SHOALHAVEN CITY FLOOD EMERGENCY SUB PLAN

A Sub-Plan of the Shoalhaven City Local Emergency Management Plan (EMPLAN)

Volume 1 of the Shoalhaven City Local Flood Plan
AUTHORISATION

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

Recommended  

[Signature]  

NSW SES Shoalhaven City Local Controller  

Date: 12/6/2014

Approved  

[Signature]  

Chair, Local Emergency Management Committee  

Date: 12/6/2014
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VERSION HISTORY

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AMENDMENT LIST

Suggestions for amendments to this plan should be forwarded to:

Illawarra South Coast Region HQ
PO Box 1460
Wollongong, NSW 2500

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

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## LIST OF ABBREVIATIONS

The following abbreviations have been used in this plan:

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<thead>
<tr>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>AEP</td>
<td>Annual Exceedance Probability</td>
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<td>AHD</td>
<td>Australian Height Datum</td>
</tr>
<tr>
<td>AIIMS</td>
<td>Australasian Inter-service Incident Management System</td>
</tr>
<tr>
<td>ARI</td>
<td>Average Recurrence Interval (Years)</td>
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<tr>
<td>ALERT</td>
<td>Automated Local Evaluation in Real Time</td>
</tr>
<tr>
<td>AWRC</td>
<td>Australian Water Resources Council</td>
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<td>BUREAU</td>
<td>Australian Government Bureau of Meteorology</td>
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<td>CBR</td>
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<td>DSC</td>
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<td>DVR</td>
<td>Disaster Victim Registration</td>
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<td>FRNSW</td>
<td>Fire and Rescue NSW</td>
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<td>NOW</td>
<td>NSW Office of Water</td>
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<tr>
<td>GIS</td>
<td>Geographic Information System</td>
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<td>GRN</td>
<td>Government Radio Network</td>
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<tr>
<td>IAP</td>
<td>Incident Action Plan</td>
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<tr>
<td>IFF</td>
<td>Imminent Failure Flood</td>
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<td>LEMC</td>
<td>Local Emergency Management Committee</td>
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<td>LEOCON</td>
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<td>LGA</td>
<td>Local Government Area</td>
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<td>OEH</td>
<td>Office of Environment and Heritage (previously DECCW)</td>
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<tr>
<td>MHL</td>
<td>Manly Hydraulics Laboratory</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>--------</td>
<td>--------------------------------------------------</td>
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<tr>
<td>NSW SES</td>
<td>NSW State Emergency Service</td>
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<tr>
<td>PMF</td>
<td>Probable Maximum Flood</td>
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<tr>
<td>PMR</td>
<td>Private Mobile Radio</td>
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<td>PMP</td>
<td>Probable Maximum Precipitation</td>
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<td>SEWS</td>
<td>Standard Emergency Warning Signal</td>
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<td>VRA</td>
<td>Volunteer Rescue Association</td>
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<td>WICEN</td>
<td>Wireless Institute Civil Emergency Network</td>
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GLOSSARY

Annual Exceedance Probability (AEP). The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood level (height) has an AEP of 5%, there is a 5% chance (that is, a one-in-20 chance) of such a level or higher occurring in any one year (see also Average Recurrence Interval).

Assistance Animal. A guide dog, a hearing assistance dog or any other animal trained to assist a person to alleviate the effect of a disability (Refer to Section 9 of the Disability Discrimination Act 1992).

Australian Height Datum (AHD). A common national surface level datum approximately corresponding to mean sea level.

Average Recurrence Interval (ARI). The long-term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods reaching a height as great as, or greater than, the 20 year ARI flood event will occur on average once every 20 years.

Catchment (river basin). The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.

Coastal Erosion. The loss of land along the shoreline predominantly by the offshore movement of sand during storms.

Dambreak Study. A Dambreak Study is undertaken to determine the likely downstream inundation areas in case of a dam failure. Modelling is undertaken for a range of dam breach possibilities and design floods. The dambreak study includes information such as the extent of flooding, flood travel times and flood water velocities. The study can assist dam owners, regulators, and emergency agencies in the preparations of evacuation plans, dam break and other flood warning systems, and hazard classification of affected areas.

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

- **Flood Induced Dam Failure**: Dam failure caused by flood, either due to overtopping erosion or by subsequent structural failure.
- **Sunny Day Dam Failure**: Dam Failure as a result of factors other than flood ie other than flood flow into the reservoir. Causes of "Sunny Day" dam failure can include internal erosion, landslide, piping, earthquake or sabotage.
**Dam Safety Emergency Plan (DSEP).** A DSEP outlines the required actions of owners and their personnel at dams in response to a range of possible emergency situations. The NSW Dam Safety Committee requires a quality controlled DSEP, with associated dambreak warning procedures to be prepared for prescribed dams where persons may be at risk downstream, if the dam failed.

**Design flood (or flood standard).** A flood of specified magnitude that is adopted for planning purposes. Selections should be based on an understanding of flood behaviour and the associated flood risk, and take account of social, economic and environmental considerations. There may be several design floods for an individual area.

**Emergency Alert.** A national telephony based alerting system available for use by emergency service agencies to send SMS and voice messages to landlines and/or mobile telephones (by billing address or location) in times of emergency.

**EMPLAN (Emergency Management Plan).** The object of a EMPLAN is to ensure the coordinated response by all agencies having responsibilities and functions in emergencies.

**Essential services.** Those services, often provided by local government authorities, that are considered essential to the life of organised communities. Such services include power, lighting, water, gas, sewerage and sanitation clearance.

**Evacuation.** The temporary movement of people from a dangerous or potentially dangerous place to a safe location, and their eventual return. It is a safety strategy which uses distance to separate people from the danger created by the hazard.

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

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

**Flash flooding.** Flooding which is sudden and often unexpected because it is caused by sudden local or nearby heavy rainfall. It is sometimes defined as flooding which occurs within six hours of the rain that causes it.

**Flood.** Relatively high water level which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences, including Tsunami.
Flood classifications. Locally defined flood levels used in flood warnings to give an indication of the severity of flooding (minor, moderate or major) expected. These levels are used by the State Emergency Service and the Australian Government Bureau of Meteorology in flood bulletins and flood warnings.

Flood intelligence. The product of collecting, collating, analysing and interpreting flood-related data to produce meaningful information (intelligence) to allow for the timely preparation, planning and warning for and response to a flood.

Flood fringe. The remaining area of flood prone land after floodway and flood storage have been defined.

Flood liable land (also referred to as flood prone land). Land susceptible to flooding by the Probable Maximum Flood (PMF) event. This term also describes the maximum extent of a floodplain which is an area of a river valley, adjacent to the river channel, which is subject to inundation in floods up to this event.

Flood of record. Maximum observed historical flood.

Floodplain Management Plan. A plan developed in accordance with the principles and guidelines in the New South Wales Floodplain Development Manual. Such a plan usually includes both written and diagrammatic information describing how particular areas of flood prone land can be used and managed to achieve defined objectives.

Flood Plan. A response strategy plan that deals specifically with flooding and is a sub-plan of a Emergency Management Plan. Flood plans describe agreed roles, responsibilities, functions, strategies and management arrangements for the conduct of flood operations and for preparing for them. A flood plan contains information and arrangements for all floods whereas an IAP is for a specific flood/event.

Flood Rescue. The safe removal of persons or domestic animals from actual or threatened danger of physical harm by floodwaters.

Flood storage areas. Those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation.

Floodway. An area where a significant volume of water flows during floods. Such areas are often aligned with obvious naturally-defined channels and are areas that, if partially blocked, would cause a significant redistribution of flood flow which may in turn adversely affect other areas. They are often, but not necessarily, the areas of deeper flow or the areas where higher velocities occur.
**Flood Watch.** A Flood Watch is a notification of the potential for a flood to occur as a result of a developing weather situation and consists of short generalised statements about the developing weather including forecast rainfall totals, description of catchment conditions and indicates streams at risk. The Bureau will also attempt to estimate the magnitude of likely flooding in terms of the adopted flood classifications. Flood Watches are normally issued 24 to 36 hours in advance of likely flooding. Flood watches are issued on a catchment wide basis.

