Reserve susceptible to isolation (12 properties, around 20 people).
3.7	Water over the One and Four Mile causeways, closes Lightning Ridge Rd (MR437), its major resupply route. Goodooga is completely isolated (7) Goodooga may also be isolated when New Angledool (Narran River) gauge (reaches 2.4m. Allowing a further 48hrs at this height, the Weetalibah Crossing on the Goodooga to Lightning Ridge Rd will be closed.
3.96	1974 Peak. 150 personnel evacuated to Brewarrina (Tent City)
4.27	2012 Peak. Temporary levees were constructed to protect local health service and western streets of the community.
4.30	2011 Peak. Goodooga Isolated for seven weeks.
5.18	1890 Peak - Highest recorded peak.

2.4.6 Isolation

- a. The majority of towns within the Brewarrina Shire are able to be accessed on bitumen roads, however the Brewarrina – Goodooga Rd changes from bitumen to gravel surface (MR70 to TR70) causing Goodooga to become isolated from Brewarrina during major flooding. An alternative route is available via Walgett and New Angledool via the Kamilaroi Highway (2).
- b. Goodooga is isolated by 3.7m on the Goodooga (Bokhara) gauge (422014) When the New Angledool gauge (422928) reaches 2.4m Goodooga may also be isolated (7).
- c. At 3m on the Goodooga (Bokhara) gauge (422014) Goodooga Reserve has historically been evacuated. By 3.4m Goodooga Reserve is totally isolated.

2.4.7 Flood Mitigation Systems

- a. There are no formal flood mitigation systems in Goodooga, however temporary levees have been constructed in past flood events to protect key infrastructure including the hospital (health service) and services along the western edge of town including along Bokhara Street.
- b. The temporary levee built during the last flood event is still existing, however this is not expected to have been maintained. The maintenance of this levee is the responsibility of the Aboriginal community rather than Council.

2.4.8 Dams

- a. There are no prescribed storage dams in the Brewarrina Shire LGA. Upstream, the closest prescribed dams are at least 250km away, in Narrabri, Gwydir and Inverell.

2.4.9 At Risk Facilities

- a. The facilities that are at risk of flooding and/or isolation within the Brewarrina Shire LGA are detailed in Annex 2. In Goodooga the only facility which may be at risk of flooding is the hospital (health service) which is close to the historical flood extent.
- b. The Goodooga Reserve has its own sewage system which can be flood affected. The reserves power also needs to be shut off by 3.4m.

2.4.10 Other Considerations

- a. None known.

2.5 ANGLEDOOL AND NEW ANGLEDOOL

- a. Angledool and New Angledool is a community comprising approximately 84 people and 22 occupied private dwellings.
- b. The area of Angledool and New Angledool is in the Brewarrina Shire (Map 7). These areas are separated by the Narran River, with Angledool consisting primarily of the Angledool homestead on the southern side of the Narran River, whilst New Angledool is located approximately 1.5km to the north east on the northern side of the Narran River.
- c. During flood events, they can both be cut off by from Brewarrina. In this situation access may be possible from Walgett Shire to the east.
- d. An Inter-Region agreement exists whereby flood operations in this area will be controlled by the Walgett SES Local Controller based within the Macquarie State Emergency Service Region (2).
- e. Table 12 lists the effects of flooding in New Angledool, relative to the New Angledool gauge (422928). At 2.1m rural properties start becoming isolated and access to Angledool / New Angledool is cut off from Brewarrina NSW SES (Refer Annex 4: Road Schematics).

Table 12: Effects of Flooding in New Angledool, relative to the New Angledool gauge 422928.

Min: 1.8m, Mod: 2.0m, Maj: 2.3m (3)

Gauge Height (m)	Description
1.8	Large area of rural land flooded north of Narran Lake
2.1	Rural properties east and north east of New Angledool isolated. Cut off by road from the Brewarrina NSW SES. Walgett NSW SES can still assist.
2.2	MR438 New Angledool-Collarenebri closes to the east of New Angledool. About 6 houses in New Angledool affected by floodwaters during the 1996 flood.
2.4	Wide spread flooding in the Lightning Ridge Area
2.5	SH 18 Castlereagh Hwy closed to the South of New Angledool preventing access to New Angledool from the South (Walgett-Lightning Ridge Rd).
2.7	New Angledool still accessible to high clearance vehicles
2.8	New Angledool likely to be isolated by closure of SH18 Castlereagh Hwy near the village at the bridge isolating two properties (one currently unoccupied).
2.87	1974 - Highest recorded Peak

2.6 GONGOLGON

- a. Gongolgon is a small community of about 25 people located on the southern side of the Bogan River about 45 km south of Brewarrina. It consists of 4-5 houses and the Orana-Haven Rehabilitation Centre.
- b. Flooding in this area is mainly from water from the Bogan River. The village residents have protected their own residences with levees, some with Council assistance, and some of which need strengthening with sandbags during floods. All supplies must come from Brewarrina or Nyngan (1).

Table 13: Effects of Flooding in Gongolgon, relative to the Gongolgon gauge 421023.

Min: 0.8m, Mod: 1.0m, Maj: 1.3m (3)

Gauge Height (m)	Description
0.5	Bogan River starts to flow into Boomi Creek
1.1	Bogan Floodwaters move towards Neranghi .Warning to Rural properties owners downstream if heights expected to exceed 1.1 metres
1.26	2011 – Peak height
1.41	1998 – Peak height
1.48	1990 – Peak height
1.52	1955 – Peak of record

2.6.2 Yetta Dhinnakkal Centre

- a. The Brewarrina Yetta Dhinnakkal Centre is a correctional centre operated by the NSW Corrective Services. It is located 64 km south of Brewarrina on Arthur Hall VC Way Rd (Brewarrina – Gongolgon Road) and it has a population of about 50 inmates and 20 staff members. A number of the staff members live in Brewarrina. The centre is isolated from Brewarrina by road during periods of major flooding by the Bogan River at Gongolgon, however access to Nyngan is still available (1).

2.7 RURAL PROPERTIES

- a. There are about 200 rural properties in the Brewarrina Shire. Approximately 25-30% of these properties are not occupied on a regular basis as their owners live off farm and run their properties from either Brewarrina or from outside the district (1).
- b. Most flood-labile rural dwellings in the shire have their own levees and can be self-sufficient for a week or so. Most also have UHF CB radio as a means of communication. There are about 50 properties that are isolated during periods of major flooding and in some areas properties can be isolated for up to three months or even longer. Therefore, some property owners elect to evacuate to Brewarrina or Dubbo during long-term floods (1).

ROAD CLOSURES AND ISOLATED COMMUNITIES

2.8 ROAD CLOSURES

- a. Road closures are detailed in Table 14 and shown schematically in Annex 4.

Table 14: Roads Liable to flooding in Brewarrina Shire LGA. (2).

Road	Designation	Closure location	Gauge height (m)
Closed by high rainfall and local flooding			
Brewarrina-Bourke	SH29	Bogan River	BWR 7.4
Brewarrina-Walgett	SH29	Cato Bridge	BWR 9.2
Brewarrina-Goodooga	MR70/TR70	Cato Bridge, Gravel Surface	BWR 9.2
Brewarrina-Weilmoringle	MR70 - No.1	Gravel Surface/ Bokhara Crossing	n/a
Brewarrina-Byrock	No.5	Gravel surface	n/a
Affected by the Bogan River			
Brewarrina-Byrock	No.5	Charlton	BWR 8.8
Brewarrina-Bourke	SH29	Bogan River	BWR 7.4
Brewarrina-Bourke via Tarcoon Rd	No.5 – No.2	Bogan River/Charlton	BWR 8.8
Brewarrina-Coolabah Rd	MR70	Sth of Gongolgon	n/a
Affected by the Barwon River			
Brewarrina - Bourke	MR68	Between Brewarrina and West Brewarrina (BREWARRINA 1:100,000 GR 852855). Cuts off aerodrome. Possible access via Tarcoon Rd & Red Hill Rd, which is red dirt, not suitable for heavy vehicles or prolonged use.	BWR 7.0
Brewarrina - Gongolgon road (Brewarrina – Nyngan via Gongolgon)		Water from the Barwon River commences to flow into Tarrion Creek near 'Gwandalon' (Map: GEERA 8337, 1:100,000, GR 106748)	BWR 8.8
Brewarrina- Yarrowin, Brewarrina-Carramar and Brewarrina-Charlton roads		Charlton Road, Tarrion Yarrowin Road and Charlton Roads are all located to the South of Brewarrina township.	BWR 8.8
Brewarrina - Walgett road	MR 68	closed to cars at the Barwon Bridge	BWR 9.5
Brewarrina-Walgett	SH29	Cato Bridge	9.2
Brewarrina-Goodooga	MR70/TR70	Tarrion Station	BWR 9.7
Affected by the Culgoa River			
Bourke-Weilmoringle Rd via Collierina	LR 403	Twin Rivers Road	W 5.47
Brewarrina-Weilmoringle	No.10	East Culgoa Road	W 5.66
Affected by the Narran River			
Brewarrina-Walgett	No.3	Various from Brewarrina	

Road	Designation	Closure location	Gauge height (m)
Narran Lake Rd	No.3	Various	N 2.10
Goodooga-Walgett	MR437	Bangate	N 2.60
Goodooga-Angledool Rd	MR70 – MR438	Mogila	N 2.10
Goodooga-Bangate Rd via 'Bil Bil'	MR70- MR402- No.3	Belvedere	n/a
Castlereagh Hwy (New Angledool to Walgett Rd)	SH18	Weetalibah Causeway	N 2.8
Hebel-New Angledool Rd	MR438	Mehi	N 1.80
Affected by the Marra Creek			
Brewarrina-Billybingbone Rd	No.4	Bogan River	n/a
Billybingbone-Yarrowin Rd	No.20	Bourimbla Station	n/a
Roads affected by the Bokhara River			
Hebel Rd to the north (MR70), Goodooga to Brewarrina River Rd (MR70) Goodooga to Leander Rd, (RLR6).		The majority of roads in the Goodooga area will close at this height. All roads will close in multiple locations. (3)	G 3.3
Brewarrina-Goodooga	MR70	Carinya	G 3.30
Goodooga-Hebel Rd	MR70	Mogila	G 3.60
Goodooga-Lightning Ridge Rd	MR437	Bangate Bridge	G 2.60
Road affected by the Cato Creek			
Brewarrina-Walgett Rd	MR70	Cato Bridge Crossing	BWR 9.50

BWR = Brewarrina gauge 422002

G = Goodooga (Bokhara) gauge 422014

N: New Angledool, Narran River gauge 422928 (Please note this is the manual gauge not the telemetric gauge No. 422012)

W: Weilmoringle Gauge 422017

2.9 SUMMARY OF ISOLATED COMMUNITIES AND PROPERTIES

- a. Table 15 lists communities liable to isolation and potential periods of isolation that were experienced during the past 20 years. The duration of isolation during previous historical events has varied considerably, with the potential for isolations to last longer than those presented in this table. In some instances isolations have lasted months rather than weeks.