**Flood Warning.** A Flood Warning is a gauge specific forecast of actual or imminent flooding. Flood Warnings specify the river valley, the locations expected to be flooded, the likely severity of flooding and when it will occur.

**Functional Area.** A category of services involved in the preparations for an emergency, including the following:

- Agriculture and Animal Services;
- Energy and Utility Services;
- Engineering Services;
- Environmental Services;
- Health Services;
- Public Information Services;
- Telecommunication Services;
- Transport Services;
- Welfare Services; and
- Defence HMAS Albatross and Creswell.

**Geographic Information System (GIS).** A geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analysing, and displaying all forms of geographically referenced information.

**Incident Action Plan (IAP).** An action plan for managing a specific event. Information from the Local Flood Plan is used to develop the flood IAP.

**Indirect Effect.** Indirect effects are generally a consequence of infrastructure damage or interruption of services and can affect communities distant from the actual flood footprint i.e. floodplain. Indirect effects can also refer to indirect losses due to disruption of economic activity, both in areas which are inundated or isolated. Indirect effects are one of the three primary sources of risk in the context of flooding (the other two are inundation and isolation).

**Inundation.** See definition for Flood.
**Isolation.** Properties and/or communities where flooding cuts access to essential services or means of supply. Isolation is one of the three primary sources of risk in the context of flooding (the other two are inundation and indirect effects).

**Local overland flooding.** Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.

**Major flooding.** Flooding which causes inundation of extensive rural areas, with properties, villages and towns isolated and/or appreciable urban areas flooded.

**Minor flooding.** Flooding which causes inconvenience such as closing of minor roads and the submergence of low-level bridges. The lower limit of this class of flooding, on the reference gauge, is the initial flood level at which landholders and/or townspeople begin to be affected in a significant manner that necessitates the issuing of a public flood warning by the Australian Government Bureau of Meteorology.

**Moderate flooding.** Flooding which inundates low-lying areas, requiring removal of stock and/or evacuation of some houses. Main traffic routes may be covered.

**Peak height.** The highest level reached, at a nominated gauging station, during a particular flood event.

**Prescribed Dam.** "Prescribed" dams are those listed in Schedule 1 of the Dams Safety Act 1978. The NSW Dam Safety Committee will prescribe those dams with the potential for a failure which could have a significant adverse effect on community interests.

**Probable Maximum Flood (PMF).** The largest flood that could conceivably be expected to occur at a particular location, usually estimated from probable maximum precipitation. The PMF defines the maximum extent of flood prone land, that is, the floodplain. It is difficult to define a meaningful Annual Exceedance Probability for the PMF, but it is commonly assumed to be of the order of $10^4$ to $10^7$ (once in 10,000 to 10,000,000 years).

**Runoff.** The amount of rainfall which ends up as stream flow, also known as ‘rainfall excess’ since it is the amount remaining after accounting for other processes such as evaporation and infiltration.

**Stage height.** A level reached, at a nominated gauging station, during the development of a particular flood event.

**Stream gauging station.** A place on a river or stream at which the stage height is routinely measured, either daily or continuously, and where the discharge is measured from time to time so as to develop a relationship between stage and discharge or rating curve.
PART 1 - INTRODUCTION

1.1 PURPOSE

1.1.1 This plan covers preparedness measures, the conduct of response operations and the coordination of immediate recovery measures from flooding within the Shoalhaven City Council area. It covers operations for all levels of flooding within the council area.

1.1.2 The plan also covers arrangements for the management of coastal erosion in the council area.

1.2 AUTHORITY

1.2.1 This plan is issued under the authority of the State Emergency and Rescue Management Act 1989 and the State Emergency Service Act 1989. It has been approved by the NSW SES Shoalhaven City Local Controller and the NSW SES Illawarra South Coast Region Controller as a NSW SES plan and endorsed by the Shoalhaven Local Emergency Management Committee as a sub plan of the Local EMPLAN.

1.3 AREA COVERED BY THE PLAN

1.3.1 The area covered by the plan is the Shoalhaven City Council area which includes: the city of Nowra, North Nowra and the urban areas and villages of Bomaderry, Berry, Cambewarra, Shoalhaven Heads, Greenwell Point, Kangaroo Valley, Culburra, Curramong, Callala Bay and Beach, Huskisson, Mollymook, Vincentia, Sanctuary Point, St Georges Basin, Sussex Inlet, Tomerong, Wandandian, Lake Conjola, Milton, Ulladulla, Burrill Lake, Lake Tabourie Termel, Bawley Point and Durras North.

1.3.2 The council area and its principal rivers and creeks are shown in Attachment 3.

1.3.3 The council area is in the NSW SES Illawarra South Coast Region and for emergency management purposes is part of the Illawarra South Coast Emergency Management Region.

1.4 DESCRIPTION OF FLOODING AND ITS EFFECTS

1.4.1 The NSW SES maintains information on the nature of flooding and effects of flooding on the community in the Shoalhaven City Council area.

1.5 RESPONSIBILITIES

1.5.1 The general responsibilities of emergency services organisations and support agencies (functional areas) are listed in the Local and State Emergency Management Plans (EMPLAN). Some specific responsibilities are expanded
upon in the following paragraphs. The extent of their implementation will depend on the severity of the flooding. Specific responsibilities of agencies and organisations as they relate to tsunami are detailed in the State Tsunami Emergency Sub Plan.

1.5.2 **NSW SES Shoalhaven City Local Controller.** The NSW SES Shoalhaven City Local Controller is responsible for dealing with floods as detailed in the State Flood Plan, and will:

**Preparedness**

a. Maintain a Local Headquarters at 92 Albatross Road, South Nowra in accordance with the NSW SES Controllers’ Guide and the NSW SES Operations Manual.

b. Ensure that NSW SES members are trained to undertake operations in accordance with current policy as laid down in the NSW SES Controllers’ Guide and the NSW SES Operations Manual.

c. Coordinate the development and operation of a flood warning service for the community.

d. Participate in floodplain and coastal risk management initiatives organised by the Shoalhaven City Council.

e. Coordinate a public education program.

f. Identify and monitor people and/or communities at risk of flooding and coastal erosion.

g. Ensure that the currency of this plan is maintained.

**Response**

h. Appoint an appropriate NSW SES Local Incident Controller to undertake response roles. The NSW SES Local Incident Controller will:

i. Control flood and storm response operations. This includes:
   - Directing the activities of the NSW SES units operating within the council area.
   - Coordinating the activities of supporting agencies and organisations and ensuring that liaison is established with them.
   - Contribute to preparation of Region IAP.

j. Provide an information service in relation to:
   - Flood heights and flood behaviour.
   - Coastal erosion / inundation.
   - Road conditions and closures.
   - Advice on methods of limiting property damage.
   - Confirmation of evacuation warnings and evacuation orders.
k. Direct the conduct of flood rescue operations.

l. Direct the evacuation of people and/or communities.

m. Provide immediate welfare support for evacuated people.

n. Coordinate the provision of emergency food and medical supplies to isolated people and/or communities.

o. Coordinate operations to protect property, for example by:
   - Arranging resources for sandbagging operations.
   - Lifting or moving household furniture.
   - Lifting or moving commercial stock and equipment.

p. Arrange for support (for example, accommodation and meals) for emergency service organisation members and volunteers assisting them.

q. Ensure that the managers of caravan parks are advised of flood warnings and the details of any evacuation order.

r. If NSW SES resources are available, assist with emergency fodder supply operations conducted by Agriculture and Animal Services.

s. If NSW SES resources are available, assist the NSW Police Force, RMS and Council with road closure and traffic control operations.

t. Exercise financial delegations relating to the use of emergency orders as laid down in the NSW SES Controllers’ Guide.

u. Coordinate the collection of flood and coastal erosion/inundation information for development of intelligence.

v. Submit Situation Reports to the NSW SES Illawarra South Coast Region Headquarters and agencies assisting within the council area. These will contain information on:
   - Road conditions and closures.
   - Current flood behaviour.
   - Current operational activities.
   - Likely future flood behaviour.
   - Likely future operational activities.
   - Probable resource needs.

w. Keep the Local Emergency Operations Controller advised of the flood and coastal erosion/inundation situation and the operational response.

x. Issue the ‘All Clear’ when flood and/or coastal erosion/inundation operations have been completed.
Recovery

y. Ensure that appropriate After Action Reviews are held after floods and/or coastal erosion/inundation.

z. Provide appropriate representation to the recovery committee for the duration of the response phase of an event and as agreed during the recovery phase.

1.5.3 NSW SES Nowra, St Georges Basin and Ulladulla Unit Controllers:

a. Assist the NSW SES Shoalhaven Local Controller with flood and coastal preparedness activities, including:
   - Flood planning.
   - Training of unit members.
   - The development of flood and coastal erosion/inundation intelligence.
   - The development of warning services.
   - Floodplain and coastal risk management initiatives.
   - Public education.

b. Conduct flood and coastal erosion operations within the area as directed by the NSW SES Shoalhaven City Local Controller.

c. Submit Situation Reports to the NSW SES Local Headquarters, the NSW SES Region Headquarters and agencies assisting within the local area.

1.5.4 NSW SES Nowra, St Georges Basin and Ulladulla Unit Members:

a. Carry out flood and coastal erosion response tasks. These may include:
   - The management of the NSW SES Shoalhaven City Local and Unit Headquarters Operations Centres.
   - Assist in the collection of flood and coastal erosion/inundation information for the development of intelligence.
   - Flood rescue.
   - Evacuation.
   - Providing immediate welfare for evacuated people.
   - Delivery of warnings and information.
   - Resupply.
   - Levee monitoring.
   - Sandbagging.
   - Lifting and/or moving household furniture and commercial stock.
   - Animal rescue.
   - Assisting with road closure and traffic control operations.
• Assisting with emergency fodder supply operations.
  b. Assist with preparedness activities.
  c. Undertake training in flood and storm response operations.

1.5.5 **Agriculture and Animal Services Functional Area:**
  a. When requested by NSW SES;
     • Activate the Agriculture and Animal Services Supporting Plan as required and coordinate the provision of required services which may include:
       ▪ Co-ordinate response for all animals including pets, livestock and wildlife.
       ▪ Supply and delivery of emergency fodder.
       ▪ Emergency water replacement in certain circumstances.
       ▪ Coordinate the management of livestock and farm animals.
       ▪ Advice on dealing with dead and injured farm animals.
       ▪ Financial, welfare and damage assessment assistance to flood affected farmers.
       ▪ Co-ordinate the establishment of animal shelter compound facilities for the domestic pets and companion animals of evacuees.

1.5.6 **Forestry Corporation of NSW:**
  a. Close and evacuate at risk camping grounds in Forestry Corporation of NSW managed areas.

1.5.7 **The Ambulance Service of NSW:**
  a. Assist with the evacuation of at risk communities (in particular elderly and/or infirm people).
  b. Deploy ambulance resources to appropriate locations if access is expected to be lost.
  c. Assist the NSW SES with flood rescue operations.

1.5.8 **Australian Government Bureau of Meteorology (The Bureau):**
  a. Provide Flood Watches for the Shoalhaven River Basin.
  b. Provide Flood Warnings, incorporating height-time predictions, for Nowra (AWRC no. 215903) gauge.
  c. Provide severe weather warnings when large waves and/or storm surge conditions are forecast to result in coastal erosion/inundation.
  d. Provide severe weather warnings when flash flooding is likely to occur.

1.5.9 **Caravan Park Proprietor(s):**
  a. Prepare a Flood Emergency Plan for the Caravan Park in accordance with Shoalhaven City Councils Caravan Parks in Flood Prone Areas Policy.
b. Ensure that owners and occupiers of caravans are aware that the caravan park is flood liable by:
   • Handing a written notice to occupiers taking up residence. The notice will indicate that the caravan park is liable to flooding and define the location of flood liable land within the caravan park.
   • Requesting park owners display this notice prominently in each van.
   • Requesting park owners display the Flood Emergency Management Plan in a prominent location in the caravan park.

   c. Ensure that owners and occupiers of caravans are aware that if they are expecting to be absent from their vans for extended periods, they must:
      • Provide the manager with a contact address and telephone number in case of an emergency.

   d. Ensure that occupiers are informed of Flood Warnings and Flood Watches. At this time, occupiers should be advised to:
      • Ensure that they have spare batteries for their radios.
      • Listen to a local radio station for updated flood information.
      • Prepare for evacuation.

   e. Owners of caravans situated on flood liable land, should ensure that the wheels, axles and draw bar of the caravan are not removed, and are maintained in proper working order to facilitate evacuation and van relocation.

   f. Inform the NSW SES of the progress of evacuation and/or van relocation operations and of any need for assistance in the conduct of these tasks.

1.5.10 Child Care Centres and Preschools:

   a. Childcare Centres are to be contacted by the NSW SES in the event of possible flooding or isolation.

   b. When notified the child care centres and preschools should:
      • Liaise with the NSW SES and arrange for the early release of children whose travel arrangements are likely to be disrupted by flooding and/or road closures.
      • Assist with coordinating the evacuation of preschools and child care centres.

1.5.11 Commonwealth Department of Defence:

   a. Where available resources are deemed to be insufficient, the Commonwealth Department of Defence may be requested to provide assistance under the Defence Assistance to the Civil Community (DACC) provisions as outlined within EMPLAN.

   b. Support may include:
      • Accommodation and catering;
• Transport;
• Personnel (within the constraints of individual competencies);
• Access to airfield and airfield support services such as hard standing and re-fuelling;
• Potentially access to aircraft.

1.5.12 **Office of Environment and Heritage:**

a. Provide specialist policy, engineering and scientific advice to councils and the NSW SES on flood related matters including assistance with:
   • The identification of flood problems.
   • The preparation of Floodplain Risk Management Plans and associated studies.
   • The implementation of floodplain risk management plans. This involves floodplain management projects which include flood mitigation works, flood warning, strategic land use planning and upgrade of evacuation routes.
   • The exercising of Local Flood Plans.

b. Provide specialist advice on flood related matters as follows:
   • Provide the NSW SES with access to relevant studies regarding flooding, including Flood Studies and Floodplain Risk Management Studies.
   • Coordinate the collection of post event flood data, in consultation with the NSW SES.
   • Provide advice to the NSW SES about conditions which may lead to coastal flooding or retarded river drainage near the coast.
   • Collect and maintain flood data relating to flood heights, velocities and discharges in coastal areas of NSW (through a contract with MHL as discussed separately).
   • Provide data to the Bureau of Meteorology and NSW SES real-time or near real-time access to river height gauges and height data for the development of official flood warnings (through a contract with MHL as described in the Response section of this plan).

c. **National Parks and Wildlife Service:**
   • Close and evacuate at risk camping grounds in National Parks managed areas.
   • Manage the entrance of Lake Wollumboola.

1.5.13 **Energy and Utility Services Functional Area:**

a. When requested by NSW SES:
Implement the Energy and Utilities Services Functional Area Supporting Plan.

Where required, coordinate energy and utility services emergency management planning, preparation, response and recovery, including the restoration of services following a flood event.

Coordinate advice to the NSW SES of any need to disconnect electricity, gas, water or wastewater services.

Assist the NSW SES to identify infrastructure at risk of flooding for incorporation into planning and intelligence.

Identify interdependencies between flooding and utility services due to secondary impacts of flooding and advise the NSW SES.

Assist the NSW SES with advisory notices relating to hazards from utility services during flooding.

Coordinate with utilities on restoration of services, including advisory notices relating to estimated time for restoration and mandatory safety checks prior to reconnection. Advise the NSW SES and the relevant recovery committee and coordinator of the timetable for restoration.

b. Local Providers (gas, water, waste water) Endevour Energy (electricity): Shoalhaven City Council (water, waste water) Jemina (gas)

Provide advice to the NSW SES Shoalhaven City Local Controller of any need to disconnect power/gas/water/waste water 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 electrical reticulation equipment.

Inspect, test and reconnect customers’ electrical/gas/water/waste water installations as conditions allow.