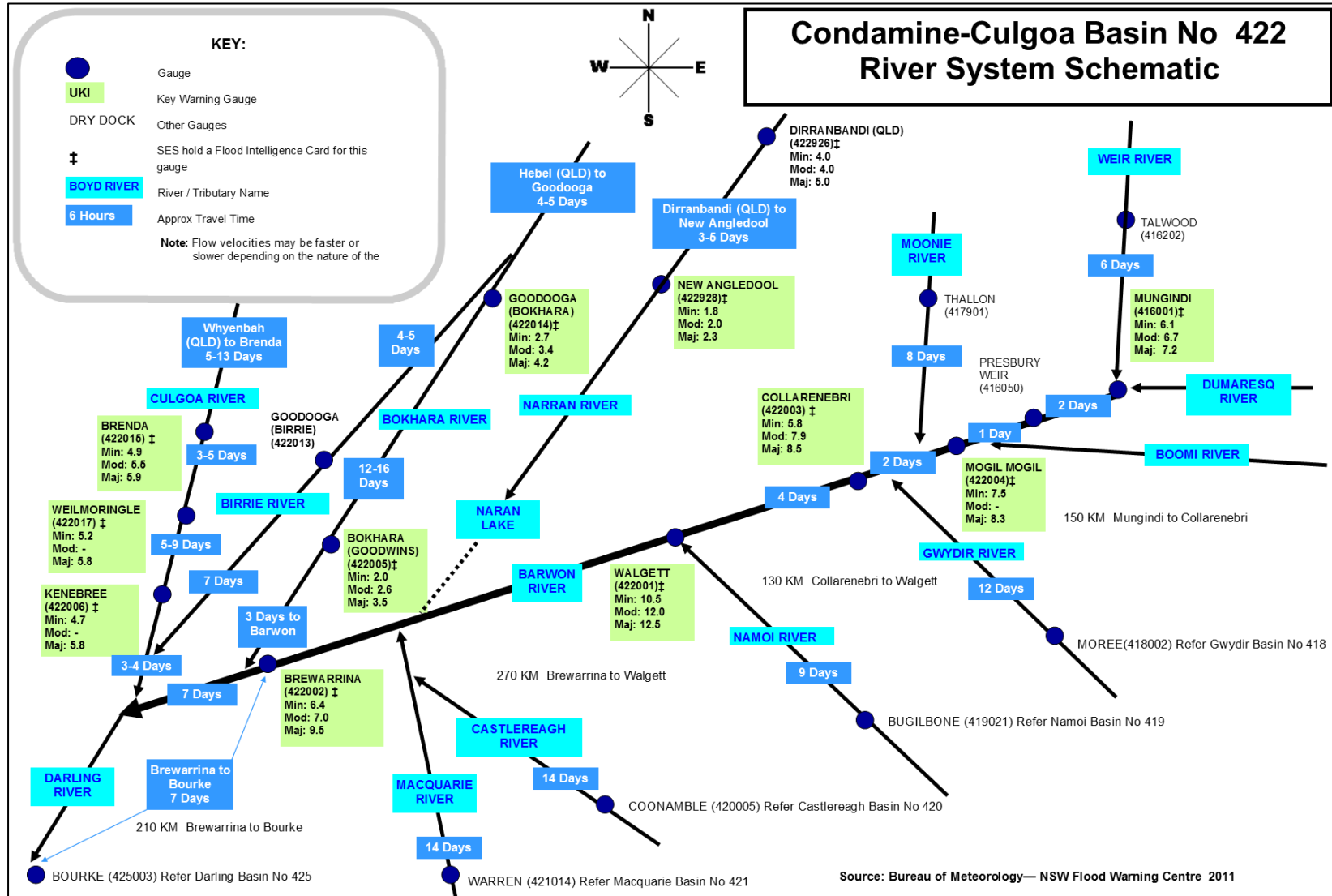
Table 15: Potential Periods of Isolation for communities in the Brewarrina Shire LGA during historical flood events in the last 20 years.

Town / Area (River Basin)	Population/ Dwellings	Flood Affect Classification	Approximate period isolation	Weeks								NOTES	
				1	2	3	4	5	6	7	8		
Brewarrina	1143pp 428dw	Low Flood Island	3-5 weeks	■	■	■	■	■					Never known to be isolated for more than 3 weeks, however potential for isolation up to 5 weeks. Isolated at 10.4m on gauge
West Brewarrina	50pp 16dw	High Flood Island	5-6 weeks	■	■	■	■	■	■				Can be initially isolated from Brewarrina at 7m, and then be totally isolated at 9.8m on gauge.
North Brewarrina	90pp 16dw	Low Flood Island	3-5 weeks	■	■	■	■	■					Becomes isolated from Brewarrina. Previously transport access has been provided by boat. Isolated at 10m on gauge.
Barwon Four	130pp 38dw	High Flood Island	6 or more weeks	■	■	■	■	■	■	■	■		Could be potentially longer than 8 weeks. Isolated at 9.7m on gauge.
Goodooga	247pp 97dw	High Flood Island	6 to 8 weeks	■	■	■	■	■	■	■	■		Timing can vary depending on which rivers are in flood. Isolated at 3.7m.
Goodooga Reserve	20-30pp 12dw	High Trapped Perimeter	6 to 8 weeks	■	■	■	■	■	■	■	■		Timing can vary depending on which rivers are in flood. Isolated at 3.4m.
South Weilmoringle (Whytabalah)	69pp 24dw	Low Flood Island	4 to 6 weeks	■	■	■	■	■	■				Mainly flooding of the Barwon river that results in road closures leading to isolation. Isolated at 5.7m on gauge.

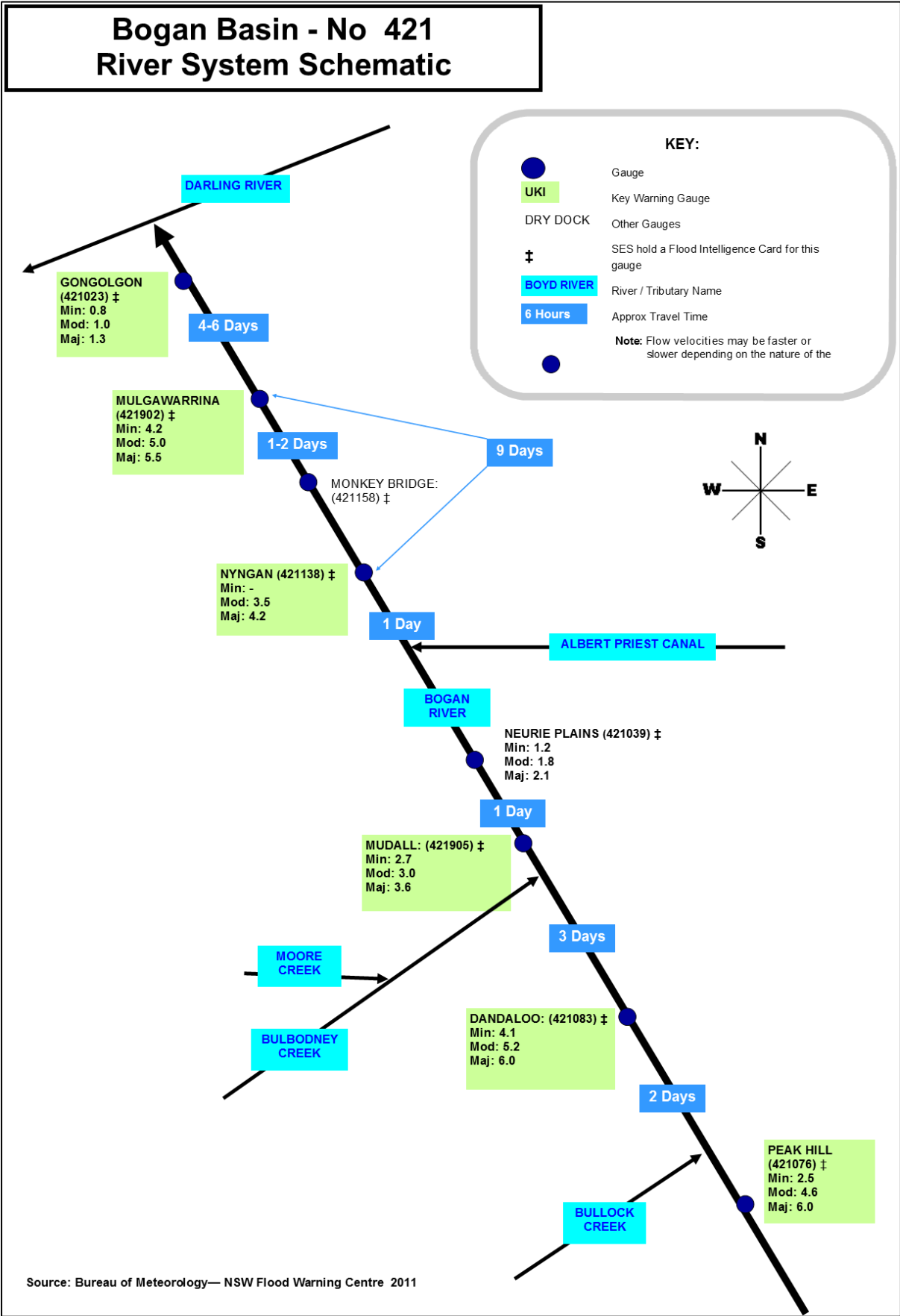
Town / Area (River Basin)	Population/ Dwellings	Flood Affect Classification	Approximate period isolation	Weeks								NOTES
				1	2	3	4	5	6	7	8	
North Weilmoringle	8pp 3dw	High Flood Island	4 to 6 weeks	Red	Red	Red	Red	Blue	Blue			Mainly flooding of the Barwon river that results in road closures leading to isolation. Isolated at 5.7m on gauge.
New Angledool / Angledool	84pp 24dw	High Trapped Perimeter	3 to 4 weeks	Red	Red	Red	Red	Blue	Blue			Isolated to both the north and the south and requires resupply.
Numerous Isolated Properties throughout LGA	Approx. 40 rural properties		Can be isolated and require resupply for 6 to 8 weeks (if not longer)	Red	Red	Red	Red	Blue	Blue			Refer to Rural Properties Isolations Register and Property Contact register maintained by the Deputy Region Controller of NSW SES FWR.

Note: Periods of isolation are a guide only. Liaison with the Local Controller and communities/residents involved is essential during periods of potential and actual isolation.