Assist the NSW SES to identify infrastructure at risk of flooding for incorporation into planning and intelligence.

1.5.14 Engineering Services Functional Area:

a. When requested by NSW SES:

Provide engineering advice regarding the integrity of damaged structures.

Assist the NSW SES with damage assessment on Council’s public infrastructure.
• Acquire and/or provide specialist technical engineering expertise.
• Assist the NSW SES and councils with the assessment and operation of flood protection levees when requested.
• Assist with property protection, including the construction or repair of levees.
• Coordinate the restoration of critical public facilities.

b. When requested by the Recovery Coordinator:
• Establish Recovery Centres by the procurement and fit-out of suitable properties.

1.5.15 Environmental Services Functional Area:
   a. When requested by NSW SES:
   • Implement the Environmental Services Functional Area (Enviroplan) Supporting Plan if required.

1.5.16 Health Services Functional Area:
   a. When requested by NSW SES:
   • Activate Healthplan if required.
   • Ensure that appropriate business continuity plans are developed for essential health infrastructure and are activated during floods.
   • Provide medical support to the NSW SES.
   • Establish health surveillance in affected areas.
   • Assess potential public health risks that either acutely endanger the health of human populations or are thought to have longer term consequences.
   • Provide environmental health advice.
   • Provide public health warnings and advice to affected communities.
   • Assist the NSW SES with the warning and evacuation of hospitals.

1.5.17 Marine Rescue NSW:
   a. Assist the NSW SES with the delivery of evacuation warnings and evacuation orders.
   b. Assist the NSW SES with the conduct of evacuations.

1.5.18 Fire and Rescue NSW, Nowra, Berry, and Ulladulla:
   a. FRNSW responsibilities are primarily confined to the FRNSW Fire District. Any deployment of FRNSW resources to assist NSW SES in Flood events rests with the respective FRNSW Zone Commander.
   b. The FRNSW Zone Commander will, assess the capability of FRNSW to assist NSW SES in the following tasks:
• Assist with the delivery of evacuation warnings and evacuation orders.
• Assist with the conduct of evacuations.
• Assist with the provision of equipment for pumping flood water out of buildings and from low-lying areas.
• Assist with clean-up operations, including the hosing out of flood affected properties.

c. FRNSW will use its best endeavours to deploy appliances and or resources into locations where access is expected to be lost.

1.5.19 **NSW Office of Water:**

a. Collect and maintain flood data including data relating to flood heights, velocities and discharges.

b. Provide the Bureau of Meteorology and NSW SES real-time or near real-time access to river height gauges and height data for the development of official flood warnings.

c. Provide flow rating charts for river height gauges.

d. Manage (with technical support from OEH) the approval process under the Water Act 1912 and Water Management Act 2000 for flood control works (earthworks, embankments and levees which can affect the distribution of floodwaters) including:
   - Assessment and approval of flood control works (including flood mitigation works) in rural areas designated under the Acts.
   - Use of floodplain management plans prepared by OEH in rural areas designated under the Acts to assess flood control work approvals.
   - Giving the NSW SES access to relevant studies regarding flooding and studies supporting floodplain management plans prepared by OEH including flood studies, floodplain risk management studies and flood behaviour investigations.

1.5.20 **NSW Police Force, Shoalhaven Local Area Command (LAC):**

a. Assist the NSW SES with the delivery of evacuation warnings and evacuation orders.

b. Assist the NSW SES with the conduct of evacuation operations.

c. Conduct road and traffic control operations in conjunction with council and/or RMS.

d. Coordinate the registration of evacuees.

e. Secure evacuated areas.

1.5.21 **NSW Rural Fire Service (RFS Shoalhaven):**

a. Provide personnel in rural areas and villages to:
• inform the NSW SES Shoalhaven City Local Controller about flood conditions and response needs in their own communities, and
• disseminate flood information.

b. Provide personnel and high-clearance vehicles for flood related activities.

c. Assist the NSW SES with the delivery of evacuation warnings and evacuation orders.

d. Assist the NSW SES with the conduct of evacuations.

e. Provide equipment for pumping flood water out of buildings and from low-lying areas.

f. If time and resources permit, assist with the removal of caravans.

g. Provide back-up radio communications.

h. Assist with ‘clean-up’ operations, including the hosing of flood affected properties.

i. Deploy fire resources to appropriate locations if access is expected to be lost.

1.5.22 Public Information Functional Area:

a. When requested by NSW SES:
• Assist the NSW SES in the establishment and operation of a Joint Media Information Centre.

1.5.23 Sydney Trains will:

• Close and reopen railway lines affected by flood waters and advise the NSW SES.

1.5.24 Roads and Maritime Services will:

• Close and reopen roads under their management and control affected by flood waters and advise the NSW SES Shoalhaven City Local Controller of their status.

• Facilitate the safe reliable access of emergency resources on RMS managed roads.

• Assist the NSW SES with identification of road infrastructure at risk of flooding.

• Manage traffic.

• Assist the NSW SES with the communication of warnings and information provision to the public through variable message signs.
1.5.25 **School Administration Offices (including Catholic Education Office - Diocese of Wollongong, Department of Education - Illawarra and South East Regional Office and Private Schools):**

   a. Liaise with the NSW SES and arrange for the early release of students whose travel arrangements are likely to be disrupted by flooding and/or road closures (or where required, for students to be moved to a suitable location until normal school closing time).
   
   b. Pass information to school bus drivers/companies and/or other schools on expected or actual impacts of flooding.
   
   c. Assist with coordinating the evacuation of schools when flooding or isolation is expected to occur.
   
   d. Provide space in schools for evacuation centres where necessary.

1.5.26 **Service and Sporting Clubs - Rotary Clubs: Nowra, South Nowra, and Ulladulla; and Lions Clubs: Nowra and Ulladulla and Nowra 4WD Club:**

   a. Assist with:
      - Delivery of evacuation warnings.
      - Conduct of evacuations.
      - Lifting and/or moving household furniture and commercial stock.
      - Sandbagging.
      - Monitoring of levees.
      - Relocation of caravans.

1.5.27 **Transport Services Functional Area:**

   a. When requested by NSW SES:
      - Assist with the coordination of transport for evacuation purposes.
      - Assist with the resupply of isolated communities and/or properties.

1.5.28 **Welfare Services Functional Area:**

   a. When requested by NSW SES:
      - Establish and manage evacuation centres, and provide disaster welfare services from recovery centres.
      - Administer the Personal Hardship and Distress component of the NSW Disaster Relief Scheme established to provide financial assistance to people affected by emergencies.

1.5.29 **Shoalhaven Local Emergency Operations Controller (LEOCON):**

   a. Monitor flood operations.
   
   b. Coordinate support to the NSW SES Shoalhaven City Local Controller if requested to do so.
1.5.30 **Shoalhaven Council Local Emergency Management Officer:**

a. Provide executive support to the LEMC and LEOCON in accordance with the Shoalhaven City Council Local Emergency Management Plan.

b. At the request of the NSW SES Shoalhaven City Local Controller, advise appropriate agencies and officers of the start of response operations.

1.5.31 **Shoalhaven City Council:**

**Preparedness**

a. Establish and maintain floodplain and coastal risk management committees and ensure that key agencies are represented on such committees.

b. Provide levee studies, flood studies, floodplain management studies and coastal management studies to the NSW SES.

c. Maintain Dam Safety Emergency Plans for the Bamarang, Danjerra and Porters Creek dams and provide copies to the NSW SES.

d. Provide information on the consequences of dam failure to the NSW SES for incorporation into planning and flood intelligence.

e. Maintain the Riverview Road and Terara levees, the notch at the river mouth at Shoalhaven Heads and drains and floodgates on the lower floodplain of the Shoalhaven River.

f. Provide the NSW SES with real-time access to information from the Shoalhaven River ALERT and other telemetered Gauges.

g. Maintain a plant and equipment resource list for the council area.

h. Contribute to the development and implementation of a public education program.

**Response**

i. At the request of the NSW SES Shoalhaven City Local Controller, deploy personnel and resources for flood and coastal erosion related activities (where practical).

j. Close and reopen council roads and advise the NSW SES Shoalhaven City Local Controller and the Police.

k. Provide information on the status of roads.

l. Provide filled sandbags to urban and village areas in which flooding is expected (where reasonably practical).

m. If time and resources permit, assist with the removal of caravans from caravan parks.

n. Provide back-up radio communications.

o. In the event of evacuations, assist with making facilities temporarily available for the domestic pets and companion animals of evacuees.
Provide access to showgrounds that are suitable for temporary livestock and pet accommodation.

p. During periods of coastal erosion from ocean storms:
   - Assist the NSW SES with reconnaissance of coastal erosion risk areas.
   - Liaise with the NSW SES Local Controller to provide advice regarding the need for response actions by the NSW SES such as evacuations.

Recovery

q. Provide for the management of health hazards associated with flooding. This includes removing debris and waste.

r. Ensure premises are fit and safe for reoccupation and assess any need for demolition.

1.5.32 Owners of Prescribed Dams within or upstream of Shoalhaven:

<table>
<thead>
<tr>
<th>Dam</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamarang Dam</td>
<td>Shoalhaven City Council</td>
</tr>
<tr>
<td>Danjera Dam</td>
<td>Shoalhaven City Council</td>
</tr>
<tr>
<td>Porters Creek Dams</td>
<td>Shoalhaven City Council</td>
</tr>
<tr>
<td>Comberton Grange Retarding Basin</td>
<td>Shaolin Buddhist Order</td>
</tr>
<tr>
<td>Bendeela Pondage</td>
<td>Sydney Catchment Authority</td>
</tr>
<tr>
<td>Tallowa Dam</td>
<td>Sydney Catchment Authority</td>
</tr>
<tr>
<td>Fitzroy Falls Reservoir</td>
<td>Sydney Catchment Authority</td>
</tr>
<tr>
<td>Kangaroo Pipeline Control Structure</td>
<td>Sydney Catchment Authority</td>
</tr>
</tbody>
</table>

a. Maintain and operate the Dam Failure Warning System for their Dam(s) and structures.

b. Contribute to the development and implementation of a public education program on flooding within the council area.

c. Consult with NSW SES on the determination of dam failure alert levels and notification arrangements when developing Dam Safety Emergency Plans.

d. Maintain a Dam Safety Emergency Plan and provide copies to the NSW SES.

e. Provide information on the consequences of dam failure to the NSW SES for incorporation into planning and flood intelligence.

f. Close and evacuate at risk camping grounds/recreational areas in Shoalhaven City Council and Sydney Catchment Authority managed areas.
1.5.33 **Shoalhaven Flood Warden and Observer Network:**

a. A network of community members in the Shoalhaven exists to:

- Provide flood information to the NSW SES Shoalhaven City Local Controller.
- Distribute flood warnings and flood information provided by the NSW SES Shoalhaven City Local Controller.
PART 2 - PREPAREDNESS

2.1 MAINTENANCE OF THIS PLAN

2.1.1 The NSW SES Shoalhaven City Local Controller will maintain the currency of this plan by:
   a. Ensuring that all agencies, organisations and officers mentioned in it are aware of their roles and responsibilities.
   b. Conducting exercises to test arrangements.
   c. Reviewing the contents of the plan:
      • After each flood operation.
      • When significant changes in land-use or community characteristics occur.
      • When new information from flood studies become available.
      • When flood control or mitigation works are implemented or altered.
      • When there are changes that alter agreed plan arrangements.

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

2.2 FLOODPLAIN AND COASTAL RISK MANAGEMENT

2.2.1 The NSW SES Shoalhaven City Local Controller will ensure that:
   a. NSW SES participates in local floodplain and coastal risk management committee activities when those committees are formed, in accordance with the protocols outlined in the NSW SES Controllers Guide.
   b. The NSW SES Illawarra South Coast Region Headquarters is informed of involvement in floodplain and coastal risk management activities.

2.3 DEVELOPMENT OF FLOOD INTELLIGENCE

2.3.1 Flood intelligence describes flood behaviour and its effects on the community.

2.3.2 The NSW SES maintains a centralised flood intelligence system.

2.4 DEVELOPMENT OF WARNING SYSTEMS

2.4.1 The NSW SES may establish a total flood warning system for areas of the Shoalhaven affected by flooding. This requires:
   a. An identification of the potential clients of flood warning information at different levels of flooding (ie. who would be affected in floods of differing severities).
   b. Available information about the estimated impacts of flooding at different heights.
c. Identification of required actions and the amounts of time needed to carry them out.

d. Appropriate means of disseminating warnings to different clients and at different flood levels.

2.4.2 Council and the Bureau have installed hardware and software (Environmon) to monitor water levels in the Shoalhaven. Data gathered provides the NSW SES with real-time access to data from the system.

2.5 PUBLIC EDUCATION

2.5.1 The NSW SES Shoalhaven City Local Controller, with the assistance of the Shoalhaven City Council and the NSW SES is responsible for ensuring that the residents of the council area are aware of the potential flood and coastal erosion threat in their vicinity and how to protect themselves from it.

2.5.2 Specific strategies to be employed include:

a. Dissemination of flood-related brochures and booklets in flood liable areas.

b. Dissemination of coastal erosion related brochures in coastal erosion liable areas.

c. Talks and displays orientated to community organisations, businesses and schools.

d. Publicity given to this plan and to flood-orientated NSW SES activities through local media outlets, including articles in local newspapers about the flood threat and appropriate responses.

2.6 TRAINING

2.6.1 Throughout this document there are references to functions that must be carried out by the members of the NSW SES Nowra and Ulladulla Units. The NSW SES Shoalhaven City Local Controller is responsible for ensuring that the members are:

a. Familiar with the contents of this plan.

b. Trained in the skills necessary to carry out the tasks allocated to the NSW SES.
2.7 RESOURCES

2.7.1 The NSW SES Nowra Unit Controller is responsible for maintaining the condition and state of readiness of NSW SES equipment and the NSW SES Nowra Unit Headquarters.

2.7.2 The NSW SES St Georges Basin Unit Controller and NSW SES Ulladulla Unit Controller has similar responsibilities in relation to the NSW SES St Georges Basin Unit and NSW SES Ulladulla Unit Headquarters and equipment respectively.
PART 3 - RESPONSE

CONTROL

3.1 CONTROL ARRANGEMENTS

3.1.1 The NSW SES is the legislated Combat Agency for floods and is responsible for the control of flood operations. This includes the coordination of other agencies and organisations for flood management tasks.

3.1.2 The NSW SES is the designated Combat Agency for damage control for storms. This includes damage control for coastal erosion and inundation from storm activity, specifically the protection of life and the coordination of the protection of readily moveable household goods and commercial stock and equipment. The NSW SES is not responsible for planning or conduct of emergency beach protection works or other physical mitigation works.

3.1.3 The Local EMPLAN will operate to provide support as requested by the NSW SES Local Incident Controller.

3.2 OPERATIONAL MANAGEMENT

3.2.1 NSW SES utilises the Australasian Inter-service Incident Management System (AIIMS), which is based on three principles:
   a. functional management;
   b. management by objectives; and
   c. span of control.

3.2.2 AIIMS provides for different incident levels based on the complexity of management.

3.2.3 The Local Government Area may be divided into sectors and divisions to manage the flood and/or coastal erosion event (divisions are usually a group of sectors).

3.2.4 Sectors and divisions may be based on floodplain classifications, geographical, physical or functional boundaries. A town, city or suburb may be one sector or split into several sectors and divisions.

3.2.5 For the purpose of managing flood response operations and evacuations during severe floods, the Shoalhaven Local Government area will be divided into three operational divisions based on NSW SES unit boundaries.
3.3 START OF RESPONSE OPERATIONS

3.3.1 This plan is always active to ensure that preparedness actions detailed in this plan are completed.

3.3.2 Response operations will begin:

a. On receipt of a Bureau of Meteorology Preliminary Flood Warning, Flood Warning, Flood Watch, Severe Thunderstorm Warning or a Severe Weather Warning for flash flooding or severe ocean conditions.
b. On receipt of a dam failure alert.
c. When other evidence leads to an expectation of flooding or coastal erosion within the council area.