ANNEX 1: CONDAMINE - CULGOA RIVER BASIN SCHEMATIC



ANNEX 2: MACQUARIE - BOGAN RIVER BASIN SCHEMATIC

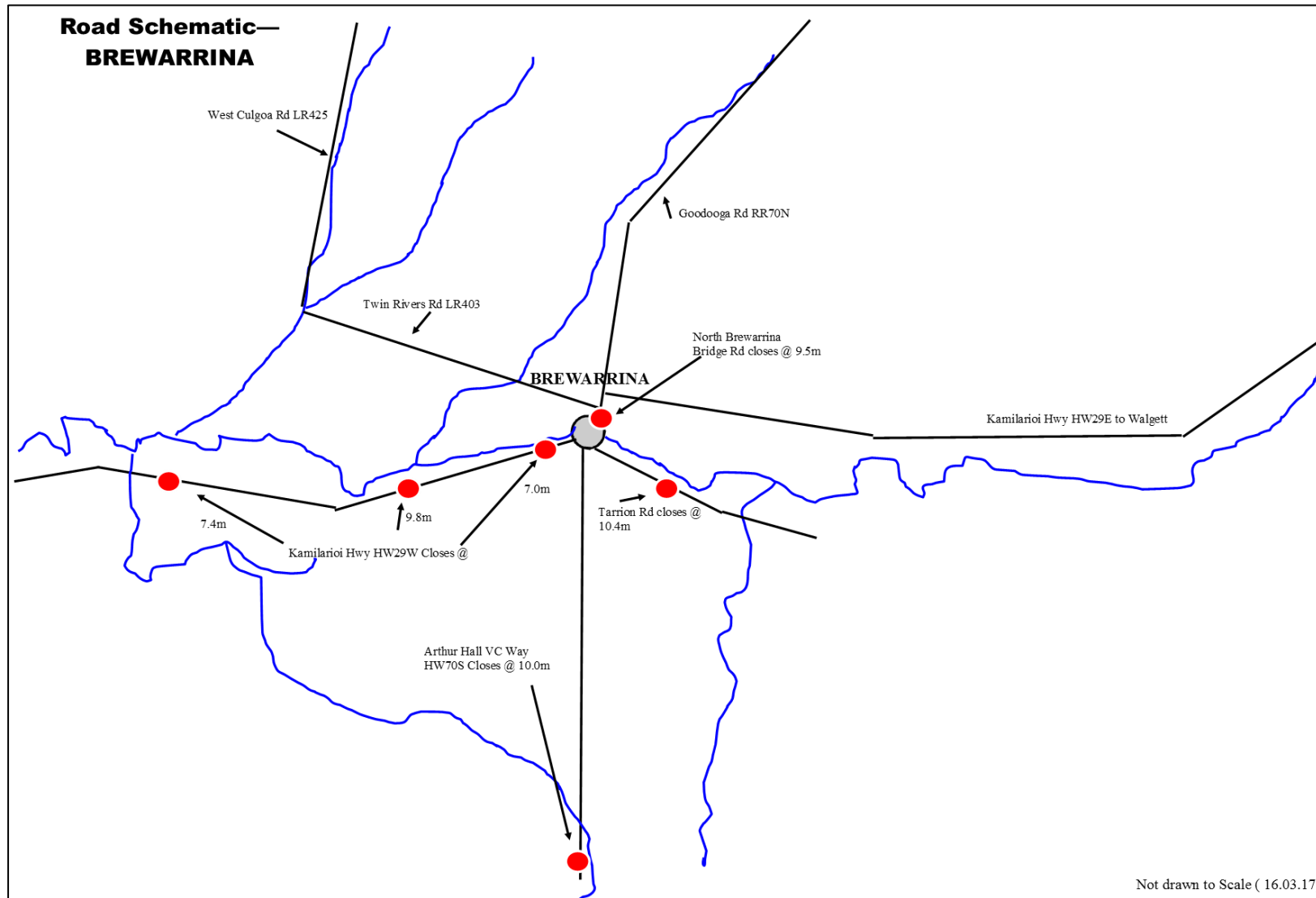


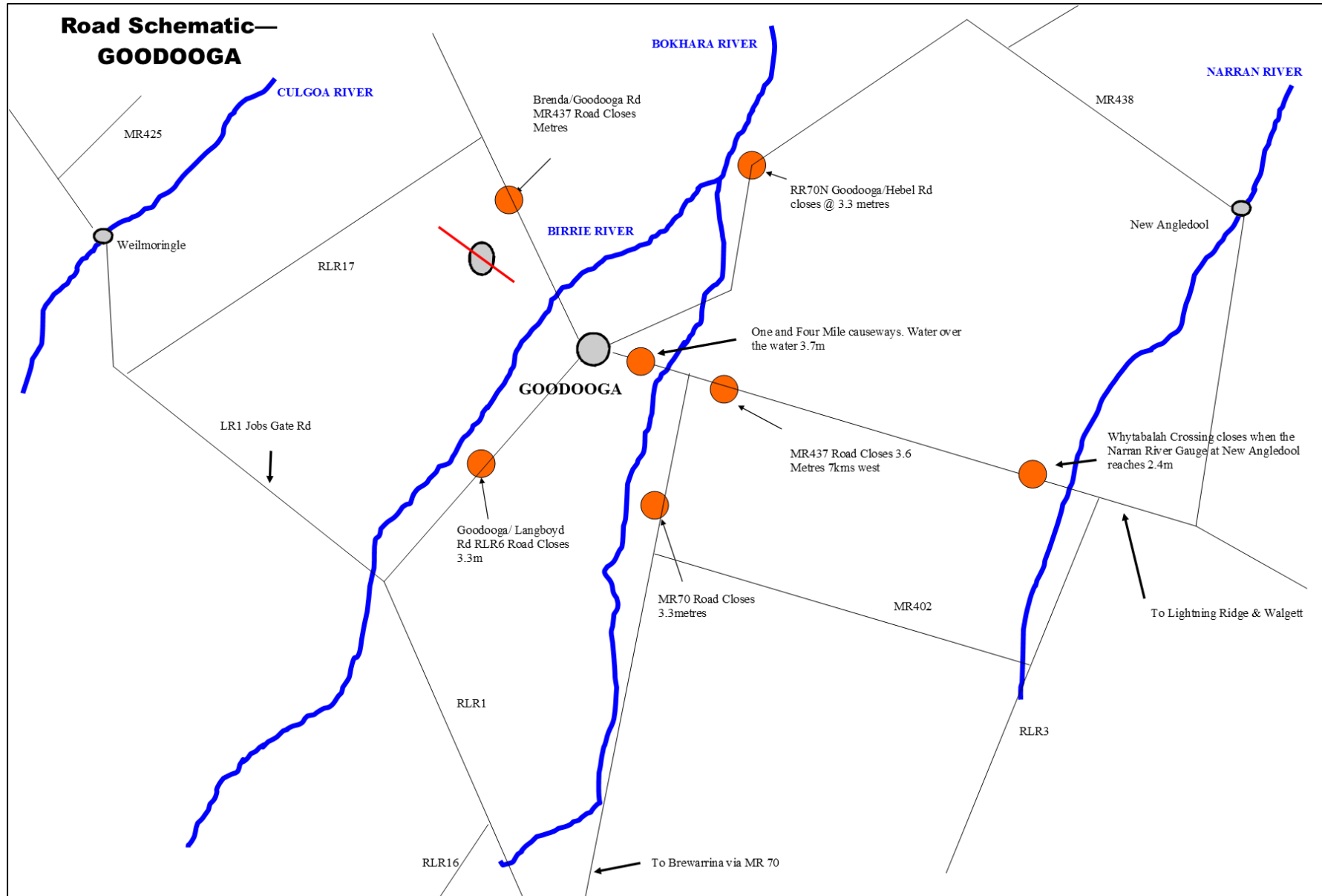
ANNEX 3: FACILITIES AT RISK OF FLOODING AND/OR ISOLATION

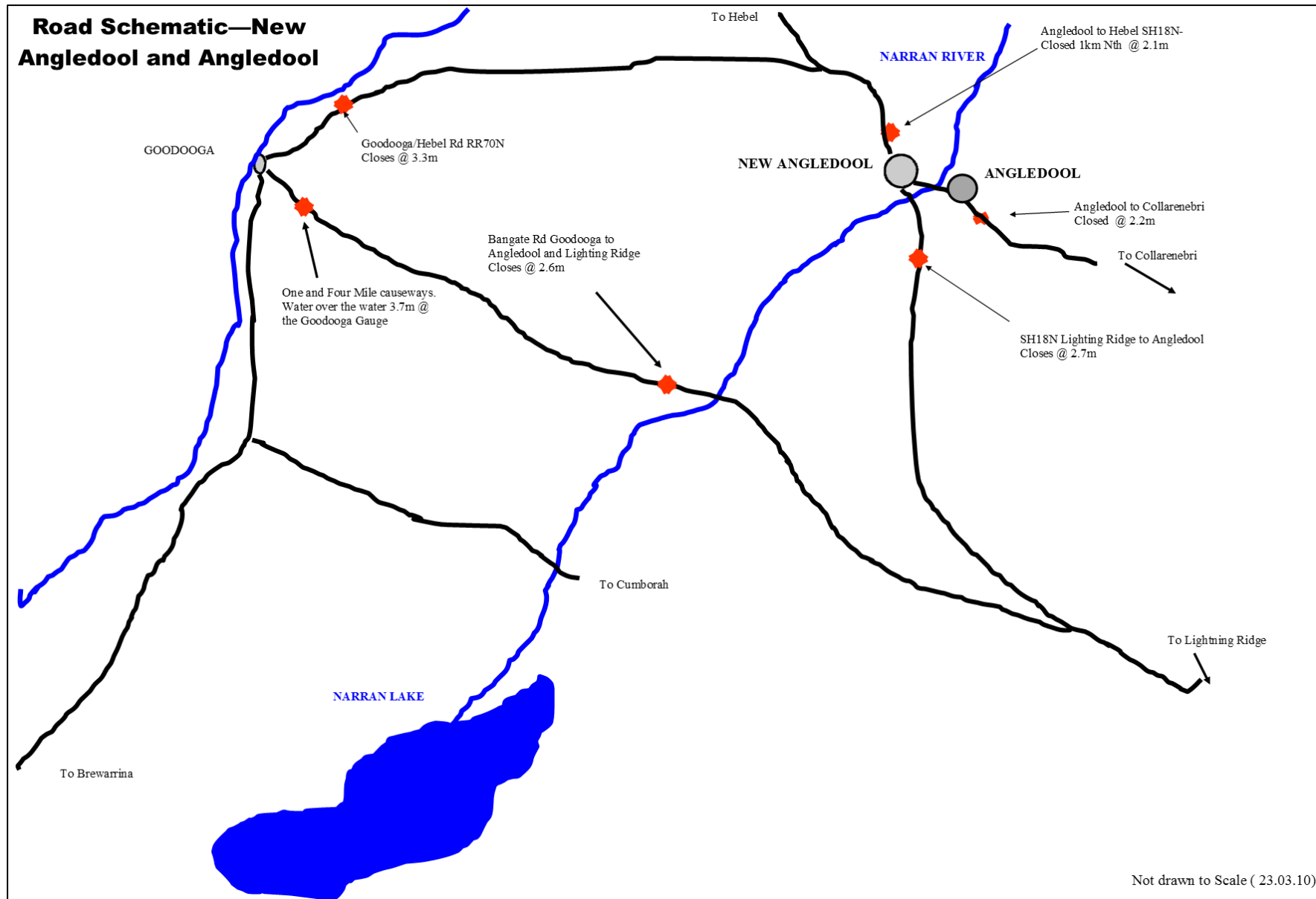
Facility Name	Street	Suburb	Comment
Schools			
St Patricks Primary School	108 Bathurst St	Brewarrina	At risk only if the town levee fails or overtops
TAFE NSW – Western Institute	Bourke St	Brewarrina	At risk only if the town levee fails or overtops
Weilmoringle Public School	Burns Rd	North Weilmoringle	Close to the historical flood extent. Is isolated on a high flood island
Child Care Centres			
Brewarrina Childcare Centre	Bourke St	Brewarrina	At risk only if the town levee fails or overtops
Gainmara Birrilee Preschool	9 Church St	Brewarrina	At risk only if the town levee fails or overtops
Warradha Family Day care	18 - 20 Wilson St	Brewarrina	At risk only if the town levee fails or overtops
Hospitals and facilities for aged and/or infirm			
Brewarrina multipurpose health service (includes nursing home)	56 Doyle St	Brewarrina	At risk only if the town levee fails or overtops
Goodooga Health Service (Hospital)	59 Hammond St	Goodooga	Close to the historical flood extent. Construction of small temporary levee occurs to protect the hospital grounds.
Utilities and infrastructure			
Brewarrina Town Sewerage sump pumps		Brewarrina	Possible failure if inundated at 7.4m. They have not failed during past record floods. The 1974 flood caused sewerage back wash due stormwater entry (2). These are located outside of the town levee. These are normally protected by temporary works during flood events. These can be pumped out if required.

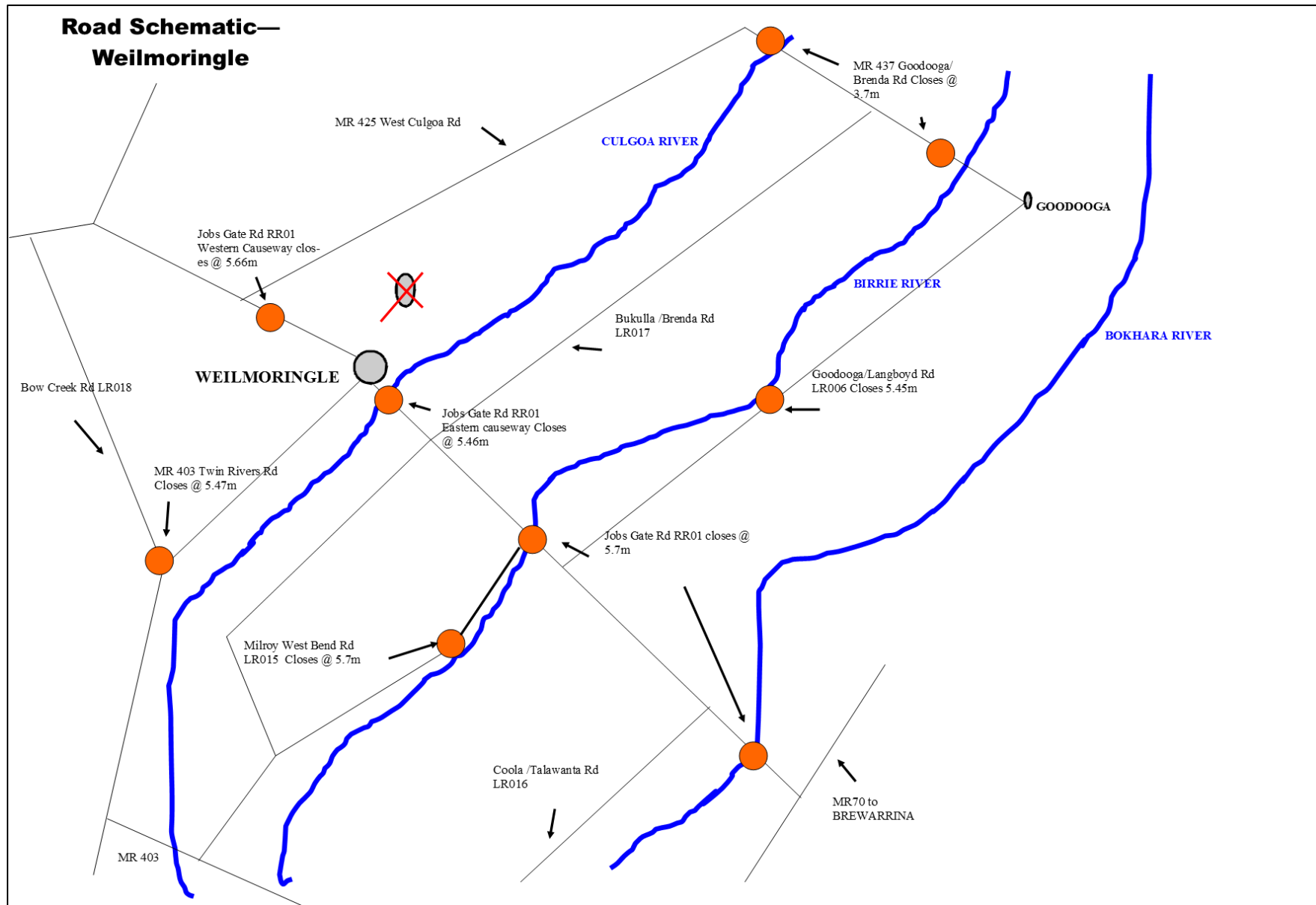
Facility Name	Street	Suburb	Comment
Camping Ground / Caravan Parks			
Four Mile Reserve	Carinda Rd, off Tarrion-Yarrowin Rd	6km southeast of Brewarrina	On banks of Barwon River (2)
Beds on the Barwon Cabins & Camping	Burban St	Brewarrina	On bank of Barwon River
Brewarrina Caravan Park	27-31 Church St	Brewarrina	At risk if the town levee fails