3.3.3 Contact with the Bureau of Meteorology to discuss the development of flood warnings will normally be through the NSW SES Illawarra South Coast Region Headquarters and/or NSW SES State Headquarters.

3.3.4 The following persons and organisations will be advised of the start of response operations regardless of the location and severity of the flooding and coastal erosion anticipated:

a. NSW SES Illawarra South Coast Region Headquarters.
b. NSW SES Nowra, St Georges Basin and Ulladulla Unit Controllers.
c. NSW SES Nowra, St Georges Basin and Ulladulla Units.
d. Shoalhaven Local Emergency Operations Controller (for transmission to the NSW Police Force Local Area Command Headquarters).
e. Shoalhaven Local Emergency Management Officer (for transmission to appropriate council officers and departments).
f. Shoalhaven City Council Mayor.
g. Other agencies listed in this plan will be advised by the Local Emergency Management Officer on the request of the NSW SES Local Incident Controller and as appropriate to the location and nature of the threat.

3.4 RESPONSE STRATEGIES

3.4.1 The main response strategies for NSW SES flood and coastal erosion operations include:

a. Information Provision and Warning:

- Provision of warnings, information and advice to communities regarding the potential impacts of a flood and what actions to undertake in preparation for flooding.
- Inform the community regarding the potential impacts of coastal erosion and what preparatory actions to undertake.
- Provide timely and accurate information to the community.
b. Property protection
   • Protect the property of residents and businesses at risk of flood damage.
   • Assistance with property protection by way of sandbagging and the lifting or transporting of furniture, personal effects, commercial stock and caravans.
   • Assistance with the relocation of readily moveable household goods and commercial stock and equipment from properties threatened by coastal erosion.
   • Assistance with the protection of essential infrastructure.

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

d. Flood Rescue
   • The rescue or safe retrieval of persons or companion animals trapped by floodwaters.

e. Resupply
   • Minimise disruption upon the community by resupplying towns and villages which have become isolated as a consequence of flooding.
   • Ensure supplies are maintained to property owners by coordinating the resupply of properties which have become isolated as a consequence of flooding.

3.4.2 The NSW SES Local Incident Controller will select the appropriate response strategy to deal with the expected impact of the flood and coastal erosion in each sector and/or community. The impact may vary so a number of different strategies may need to be selected and implemented across the whole operational area. The available strategies for each sector and/or community are maintained by the NSW SES.

3.4.3 Supporting strategies may include:
   a. Protect the community from incidents involving fire and hazardous materials
   b. Maintain the welfare of communities and individuals affected by the impact of a flood and coastal erosion.
   c. Minimise disruption to the community by ensuring supply of essential energy and utility services.
   d. Ensure coordinated health services are available to and accessible by the flood affected communities.
e. Maintain the welfare of animals affected by the impact of a flood.

### 3.5 OPERATIONS CENTRES

3.5.1 The NSW SES Shoalhaven City Operations Centre and Shoalhaven City Council Emergency Operations Centre is located at 92 Albatross Road, South Nowra

a. The NSW SES Nowra Unit Operations Centre is located at:
   - 92 Albatross Road, South Nowra

b. The NSW SES Ulladulla Unit Operations Centre is located at:
   - 180 Camden Street, Ulladulla

### 3.6 LIAISON

3.6.1 Any agency with responsibilities identified in this plan may be requested by the NSW SES to provide liaison (including a liaison officer where necessary) to the NSW SES Shoalhaven City Operations Centre.

3.6.2 Liaison officers will:

a. maintain communication with and convey directions/requests to their organisation or functional area;

b. provide advice on the status, resource availability, capabilities, actions and requirements of their organisation or functional area, and

c. where appropriate, have the authority to deploy the resources of their parent organisation at the request of the NSW SES Local Incident Controller.

### 3.7 END OF RESPONSE OPERATIONS

3.7.1 When the immediate danger to life and property has passed the NSW SES Region Incident Controller or the NSW SES Local Incident Controller will issue an ‘all clear’ message signifying that response operations have been completed. The message will be distributed through the same media outlets as earlier evacuation messages. The relevant Controller will also advise details of recovery coordination arrangements, arrangements made for ‘clean-up’ operations prior to evacuees being allowed to return to their homes, and stand-down instructions for agencies not required for recovery operations.
PLANNING

3.8 COLLATING SITUATIONAL INFORMATION

Strategy

3.8.1 The NSW SES maintains and records situational awareness of current impacts and response activities.

Actions

3.8.2 The NSW SES Shoalhaven City Local Headquarters collates information on the current situation in the Shoalhaven City Council LGA and incorporates in Situation Reports.

3.8.3 The NSW SES Illawarra South Coast Region Headquarters collates Region-wide information for inclusion in Region NSW SES Situation Reports.

3.8.4 Sources of situational information during times of flooding and coastal erosion are:

a. **Agency Situation Reports.** Agencies and functional areas provide regular situation reports (SITREPs) to the NSW SES.

b. **Active Reconnaissance.** The NSW SES Local Incident Controller is responsible for coordinating the reconnaissance of impact areas, recording and communicating observations. Reconnaissance can be performed on the ground and using remote sensing (more commonly aerial). The NSW SES monitors the following problem areas:
   - Terara Levee
   - Riverview Road Levee
   - Burrill Lake Bridge
   - Mollymook (for coastal erosion)
   - Collingwood Beach (for coastal erosion)
   - Callala Beach (for coastal erosion)


d. **Manly Hydraulics Laboratory (a business unit within NSW Public Works)** automated river watch system funded by the Office of Environment and Heritage. This system provides river height and rainfall readings for a number of gauges in the Shoalhaven City Council area. Recent data from this system is available on the Manly Hydraulic Laboratory website: [http://www.mhl.nsw.gov.au](http://www.mhl.nsw.gov.au). A history of area floods is also available upon request via the website.

e. **NSW Office of Water.** This office advises flow rates and rates of rise for the Shoalhaven River. Daily river reports containing information on
gauge heights and river flows are available from the website:  

f. **Tallowa, Fitzroy Falls Reservoir and Kangaroo Pipeline Control Structure Dam Storage Monitoring System.** This system provides information on Tallowa, Fitzroy Falls Reservoir and Kangaroo Pipeline Control Structure Dams.

g. **NSW SES Illawarra South Coast Region Headquarters.** The Region Headquarters provides information on flooding and its consequences, including those in nearby council areas (this information is documented in Bulletins and Situation Reports).

h. **Shoalhaven City Council.** The Council jointly operates the Shoalhaven River ALERT system with the Bureau of Meteorology and provides the NSW SES with real-time access to data from the system known as Enviromon.

### 3.8.5 During flood operations sources of information on roads closed by flooding include:

a. Shoalhaven City Council:  

b. Shoalhaven Local Area Command, NSW Police Force

c. Roads and Maritime Services (website and/or telephone service)

d. NSW SES Illawarra South Coast Region Headquarters

e. NSW SES Nowra Headquarters.

f. NSW SES St Georges Basin Headquarters.

g. NSW SES Ulladulla Headquarters.

### 3.8.6 Situational information relating to consequences of flooding and/or coastal erosion should be used to verify and validate NSW SES Flood Intelligence records.

### 3.9 PROVISION OF FLOOD AND COASTAL EROSION INFORMATION AND WARNINGS

#### Strategy

#### 3.9.1 The NSW SES Shoalhaven City Local Headquarters provides advice to the NSW SES Illawarra South Coast Region Headquarters on current and expected impacts of flooding and coastal erosion in the Shoalhaven LGA.

#### 3.9.2 The NSW SES Illawarra South Coast Region Headquarters issues NSW SES Flood Bulletins, NSW SES Livestock and Equipment Warnings, Evacuation Warnings and Evacuation Orders to media outlets and agencies on behalf of all NSW SES units in the Region.
**Actions**

3.9.3 The NSW SES Local Incident Controller will ensure that the NSW SES Illawarra South Coast Region Incident Controller is regularly briefed on the progress of operations.