ANNEX 4: BREWARRINA LGA ROAD SCHEMATICS

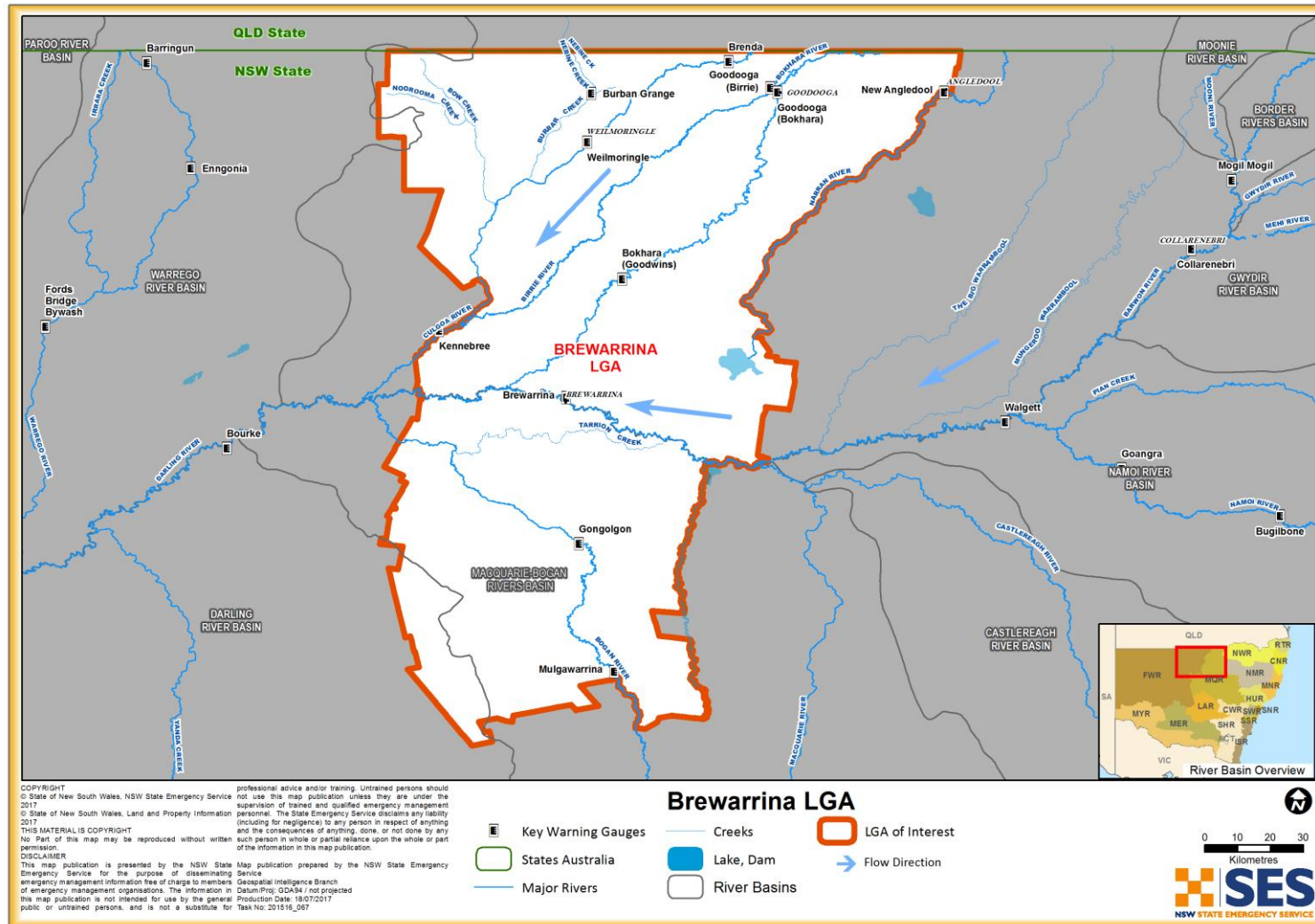




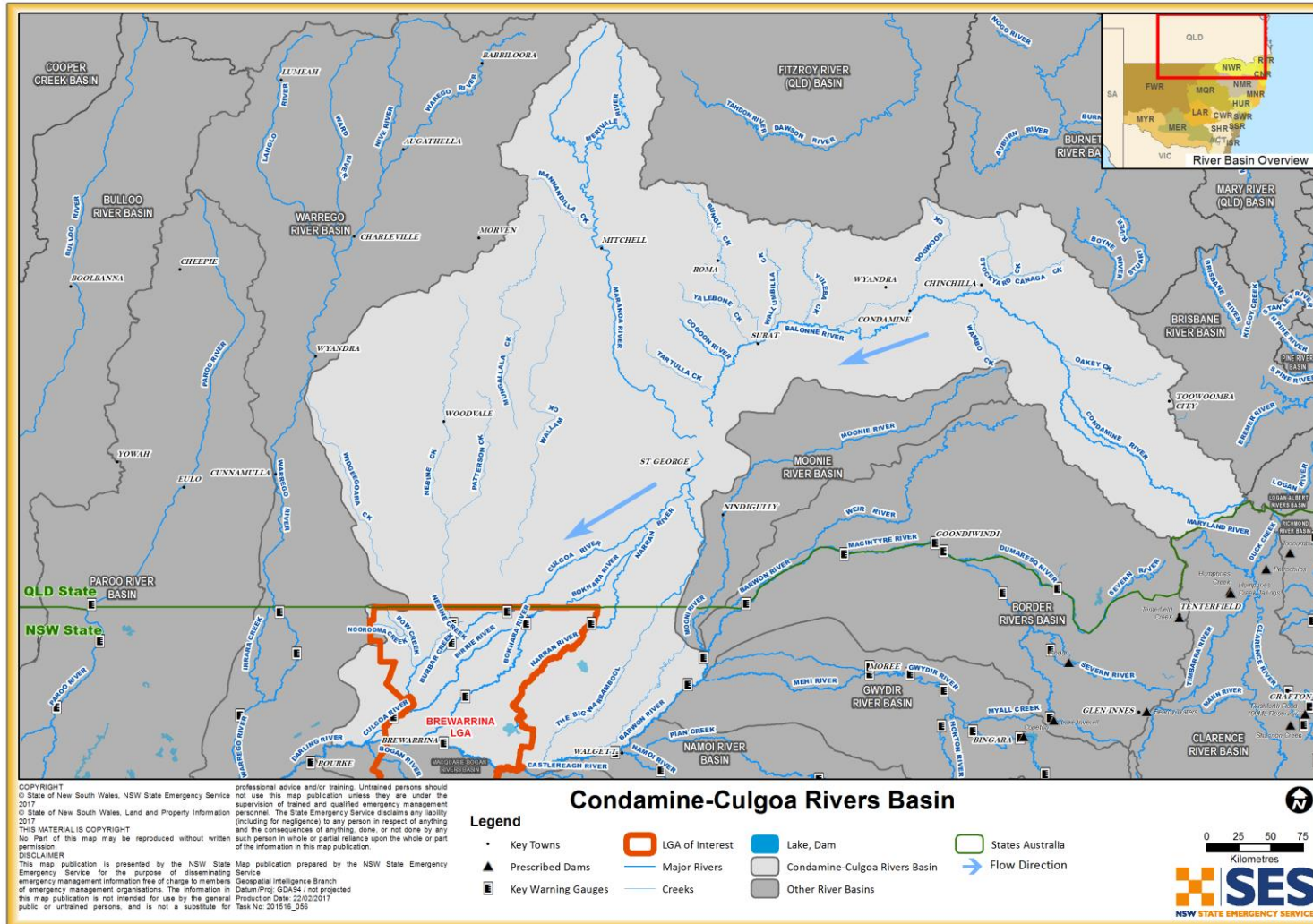




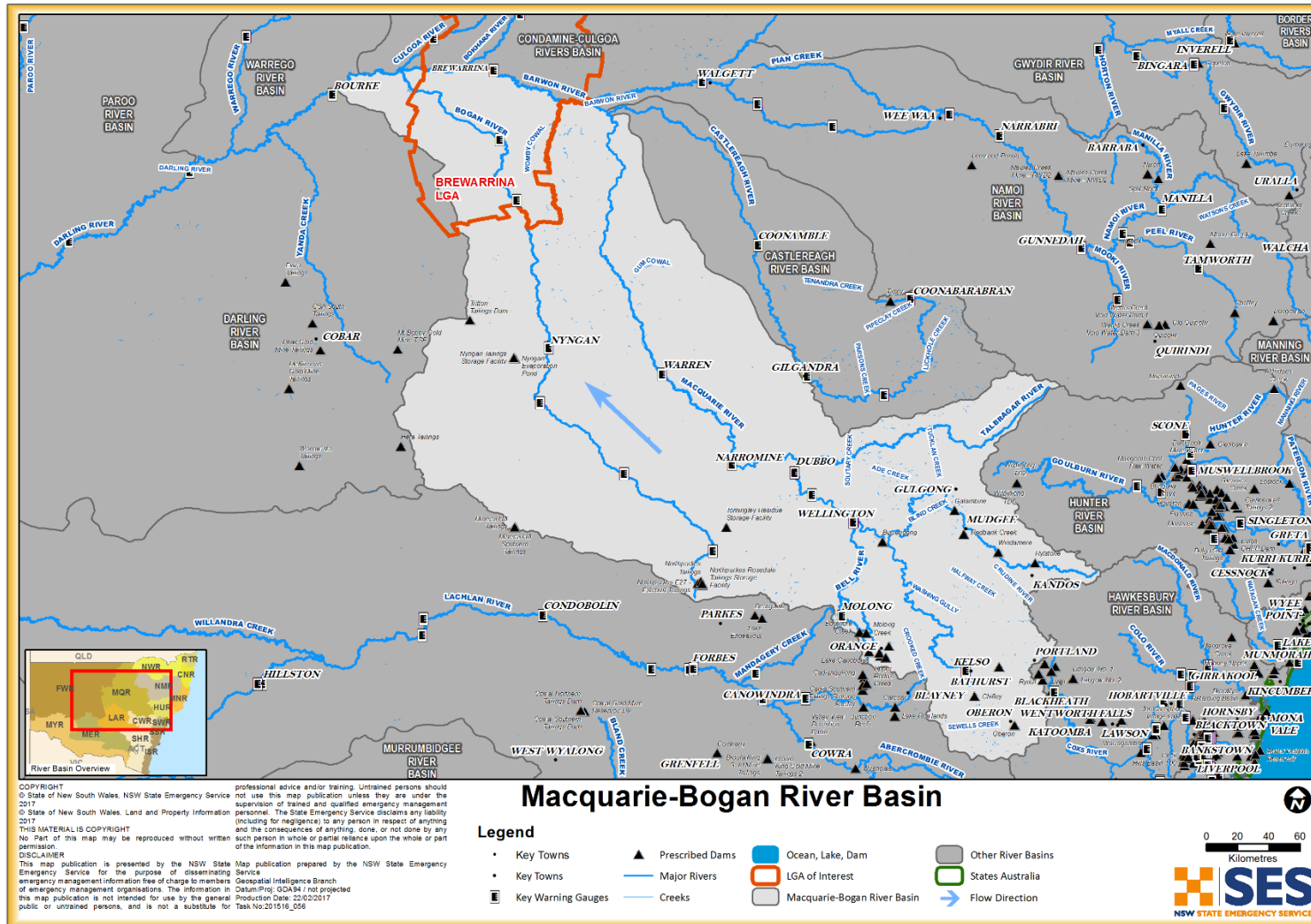
MAP 1: BREWARRINA LGA



MAP 2: CONDAMINE-CULGOA RIVER BASIN



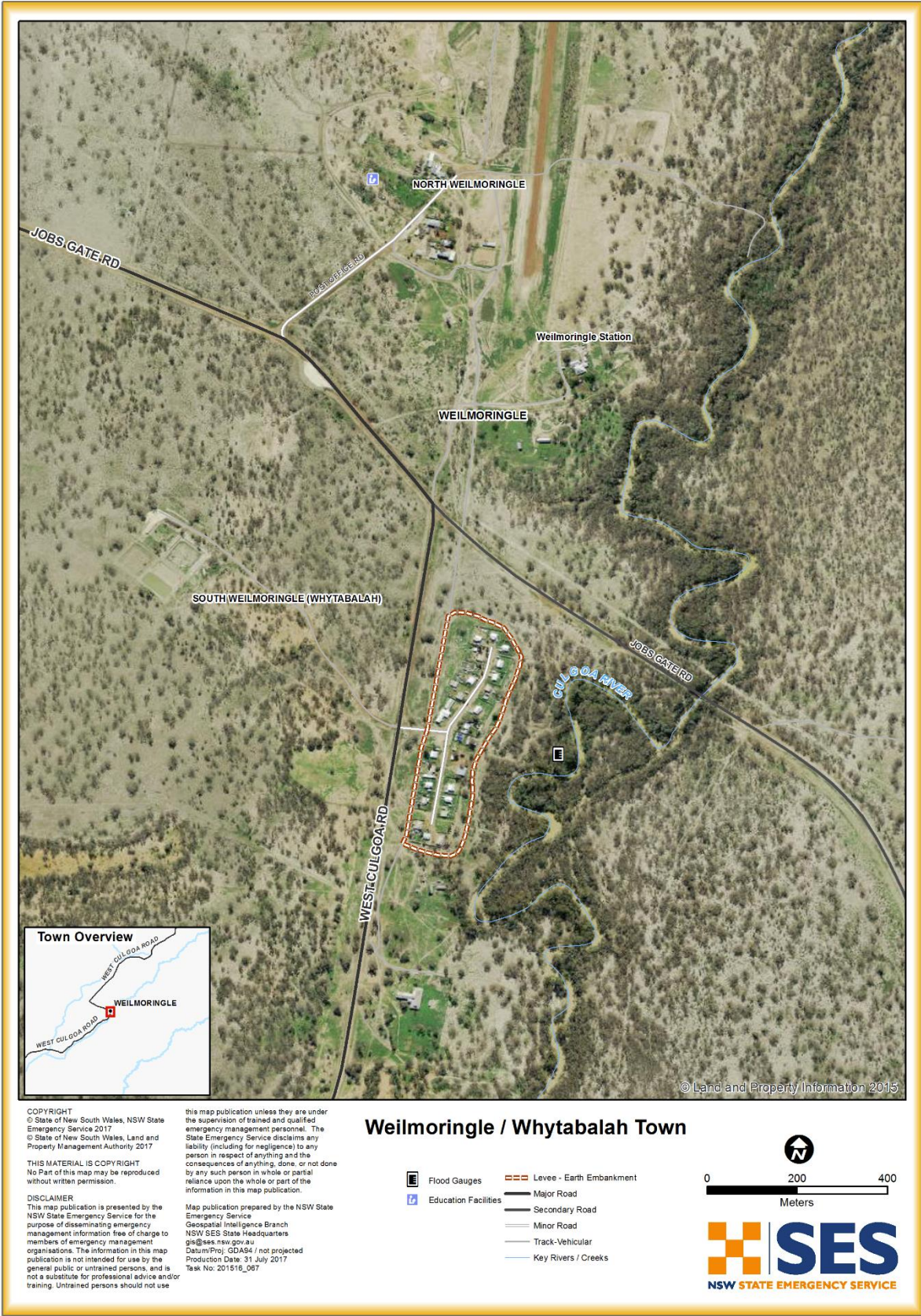
MAP 3: MACQUARIE-BOGAN RIVER BASIN



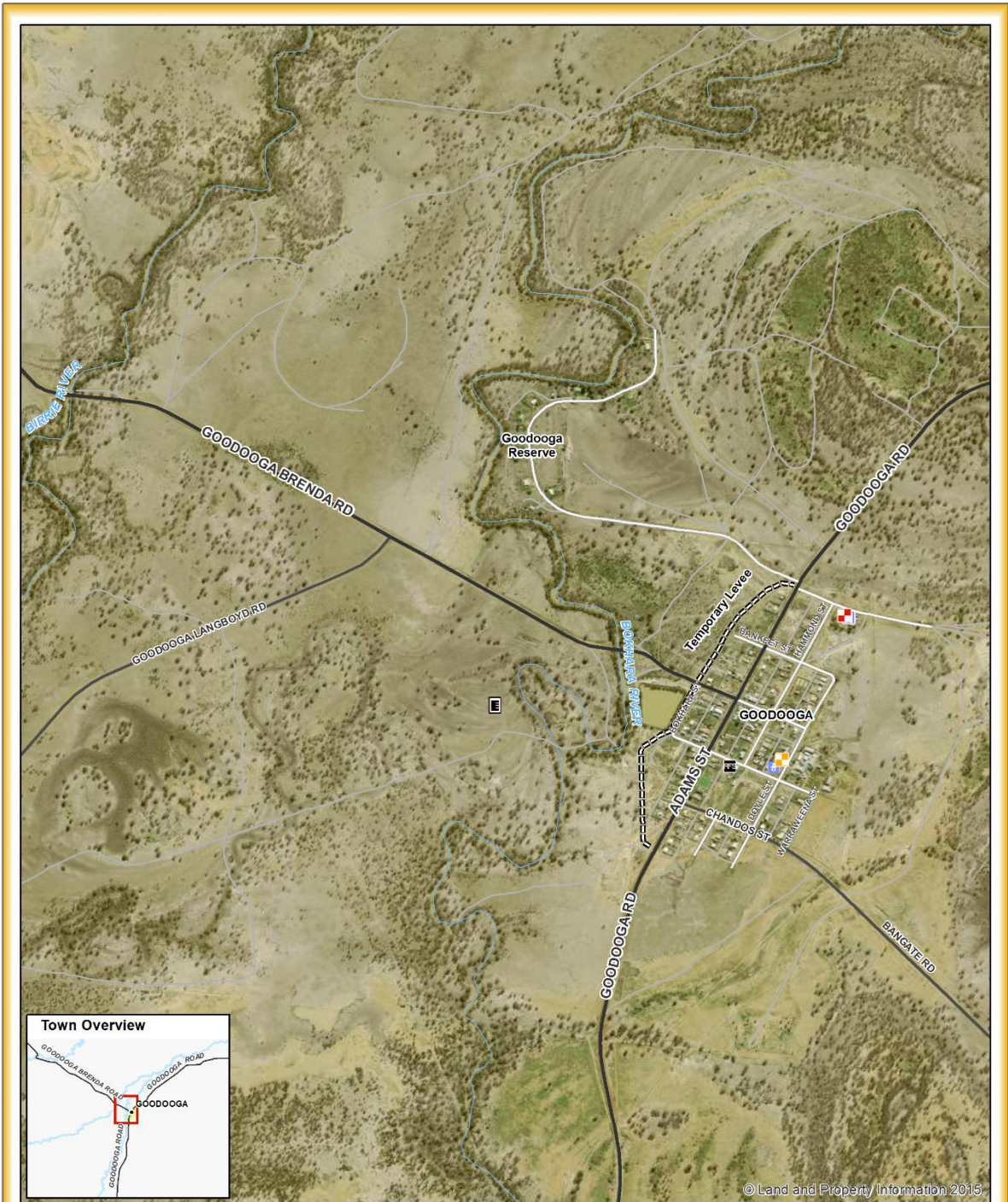
MAP 4: BREWARRINA TOWN MAP



MAP 5: WEILMORINGLE / WHYTABALAH TOWN MAP



MAP 6: GOODOOGA TOWN MAP



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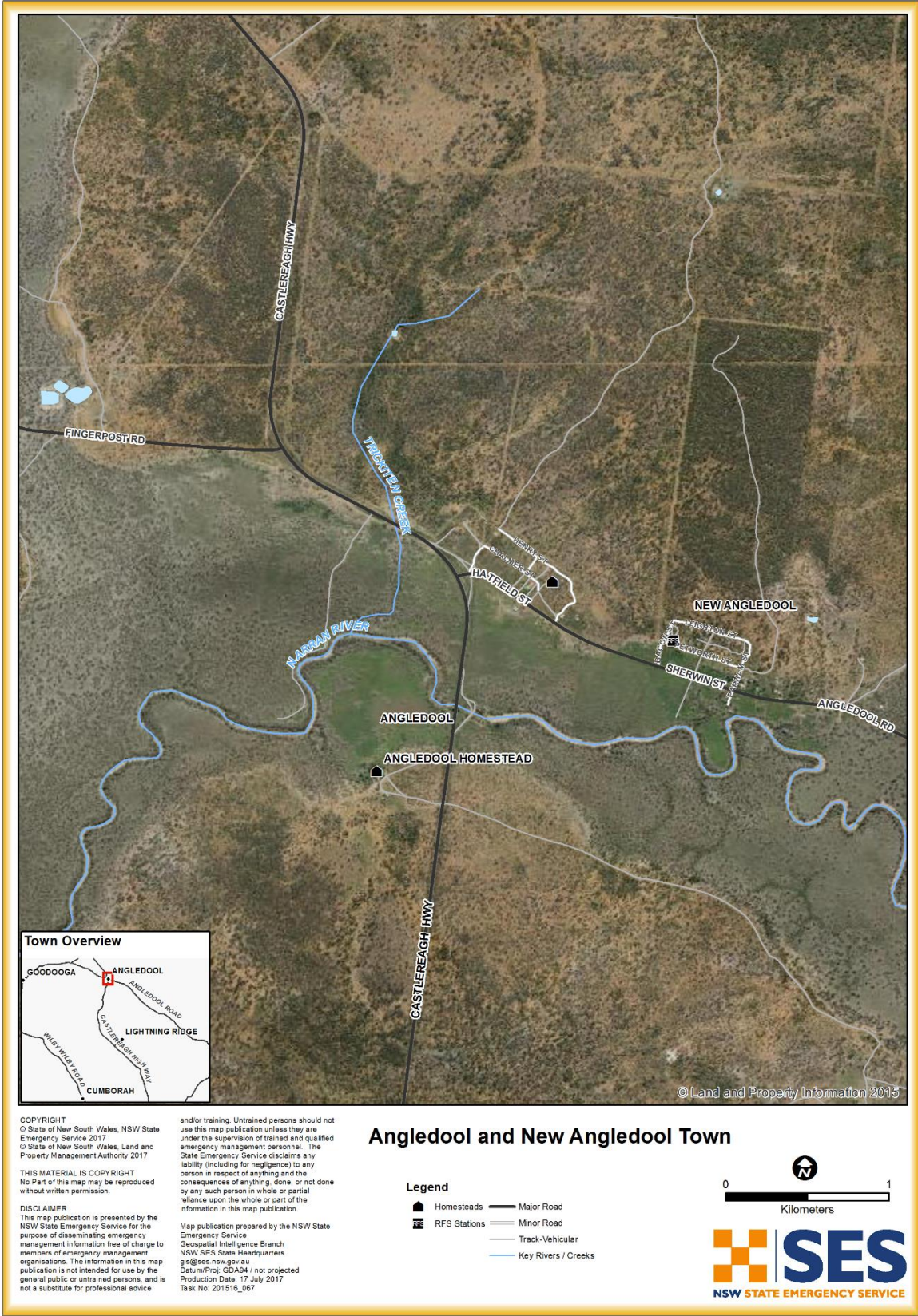
Map publication prepared by the NSW State Emergency Service
 Geospatial Intelligence Branch
 NSW SES State Headquarters
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 Datum/Proj: GDA94 / not projected
 Production Date: 14 July 2017
 Task No: 201516_067

Goodooga Town

- Flood Gauges
- NSW SES Headquarters
- Ambulance Facilities
- RFS Stations
- Child Care Facilities
- Hospitals
- Levee Alignment
- Major Road
- Secondary Road
- Minor Road
- Track-Vehicular
- Key Rivers / Creeks



MAP 7: ANGLEDPOOL AND NEW ANGLEDPOOL TOWN MAP



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SES RESPONSE ARRANGEMENTS FOR BREWARRINA SHIRE

Volume 3 of the Brewarrina Shire Local Flood Plan

Last Update: February 2004

ANNEX C - GAUGES MONITORED BY BREWARRINA SES

Station	AWRC No	Stream	Flood Classification		
			Min	Mod	Maj
Gauges within Brewarrina Shire					
Brewarrina*	422002	Barwon	6.4	7.0	9.5
Goodooga (Bokhara)*	422014	Bokhara	2.7	3.4	4.2
Bokhara (Goodwins)	422005	Bokhara	2.0	2.6	3.5
Brenda*	422015	Culgoa	4.9	5.5	5.9
Weilmoringle*	422017	Culgoa	5.2		5.8
Kenebree*	422006	Culgoa	4.7		5.8
New Angledool*	422928	Narran	1.8	2.0	2.3
Gongolgon	42/023	Bogan	0.8	1.0	1.3

Station	AWRC No	Stream
Gauges Upstream of Brewarrina Shire		
Hebel (Queensland)	422949	Bokhara
Mungindi	416001	Barwon
Collarenebri	422003	Barwon
Walgett	422001	Barwon
Coonamble	42005	Castlereagh
Warren	421014	Macquarie
Mulgawarrina	421902	Bogan

Note: The CBM provides flood warnings (predictions of flood heights at nominated future times) for those gauges within the Brewarrina Shire indicated by an asterisk. These predictions, which are issued when the 'minor flood' level is expected to be reached or exceeded, are relevant within the reference areas of the identified gauges.