3.9.4 NSW SES Shoalhaven City Local Headquarters operations staff will be briefed regularly so that they can provide information in response to inquiries received in person or by other means such as phone or fax.

3.9.5 **Bureau of Meteorology Severe Thunderstorm Warning.** These are issued direct to the media by the Bureau when severe thunderstorms are expected to produce dangerous or damaging conditions, including flash flooding. Severe thunderstorms are usually smaller in scale than events covered by Flood Watches and Severe Weather Warnings.

3.9.6 **Bureau of Meteorology Severe Weather Warnings for Flash Flooding.** These are issued direct to the media by the Bureau and provide a warning of the possibility for flash flooding as a result of intense rainfall. These warnings are issued when severe weather is expected to affect land based communities within 6 to 24 hours. Severe Weather Warnings may also include other conditions such as Damaging Surf, Dangerous Surf or tides, or Damaging Winds.

3.9.7 **Bureau of Meteorology Flood Watches.** Flood Watches are issued by the Bureau to advise people of the potential for flooding in a catchment area based on predicted or actual rainfall. Flood Watches will be included in NSW SES Flood Bulletins issued by the NSW SES Illawarra South Coast Region Headquarters.

3.9.8 **Bureau of Meteorology Flood Warnings.** The NSW SES Illawarra South Coast Region Headquarters will send a copy of Bureau Flood Warnings to the NSW SES Shoalhaven City Unit. On receipt the NSW SES Local Incident Controller will provide the NSW SES Illawarra South Coast Region Headquarters with information on the estimated impacts of flooding at the predicted heights for inclusion in NSW SES Region Flood Bulletins.

3.9.9 **NSW SES Livestock and Equipment Warnings.** Following heavy rain or when there are indications of significant creek or river rises (even to levels below Minor Flood heights), the NSW SES Local Incident Controller will advise the NSW SES Illawarra South Coast Region Headquarters which will issue NSW SES Livestock and Equipment Warnings.

3.9.10 **NSW SES Local Flood Advices.** The NSW SES Local Incident Controller may issue Local Flood Advices for locations not covered by Bureau Flood Warnings. They may be provided verbally in response to phone inquiries but will normally be incorporated into NSW SES Region Flood Bulletins.

3.9.11 **NSW SES Flood Bulletins.** The NSW SES Illawarra South Coast Region Headquarters will regularly issue NSW SES Flood Bulletins which describe information on the estimated impacts of flooding at the predicted heights (using information from Bureau Flood Warnings and NSW SES Local Flood
Advices) to NSW SES units, media outlets and agencies on behalf of all NSW SES units in the Region. When operations relating to coastal erosion/inundation are being undertaken, NSW SES Region Bulletins will contain information and advice about property damage mitigation measures and evacuation in affected areas.

3.9.12 **NSW SES Evacuation Warnings and Evacuation Orders.** These are usually issued to the media by the NSW SES Region Incident Controller on behalf of the NSW SES Local Incident Controller.

3.9.13 **Dam Failure Alerts.** Dam failure alerts are issued to NSW SES by the dam owner, in accordance with arrangements in the Dam Safety Emergency Plan (DSEP), the system involves the Dam Owner notifying NSW SES State Headquarters Operations Communications Centre, who in turn distribute the warning to the NSW SES Region Headquarters and NSW SES Unit Headquarters.

3.9.14 A flow chart illustrating the notification arrangements for potential dam failure is shown in Attachment 2.

3.9.15 Dam failure alert levels are set in consultation with the NSW SES and are used to trigger appropriate response actions. The conditions that define each of the alert levels are listed in the relevant DSEP. Responses escalate as the alert level migrates from white to amber to red. Table 1 briefly outlines example defining conditions and appropriate NSW SES responses associated with each alert.

<table>
<thead>
<tr>
<th>Alert Level</th>
<th>Example Defining Condition</th>
<th>NSW SES Response</th>
<th>NSW SES Warning Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>May be a structural anomaly.</td>
<td>Implements notification flowchart.</td>
<td>This is a preliminary alert to assist the NSW SES in its preparation. This is not a public alert.</td>
</tr>
<tr>
<td></td>
<td>May be increased monitoring in response to a heavy rainfall event</td>
<td>Check operational readiness.</td>
<td></td>
</tr>
<tr>
<td>Amber</td>
<td>Failure possible if storage level continues to rise or structural anomaly not fixed</td>
<td>Implements notification flowchart.</td>
<td>NSW SES Evacuation Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warn downstream population at risk to prepare to evacuate</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>Failure imminent or occurred</td>
<td>Implements notification flowchart.</td>
<td>NSW SES Evacuation Order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Evacuation of downstream populations</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Dam Failure Alert Levels
Note: Some DSEPs will have alert levels that proceed directly from White to Red. This is the case if adequate time does not exist between the three alert levels to evacuate the downstream population at risk. The decision to omit the Amber Alert level, and the general setting of Alert levels should be undertaken in consultation with the NSW SES.

3.9.16 The NSW SES / Dam Owner will disseminate warnings to the population at risk of dam failure (these arrangements are specific to each dam, are negotiated between the Dam Owner and NSW SES, and are documented in the DSEP).

3.9.17 **Standard Emergency Warning Signal (SEWS).** This signal may be played over radio and television stations to alert communities to Evacuation Warnings, Evacuation Orders, Special Warnings or Dam-Failure Warnings. Approval to use the signal is associated with who approves the warning/order message.

3.9.18 **The Public Information and Inquiry Centre (PIIC)** (operated by the NSW Police Force) will answer calls from the public regarding registered evacuees.

3.9.19 **The Disaster Welfare Assistance line** is a central support and contact point for disaster affected people inquiring about welfare services advice and assistance.

3.9.20 **The RMS Transport Information Line** will provide advice to callers on the status of roads. The RMS website also lists road closure information.


3.9.22 Collation and dissemination of road information is actioned as follows:

   a. As part of Situation Reports, the NSW SES Local Incident Controller provides road status reports for main roads in the council area to the NSW SES Illawarra South Coast Region Headquarters.

   b. The NSW SES Illawarra South Coast Region Headquarters distributes information on main roads to NSW SES units, media outlets and agencies as part of NSW SES Flood Bulletins.

**3.10 AIRCRAFT MANAGEMENT**

3.10.1 Aircraft can be used for a variety of purposes during flood operations including evacuation, rescue, resupply, reconnaissance and emergency travel.

3.10.2 Air support operations will be conducted under the control of the NSW SES Region Headquarters, which may allocate aircraft to units if applicable.

3.10.3 NSW SES maintains the following information for the Shoalhaven City Council area:

   a. Locations of suitable helicopter landing points.

   b. Locations of suitable airports and records detailing aircraft size and type that can land at airports.

   c. Intelligence on when access to these locations is expected to be lost.
3.11 ASSISTANCE FOR ANIMALS

3.11.1 Matters relating to the welfare of livestock, companion animals and wildlife are to be referred to Agriculture and Animal Services Functional Area.

3.11.2 Requests for emergency supply and/or delivery of fodder to stranded livestock, or for livestock rescue, are to be referred to Agriculture and Animal Services Functional Area.

3.11.3 Requests for companion animal rescue should be referred to the NSW SES.

3.12 COMMUNICATION SYSTEMS

3.12.1 The primary means of communications between fixed locations is by telephone, email and facsimile.

3.12.2 The primary means of communication to and between deployed NSW SES resources is by GRN.

3.12.3 All liaison officers will provide their own communication links back to their parent agencies.

3.12.4 All other organisations will provide communications as necessary to their deployed field teams.

3.13 PRELIMINARY DEPLOYMENTS

3.13.1 When flooding is expected to be severe enough to cut road access to towns, within towns and/or rural communities, the NSW SES Local Incident Controller will ensure that resources are in place for the distribution of foodstuffs and medical supplies to the areas that could become isolated.

3.13.2 When Greenwell Point, Shoalhaven Heads, Callala Bay, Sussex Inlet, Burrill Lake, Lake Tabourie or Nowra are expected to be isolated the NSW SES Shoalhaven City Local Controller will advise appropriate agencies so that resources (including sandbags, fire fighting appliances, ambulances, etc.) are deployed to ensure that operational capability is maintained.