ANNEX D - DISSEMINATION OF SES FLOOD BULLETINS

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

Television Stations

Station	Location
Prime	Dubbo
Imparja	Alice Springs
NQTV	Townsville

Radio Stations

Station	Location	Frequency	Modulation
2WEB	Bourke	585	AM
2CUZ FM	Bourke	106.5	FM
2DU	Dubbo	1251	AM
ABC	Western Plains Radio, Dubbo	107.1	FM
549 ABC	Orange	549	AM

Newspapers

Name	Location
Western Herald	Bourke
Western Magazine	Dubbo
Brewarrina News	Brewarrina
The Land	Richmond
The Barrier Daily Truth	Broken

SES Flood Bulletins are also forwarded to the following agencies:

- Department of Infrastructure, Planning and Natural Resources: regional offices at Bourke, Menindee and Dubbo.
- Orana and Barrier Police District Headquarters: Dubbo and Broken Hill.
- NSW Ambulance Service: Dubbo Control Centre.
- NSW Agriculture: Bourke.
- NSW Fire Brigade Zone Commander's Office: Dubbo.
- The Pipeline Authority: Cobar.

ANNEX E - TEMPLATE EVACUATION MESSAGE

Date/Time of Issue:

Authorised By:

The Bureau of Meteorology has predicted a flood level of [] metres at [] (*place*) at [] (*time*). This means that [] (*describe areas*) may be inundated.

It is recommended that you evacuate within the next [] hours. If you leave it later, the roads may be congested or closed.

To prepare for evacuation, you should:

- Raise belongings by placing them on tables, beds and benches. Put electrical items on top. Some items may be able to be placed in ceilings.
- Gather medicines, personal and financial documents and mementos together to take with you.
- Listen to radio stations [] for further information and to confirm this warning.
- If possible, check to see whether your neighbours need help.
- Make arrangements for care of pets or companion animals.

When you evacuate:

- Turn off the electricity, gas and water.
- Take three days' supply of clothes with you.
- If you have a car, drive to the evacuation centre at [] (*specify route if appropriate*).
- If you don't have a car, special transport can also be provided on request if necessary. Telephone [].
- So that you can be accounted for, it is important that you register at the evacuation centre.
- After registering, you may go to the house of a friend or relative. Alternatively, accommodation will be arranged for you.
- The Police will provide security for your property while you are away.

ANNEX F - RESUPPLY REQUIREMENTS AND OPERATIONS

The Problem

1. Brewarrina, Goodooga, Weilmoringle, Gongolgon, New Angledool and in excess of 50 rural properties in the Brewarrina Shire can be isolated during periods of flooding for prolonged periods and will require resupply.
2. The main highways that are used as the main supply routes for Brewarrina and the surrounding areas are the Castlereagh, Mitchell and Kamilaroi highways. The other main lateral route is the Brewarrina to Coolabah Road. With the exception of the Mitchell Highway from Dubbo to Bourke, these highways are subject to inundation of varying levels and are often closed to all vehicles during periods of major flooding.
3. The majority of the other roads within the Brewarrina Shire Council area are “black soil” roads that are impassable to normal vehicles after 10mm of rain and to emergency four-wheel drive or multi-tyred vehicles when the roads become saturated.

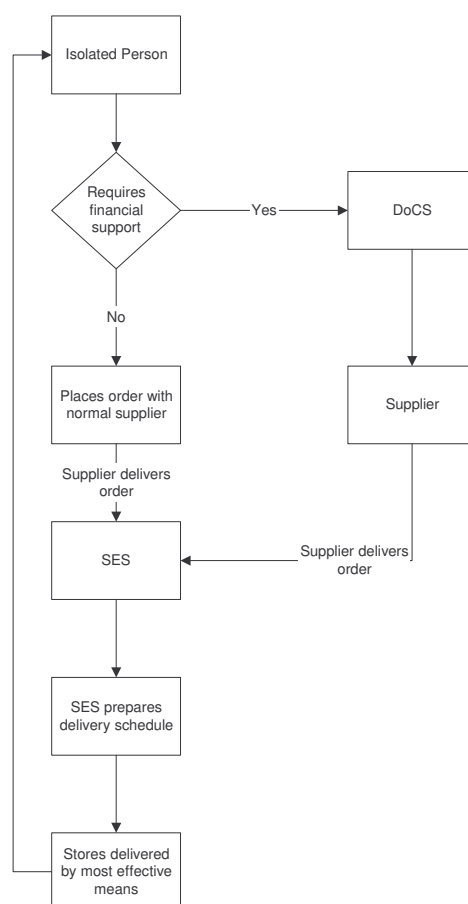
Management of Resupply

4. The SES is to coordinate resupply operations during periods of flooding in order to sustain people located in isolated towns and villages or isolated on rural properties.
5. **General.** Rural residents can become isolated on outlying properties even before the onset of flooding due to the “black soil” roads becoming impassable. People on these isolated properties may not have had an opportunity to stock up and may require resupply early in a flood event. Once the main supply routes are closed, there will be a requirement for the SES to coordinate the delivery of essential foodstuffs, fuels, urgent medical supplies and stores to isolated towns and villages in the Brewarrina Shire.
6. **Normal Supply Arrangements.**
 - a. **Brewarrina.** Storekeepers in Brewarrina normally source their supplies from Dubbo.
 - b. **Goodooga and Weilmoringle.** There is a General Store at both Goodooga and Weilmoringle. These provide the local residents with many of their immediate requirements. However, the majority of the residents of these villages and the outlying area do most of their shopping at Lightning Ridge or Walgett.
7. **Main Supply Routes.** Normally, goods are shipped from Dubbo to Brewarrina by road via any of the following main supply routes:

- a. **Dubbo - Brewarrina via Walgett.** Supplies are shipped to Brewarrina via the Newell, Castlereagh and Kamilaroi highways.
 - b. **Dubbo - Brewarrina via Coolabah.** Supplies are shipped via Nyngan, Coolabah and Gongolgon using the Mitchell Highway and then the Nyngan Road.
 - c. **Dubbo - Brewarrina via Bourke.** Supplies are shipped via the Mitchell Highway to Bourke and then the Kamilaroi Highway to Brewarrina.
8. **Pre-Stocking.** If flood predictions indicate that areas are likely to become isolated, the Brewarrina SES Local Controller will advise businesses (normally through the Brewarrina Shire Council) and, where possible, rural residents that they should stock up. Advice of impending isolation will also be included in SES Flood Bulletins.
9. **Resupply Procedure.** When isolation occurs, storekeepers and rural residents on isolated properties 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. Similarly, essential services (eg. hospitals) will make arrangements to acquire their resupply needs from the normal sources and have the supplies delivered to the designated loading point. The SES will arrange for the stores to be conveyed to designated distribution points within the Brewarrina Shire for delivery via the most appropriate and practical means. Due to the extent of flooding and its impact on the road system, stores and equipment will usually be transported by air using both fixed wing and rotary wing aircraft.
10. **Vetting Committee.** When isolation occurs the SES will establish a vetting committee to ensure that only essential goods are ordered. The committee will consist of representatives from the SES, Brewarrina Shire Council, Police, DoCS, retailers and the aboriginal community. The committee will ensure that businesses requesting supplies are not using the flood as a means of restocking free of charge and also that load space in resupply vehicles and aircraft is optimally used (ie no wasted capacity).
11. **Essential Items.** As a guide, the priorities for the resupply of essential items are:
- a. Priority 1 - Subsistence items and operational supplies, foodstuffs (including animal food for companion animals), water, health and welfare items and items for the maintenance of morale (eg. newspapers).
 - b. Priority 2 - Pharmaceutical and medical supplies (including hospital linen).
 - c. Priority 3 - Petrol, oils and lubricants (including AVTUR and AVGAS).
 - d. Priority 4 - Repair parts for essential machinery.

e. Priority 5 - General stores.

12. **Operational Supplies.** The SES will also coordinate the resupply of operational supplies such as sandbags, sandbagging machines, plastic sheeting and chemicals for disease or pest control.
13. **Mail.** At the request of Australia Post, the SES will deliver mail to isolated communities. However, it will not usually be possible to do so in accordance with normal Australia Post timetables.
14. **Hospital Linen.** The SES will assist hospitals with the resupply of linen and other consumables.
15. **Resupply of Isolated Properties.** The SES will coordinate the resupply of isolated properties. Rural residents will liaise with the Brewarrina SES to ensure that the items they seek are essential to their wellbeing or livelihood. The SES Local Controller will coordinate the resupply of approved items and establish a delivery schedule. Property owners are responsible for sourcing the supplies and arranging finance. People who claim to be or are considered to be in necessitous circumstances and require financial assistance are to be referred to DoCS. A flow chart outlining the resupply system for isolated properties is shown below.



16. **Personnel Movement.** Where possible, the SES will assist isolated communities or properties with the movement of people to and from isolated

areas. This includes property owners who require access to their property, school children and/or university students who need to get to or return from boarding schools or universities and members of the isolated communities who have to attend medical appointments etc. Each request will be considered on its merit.

17. **People in Necessitous Circumstances.** Some people in the isolated communities or on isolated properties may find themselves in financial difficulty or dire circumstances. People in this situation should be directed to liaise with DoCS who will arrange for the necessary assistance.
18. **Air Resupply.** When isolation by road is predicted, the SES Local Controller will liaise with the Far West SES Division Controller who will make arrangements with the SES State Headquarters for air resupply. If air resupply is authorised the basic plan will be to establish a loading point at the Dubbo Airport. Suppliers will be responsible to pack and deliver the approved stores to the loading point from where it will be delivered to Brewarrina by fixed wing aircraft . From Brewarrina the stores will be delivered to the retail outlets in Brewarrina or transhipped to either light aircraft or helicopters for delivery to the outlying communities in accordance with pre-determined delivery schedules.

ANNEX G - THE MANAGEMENT OF FLOODING IN THE TOWN OF BREWARRINA (INCLUDING WEST BREWARRINA, NORTH BREWARRINA AND BARWON FOUR)

The Problem

1. It has been found by recent engineering studies that the new levees protecting the town of Brewarrina and the North Brewarrina area are deficient, to the point that failure is possible under flood conditions. Failure would occur at different flood heights in various locations along these levees, possibly beginning when the Barwon River reaches a height of 7.2 metres (just above the threshold of 'moderate flooding') at the town gauge located at the bridge over the river. Failure at this height, at a culvert on Charlton Rd, would not cause flooding of the town. Failures in other locations occur at greater heights, however, and inundation within the main town and in North Brewarrina is expected to begin when the flood height reaches 9.4 metres at the gauge.
2. Since 1890, 16 separate floods at Brewarrina have exceeded the 9.4 metres flood height. This is the height reached by the 10% AEP (once-in-10-years) flood, which is 0.1 metres below the designated 'major flood' height and approximately 1.3 metres below the level reached in the record flood of 1974. It is about 0.7 metres below the peak level of the flood of September 1998.
3. In the circumstances described above, the levee can be assumed to be incapable of preventing inundation of the town and North Brewarrina in floods reaching 9.4 metres at the gauge. In Brewarrina itself, flood waters would be likely to enter first from the western edge of town (near the intersection of Bourke St and Charlton St) and the northern edge near the bridge to North Brewarrina. As the flood level rises beyond 9.4 metres, the area inundated within the town will increase in size and levee failure will occur at additional locations. It is likely that the disused southern levee would also fail at some stage, leading to flooding in the southern part of the town.
4. In floods reaching 10.7 metres (approximately equal to the flood of 1974), about half the town west of the line of the former Byrock-Brewarrina railway would be inundated to depths of well over a metre in some locations. Much of North Brewarrina would also be flooded at this height, although West Brewarrina, Barwon Four and the eastern part of the main town would not be directly affected by inundation. Before this height was reached, however, the sewerage system would be expected to fail and most of the businesses and many dwellings in the inundated area would experience over-floor inundation.
5. The total population of Brewarrina (including North Brewarrina, West Brewarrina and Barwon Four) is about 1300. Of these about 100 are aged 65 and over and 180 are less than 5 years old. There are about 460 dwellings in the area, approximately 100 of which have no car available to the household. In

addition there are about 90 commercial, industrial, public and institutional premises.

6. The population of the leveed areas (the main town and North Brewarrina) is about 1100. There are 400 dwellings in these areas.
7. Map 4 indicates the approximate flood heights (measured at the Brewarrina gauge) at which roads close to cars at the specified locations. Brewarrina is expected to be completely cut off from all road access in floods which reach 10.0 metres on the Brewarrina gauge.

Management of Flooding

8. **Flood Warning:** The effective management of flooding in and immediately around Brewarrina will depend on appropriate actions being carried out in expectation of particular flood heights being reached at the gauge. These actions will be triggered by flood predictions provided by the Bureau of Meteorology. The predictions will forecast heights likely to be reached at the Brewarrina gauge at specified times in coming days. They may provide up to two weeks notice of such heights occurring.
9. **Management Strategies:** Three different flood management strategies are envisaged for floods of different forecast heights (severities), as follows:
 - a. Floods forecast to peak below 9.4 metres: resupply and ferrying operations between Brewarrina and West Brewarrina, North Brewarrina and Barwon Four; general monitoring.
 - b. Floods forecast to peak between 9.4 and 10.4 metres: maintenance of the town in situ, using temporary levees, a strategy to resupply Brewarrina from outside, and the management of a limited number of evacuees within the town.
 - c. Floods forecast to peak at or above 10.5 metres: evacuation of all of Brewarrina and the settled areas immediately adjacent (West Brewarrina, North Brewarrina and Barwon Four) to Dubbo.