3.14 ROAD AND TRAFFIC CONTROL

3.14.1 A number of roads within the council area are affected by flooding. NSW SES maintains details of these roads.

3.14.2 The council closes and re-opens its own roads.

3.14.3 The NSW Police Force has the authority to close and re-open roads but will normally only do so (if the Council or the RMS have not already acted) if public safety requires such action.

3.14.4 Shoalhaven City Council operates a vehicular ferry at:

a. Comerong Island Ferry which will cease operation during flooding.
3.14.5 When resources permit, the NSW SES assists Council, RMS or the Police by erecting road closure signs and barriers.

3.14.6 In flood events, the NSW SES Local Incident Controller may direct the imposition of traffic control measures. The entry into flood affected areas will be controlled in accordance with the provisions of the State Emergency Service Act, 1989 (Part 5, Sections 19, 20, 21 and 22) and the State Emergency Rescue Management Act, 1989 (Part 4, Sections 60KA, 60L and 61).

3.14.7 Police, RMS or Council officers closing or re-opening roads or bridges affected by flooding are to advise the NSW SES Shoalhaven City Local Headquarters, which will then provide a road information service to local emergency services, the public and the NSW SES Illawarra South Coast Region Headquarters. All such information will also be passed to the Police, RMS and the Council.

3.15 STRANDED TRAVELLERS

3.15.1 Flood waters can strand travellers. Travellers seeking assistance will be referred to the Welfare Services Functional Area for the arrangement of emergency accommodation.

3.16 MANAGING PROPERTY PROTECTION OPERATIONS

**Strategy**

3.16.1 Protect the property of residents and businesses at risk of flood damage.

**Actions**

3.16.2 The NSW SES is the responsible agency for the coordination of operations to protect property.

3.16.3 Property may be protected from floods by:

a. Lifting or moving of household furniture.

b. Lifting or moving commercial stock and equipment.

c. Sandbagging to minimise entry of water into buildings.

3.16.4 The NSW SES maintains stocks of empty sandbags.

3.16.5 Property protection options are however very limited in the Shoalhaven City Council Area due to the large number of properties that can be affected and the depth of floodwaters arising from severe flooding.

3.16.6 Property protection measures for the threat of coastal erosion involves the relocation of readily moveable household goods and commercial stock and equipment. The NSW SES is not responsible for planning or conduct of emergency beach protection works or other physical mitigation works.
3.17 MANAGING FLOOD RESCUE OPERATIONS

Strategy

3.17.1 Rescue of people and animals from floods.

Actions

3.17.2 The NSW SES Local Incident Controller controls flood rescue in Shoalhaven Local Government Area during a flood emergency.

3.17.3 Flood rescues, may be carried out by accredited units in accordance with appropriate standards.

3.17.4 Additional flood boats and crews can be requested through the NSW SES Illawarra South Coast Region Headquarters.

3.17.5 There may be some residual population which did not evacuate during the early stages of flooding and which require rescue.

3.18 MANAGING EVACUATION OPERATIONS

Strategy

3.18.1 When there is a risk to public safety, evacuation is the primary strategy. Circumstances may include:

a. Evacuation of people when their homes or businesses are likely to flood.

b. Evacuation of people who are unsuited to living in isolated circumstances, due to flood water closing access.

c. Evacuation of people where essential energy and utility services are likely to fail, have failed or where buildings have been made uninhabitable.

d. Evacuation of people when their homes or business are at threat of collapse from coastal erosion

Actions

3.18.2 The evacuation operation will have the following stages:

a. Decision to evacuate.

b. Mobilisation (mobilisation may begin prior to the decision to evacuate).

c. Evacuation Warning delivery.

d. Evacuation Order delivery.

e. Withdrawal.

f. Shelter.

g. Return.

3.18.3 During floods and coastal erosion evacuations will be controlled by the NSW SES. Small-scale evacuations will be controlled by the NSW SES Local Incident
Controller. Should the scale of evacuation operations be beyond the capabilities of local resources control may be escalated to the NSW SES Illawarra South Coast Region Incident Controller.

Decision to evacuate

3.18.4 In most cases the decision to evacuate rests with the NSW SES Local Incident Controller who exercises his/her authority in accordance with Section 22(1) of The State Emergency Service Act 1989. However, the decision to evacuate will usually be made after consultation with the NSW SES Illawarra South Coast Region Incident Controller and the Local Emergency Operations Controller.

3.18.5 In events that require large scale evacuations, the decision to evacuate may be escalated to the Region or the State Incident Controller.

3.18.6 Some people will make their own decision to evacuate earlier and move to alternate accommodation, using their own transport. This is referred to as self-managed evacuation.

Mobilisation

3.18.7 The NSW SES Local Incident Controller will request the following to provide personnel for doorknock teams for designated sectors/locations:

a. NSW SES Nowra, St Georges Basin and Ulladulla Unit members,

b. RFS Shoalhaven members via the RFS Fire Control Officer,

c. Local Police Force officers via the Local Area Command.

3.18.8 The NSW SES Illawarra South Coast Region Incident Controller will request any additional personnel required to assist with doorknock teams using:

a. NSW SES members from the NSW SES Illawarra South Coast Region and surrounding NSW SES Regions,

b. FRNSW personnel arranged via the FRNSW Liaison Officer,

c. RFS personnel arranged via the RFS Liaison Officer.

3.18.9 The NSW SES Local Incident Controller will request the Council Liaison Officer to provide Council personnel to assist with traffic coordination within Sector(s) or affected communities.

3.18.10 The NSW SES Local Incident Controller will arrange liaison officers for Sector Command Centres.

3.18.11 The NSW SES Illawarra South Coast Region Incident Controller will mobilise the required number of buses for Sectors via the Transport Services Functional Area.

Delivery of Evacuation Warnings and Evacuation Orders

3.18.12 The NSW SES will advise the community of the requirements to evacuate. The NSW SES will issue an *Evacuation Warning* when the intent of an NSW SES
Incident Controller is to warn the community of the need to prepare for a possible evacuation.

3.18.13 The NSW SES will issue an **Evacuation Order** when the intent of the NSW SES Incident Controller is to instruct a community to immediately evacuate in response to an imminent threat.

3.18.14 The NSW SES Local Incident Controller will distribute Evacuation Warnings and Evacuation Orders to:

- a. Sector/Division Command Centres (where established).
- b. Shoalhaven Local Emergency Operations Centre.
- c. Shoalhaven City Council.
- d. Shoalhaven Local Area Command, NSW Police Force.
- e. Shoalhaven Rural Fire Service Control Centre.
- f. Other local agencies and specified individuals.

3.18.15 The NSW SES Illawarra South Coast Region Incident Controller will distribute Evacuation Warnings and Evacuation Orders to:

- a. The NSW SES State Operations Centre.
- b. The NSW SES Local Incident Controller.
- c. Illawarra South Coast Regional Emergency Management Officer.
- d. Regional Emergency Operations Controller, NSW Police Force.
- e. Radio Stations: ABC Radio Illawarra, Power FM, 2UUU, i98 FM, WAVE FM and 2ST.
- f. Affected communities via dial-out warning systems where installed or applicable.
- g. Relevant media outlets and agencies.

3.18.16 Evacuation Warnings and Evacuation Orders may be delivered through:

- b. Doorknocking by emergency service personnel.
- c. Public address systems (fixed or mobile).
- d. Telephony-based systems (including Emergency Alert).
- e. Two-way Radio.
- f. Direct access to Radio Station 2ST and ABC Illawarra.

3.18.17 The Standard Emergency Warning Signal (SEWS) may be used to precede all Evacuation Orders broadcast on Radio Stations.

3.18.18 Sector Command Centres, where established, will distribute Evacuation Orders via Emergency Service personnel in doorknock teams to areas under threat of inundation.
3.18.19 Doorknock teams will work at the direction of:
   a. The Sector Commander if a Sector Command Centre is established;
   b. The relevant Division Commander where a Sector Command Centre has not been established; or
   c. The NSW SES Local Incident Controller.

3.18.20 