Floods Forecast to Peak Below 9.4 Metres

10. In these floods, some or all roads out of Brewarrina will be closed at some stage but no inundation of the town or nearby built-up areas is anticipated. Buses (for as long as possible) and then ferry services, operated by the SES between Brewarrina and the outlying areas of West Brewarrina, North Brewarrina and Barwon Four, will allow children to go to and from school and adults to travel to and from the main town. Mail delivery and the resupply of basic necessities to these outlying areas will be undertaken along with helicopter resupply to villages and pastoral properties.
11. There may be a need to supply fodder for large animals within the town and to relocate them from low areas to higher ground at the racecourse.

Floods Forecast to Peak Between 9.4 and 10.4 Metres

12. In these floods, flood water will be kept out of the town by the following actions:

a. Creation of temporary levees within Brewarrina. Pallet barrier materials (pallets, brackets, plastic sheeting and sandbags), sufficient to construct 1000 metres of barrier and to be stockpiled by the Brewarrina Shire Council, will be used to create levees:

- Along Darling St, from the point at which Darling St and Bourke St meet the levee, to Bathurst St.
- Along Doyle St, from the intersection with Sandon St, to Young St and then northwards to the levee.

The proposed alignment of these temporary levees is shown on Map 5.

b. Strengthening of the existing disused southern levee at the culvert south of Wilson St, and the new levee at Tarrion Creek, by placing earth on them.

c. Placement and anchoring of plastic sheeting at the known weak points of the levees.

d. Closure of road and walkway gaps in the levees by installing flood plates and temporary levees.

13. In addition, the following actions will be undertaken:

a. Resupply goods (including food for animals) will be trucked into Brewarrina or flown in by fixed-wing aircraft (supplemented if necessary by helicopters if the town is cut off from the airport). Supermarkets, the chemist's store and other retail outlets will be encouraged, via the Brewarrina Chamber of Commerce, to make orders to cover requirements in anticipation of two weeks' isolation (see Annex F for further details).

b. The town's hospital will be closed, except for its emergency capability, and patients will be transferred to other hospitals in north-western NSW.

c. A capacity will be established to manage evacuees from:

- Outlying parts of the shire (Goodooga, New Angledool, Weilmoringle, Gongolgon and pastoral properties),
- West Brewarrina, North Brewarrina and Barwon Four,

- Houses on the edges of the main town of Brewarrina which are not protected by temporary levee works and/or are affected by local flooding.

Evacuees will be accommodated by billeting, in hotels and/or in tents set up at the racecourse. Note that evacuees from the outlying parts of the shire will not be accommodated in Brewarrina if a flood level of 10.5 metres or more is likely there.

- d. A facility to manage domestic pets will be set up at Geoff New Oval with larger animals being managed at the racecourse (see Map 6). These facilities may need to supply food for pets and livestock being brought in from outside the town (including such animals being brought in by evacuees from outlying parts of the shire).
- e. Periodic meetings will be held:
 - Of heads of emergency service organisations and the Brewarrina Local Emergency Management Committee (to coordinate response activities).
 - To advise members of the community about current and likely response activities and to remind people about what they should do to stay safe and protect their belongings.

Floods Forecast to Peak at 10.5 Metres or More

14. In these floods, which the temporary levees and the disused southern levee may not be able to hold out, Brewarrina will be considered not to be viable. As a result the population (including residents of West Brewarrina, North Brewarrina and Barwon Four) will be evacuated to Dubbo. The decision to conduct this evacuation will be made by the SES Local Controller after discussions with the Mayor of Brewarrina Shire and the Local Emergency Operations Controller. The following actions will be undertaken:
 - a. The hospital will be closed (except for its emergency capability) if that has not already occurred, and the schools will also be closed.
 - b. Doorknocking of all properties will be undertaken, to advise occupants of the need to evacuate and of property-protecting and other actions to take before and during evacuation. These doorknocks will be conducted, as follows, by SES, Police, NSW Fire Brigades, Rural Fire Service and Ngemba Housing Cooperative personnel:
 - The town and the three small outlying communities will be divided into sectors as shown on the accompanying map (Map 6). A two-person doorknocking team, provided with radio communications, will be assigned to each sector as shown below (see map):

- ◆ Sector A: West Brewarrina (Ngemba Housing Cooperative).
- ◆ Sector B: Barwon Four (Ngemba Housing Cooperative).
- ◆ Sector C: North Brewarrina (SES).
- ◆ Sector D: west of Byron St and Sandon St to levee (SES).
- ◆ Sector E: east of Byron St and Sandon St and west of Young St (SES).
- ◆ Sector F: east of Young St and west of Belmore St and Bridge Rd (NSWFB).
- ◆ Sector G: east of Belmore St and Bridge Rd and east of Tarrion St (RFS).
- ◆ Sector H: east of Tarrion St and west of former railway line (RFS).
- ◆ Sector I: east of former railway line (RFS).
- Doorknockers will be assembled and briefed at the SES Local Headquarters and given:
 - ◆ A copy of the evacuation order and information on evacuation procedures. This is to be handed to residents, shopkeepers and others. The information will describe what people should do before they leave, what they should take with them (including their pets), and where they should go.
 - ◆ A map of the Sector to be doorknocked.
 - ◆ Sector Progress Sheets to be filled out on a property-by-property basis.
 - ◆ Instructions on regular reporting back of progress and of cases of people requiring special assistance.
- The doorknocking is intended to be completed within 6 hours. Evacuations are expected to begin on the same day as the doorknocks and completed the following day.
- Radio broadcasts reinforcing the need for the evacuation will be made before and during the doorknocking. Police vehicles with loud hailers will further reinforce the message in the streets of the main town of Brewarrina.

- c. The following facilities will be established:
- A collection point at Geoff New Oval to gather people together for evacuation by road, floodboat and/or helicopter to Brewarrina airport (see Map 6).
 - A Large Animal Management Facility at the Brewarrina Racecourse to administer the check-in of large animals.
 - A car parking area for evacuees' cars. This will be on the high ground adjacent to the site of the former railway station (see Map 6).
- d. Transport resources will be arranged for the evacuation of up to 1400 people (including those who may have been evacuated to Brewarrina from outside the town) to Dubbo. These will include:
- Coaches to travel via Gongolgon and Nyngan. Coaches of varying sizes may be available locally from the Brewarrina Pre-School, Brewarrina Aged People's Home, Home Care and three commercial operators.
 - A large (12-seater or larger) helicopter and additional punts (to transport people to the airport if road access is unavailable). The only large helicopters available in the state are located in Sydney.
 - Commercial and/or military fixed-wing aircraft capable of operating on a 1380-metre bitumen strip (maximum requirement approximately 47 loads at 30 persons per load plus evacuees' belongings). Commercial SAAB and military Caribous can seat 34 and 32 passengers respectively, and military Hercules (C130s) can seat 128.
- e. Extra emergency service personnel (SES, Police, NSW Agriculture and fire-fighting) will be sought to conduct doorknocks and evacuations and make up a stay-behind party to maintain the security of evacuated properties and carry out other tasks. These personnel can be accommodated in the hospital, in tents at the racecourse (see Map 6) and possibly in hotels.
- f. Resupply operations to areas outside Brewarrina and its immediate environs will be continued. This will require the assistance of the Walgett, Bourke, Warren and Bogan SES organisations for the outlying areas of Brewarrina Shire (Goodooga, New Angledool, Weilmoringle, Gongolgon and pastoral properties).
15. The evacuation would probably be conducted over a two-day period, with elderly people and mothers with small children evacuated first, then complete families and finally other people. Evacuees would be accommodated in motels and hotels in Dubbo, and community facilities would be made available to them

to establish a drop-in-centre there. Reception and management arrangements would be handled by the Department of Community Services.

16. Assistance animals and small pets (mainly cats and dogs) will be transported to Dubbo along with their owners. These animals will be held as close as possible to where their owners are staying. Larger animals will be held in Brewarrina, being relocated to high ground at the racecourse where they can be held and fed.
17. To ensure that as much as possible of the evacuation is accomplished by road, it is important that the operation is started early (that is, before roads close and levees fail) and people will need to be given the option to evacuate early and using their own vehicles. A late start will increase the danger involved in the operation and place greater stress on the resources required for aerial evacuation. Note, however, that the roads to Bourke and Nyngan close at relatively low flood levels on the Barwon and Bogan rivers and that the last route from Brewarrina to the town's airport is built on a levee which could fail at a flood height of less than 9.7 metres. If there is serious flooding on both the Barwon and the Bogan rivers simultaneously, it is likely that most or all of the evacuees will need to be transported by air: by the time it is known that evacuation will be necessary the roads are likely already to be closed.

Return of Evacuees to Brewarrina

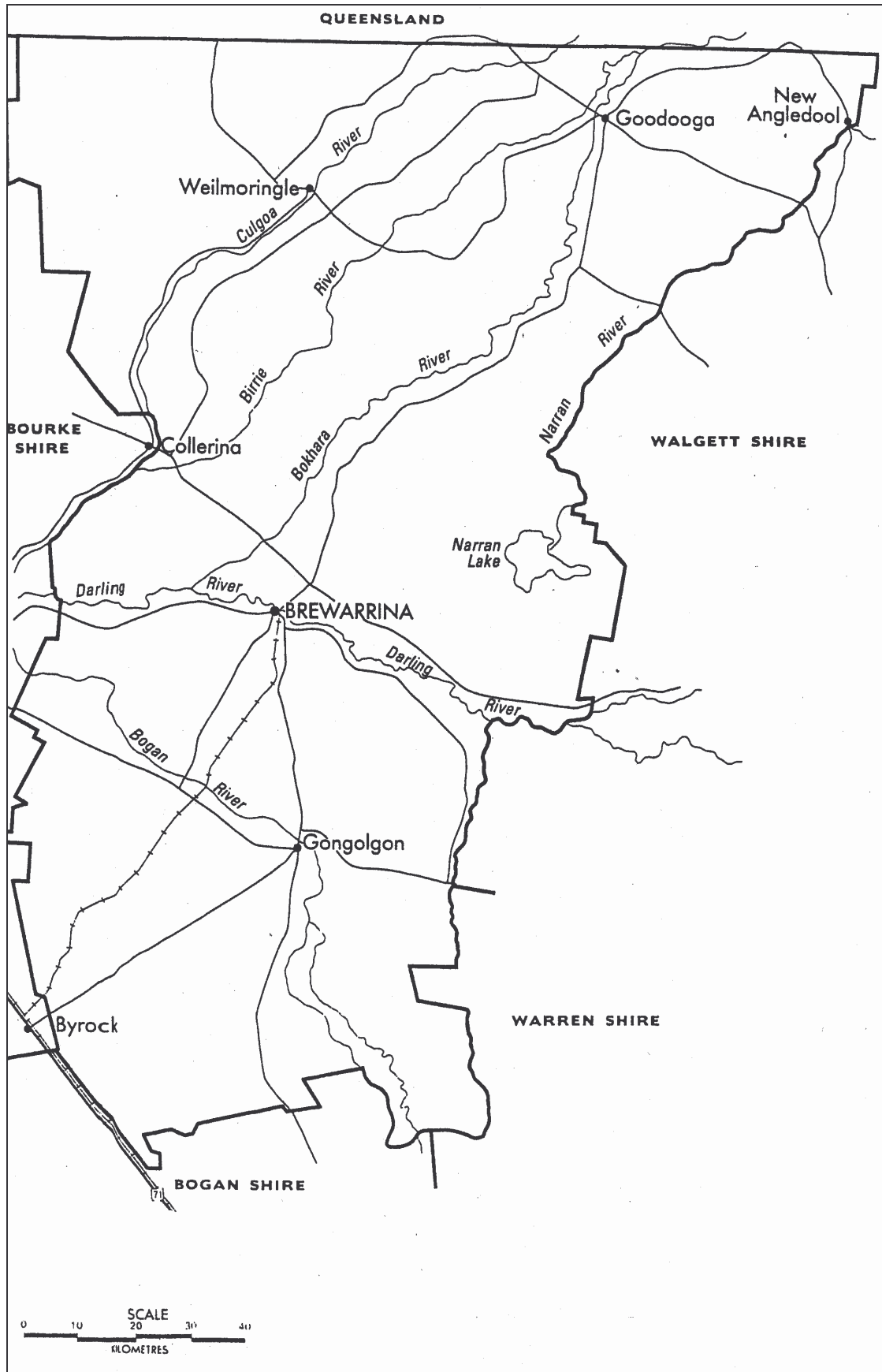
18. The return of evacuees will be managed by the Local Emergency Operations Controller and the Department of Community Services after the town has been declared safe for re-occupation.

Liaison with the Community

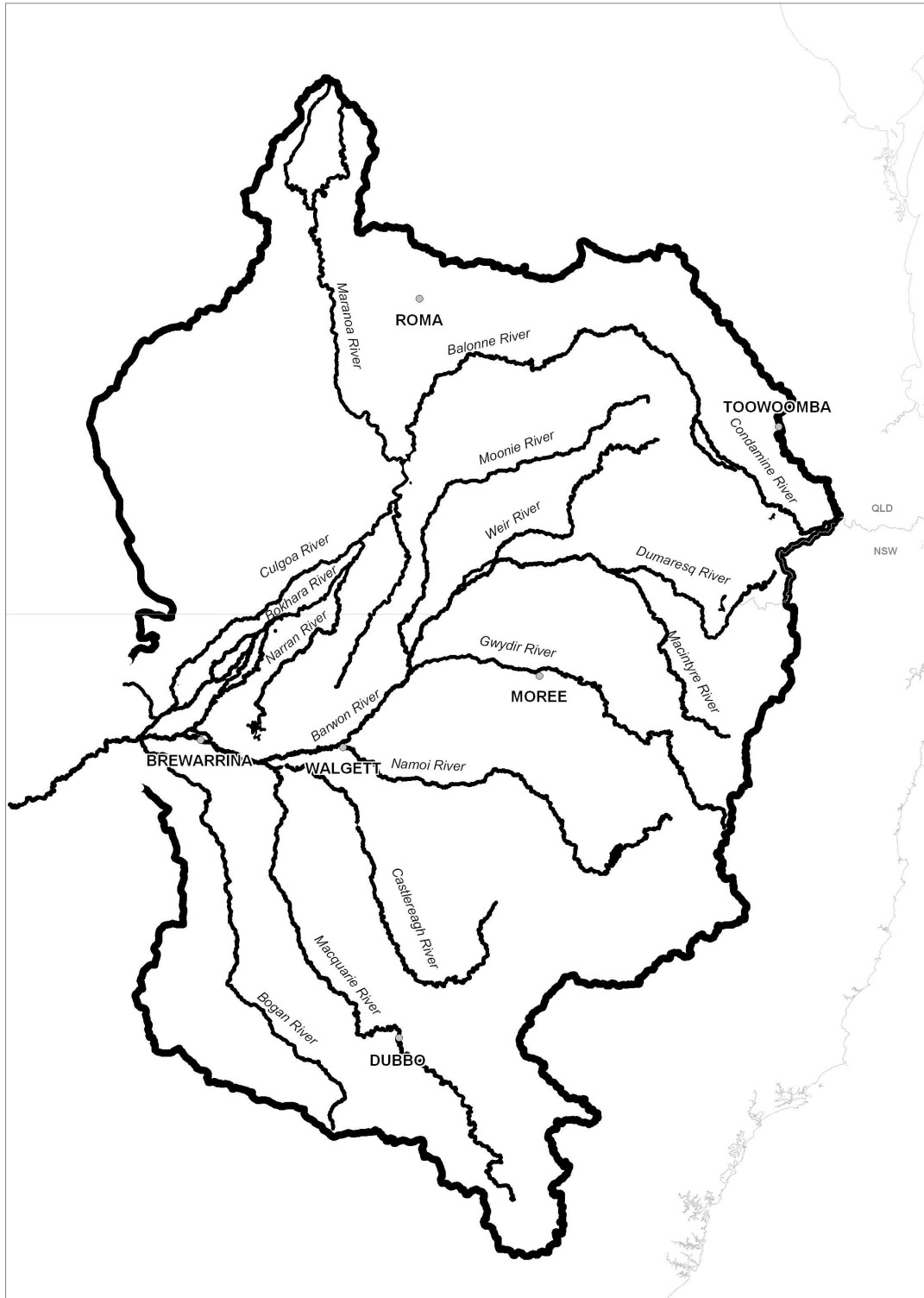
19. For flood operations to be conducted successfully it is important that the community be consulted and advised beforehand on the potential necessity for resupply and evacuation operations. A community contact strategy has been devised, consisting of the following elements:
 - a. Provision of information to residents about the condition of the levees and the potential need for evacuation when floods are occurring. This will be done periodically by Brewarrina Shire Council in letters to residents.
 - b. Provision of FloodSafe guides (brochures) to all residents. This will be carried out by the SES.
 - c. The conduct of media campaigns, coordinated by the SES and using the Brewarrina News, the Western Herald, the Dubbo Daily Liberal and radio stations 2WEB and 2CUZ.
 - d. The conduct of public meetings in Brewarrina, coordinated by the SES and with input from Council and the Community Working Party, to advise residents about the problem and its management.

20. This strategy will be maintained for as long as the problem of levee deficiency exists, with repetition of the above elements especially during the peak (summer) flood season.

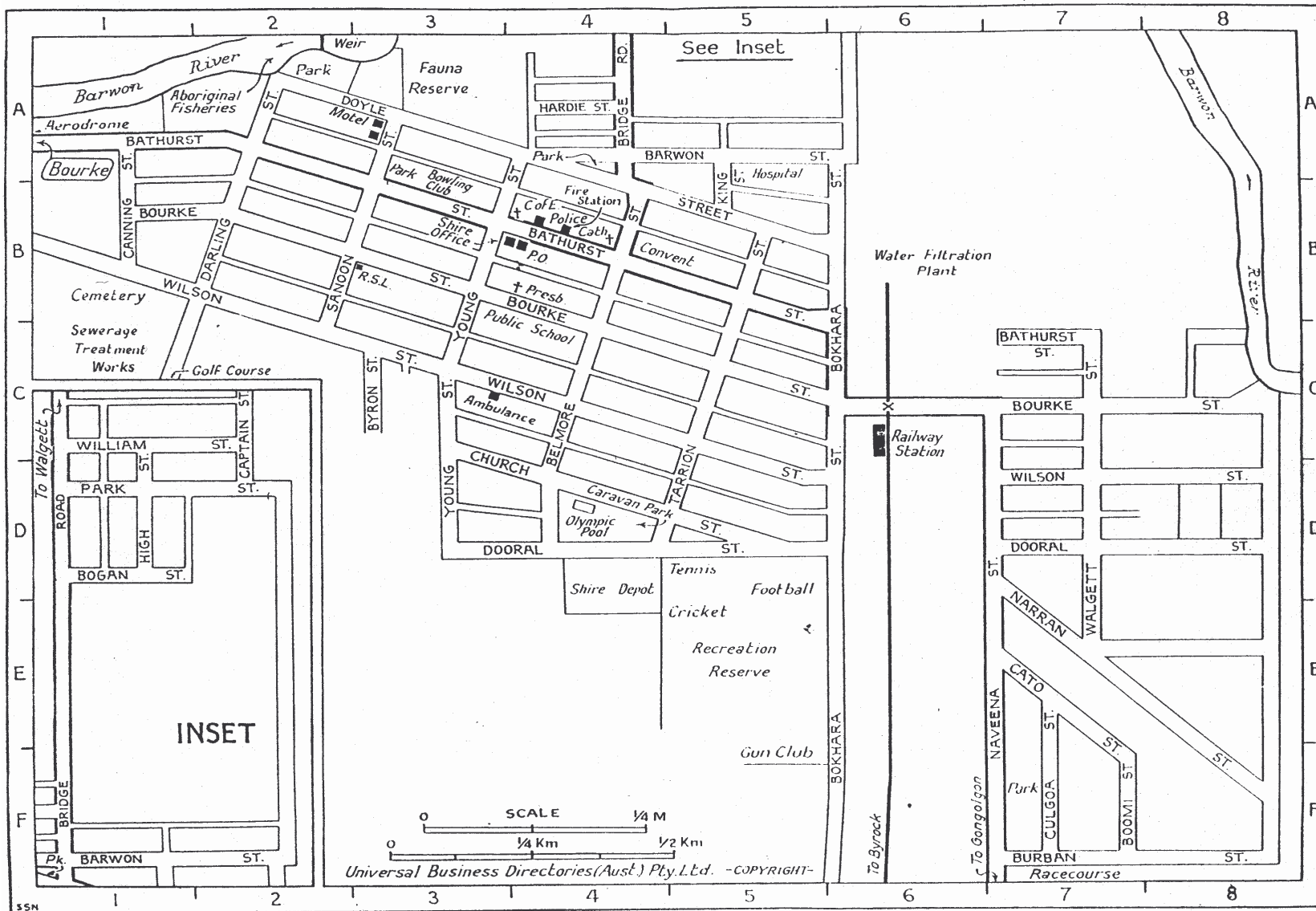
Map 1 - Brewarrina Shire



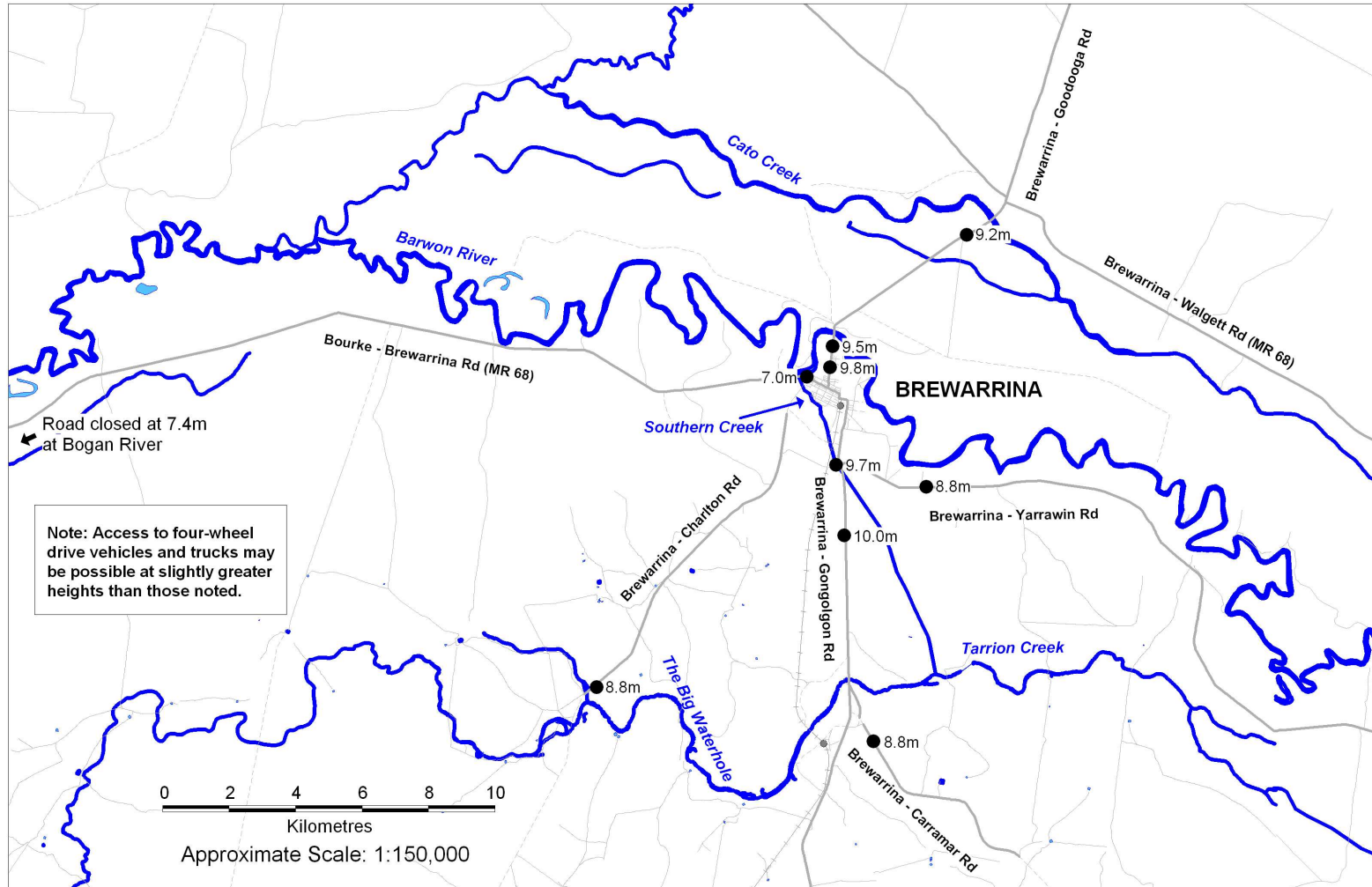
Map 2 - Barwon River and Tributaries: Catchment Upstream of Brewarrina



Map 3 – Brewarrina and North Brewarrina



Map 4 - Approximate Heights (in Metres at the Brewarrina Gauge) at Locations at which Roads Close to Cars



Map 5 - Brewarrina Town and Nearby Areas: New Levees, Disused Southern Levee and Proposed Alignment of Temporary Pallet Barrier Levees



Map 6 – Brewarrina: New Levees, Disused Southern Levee, Doorknocking Sectors and Special Sites

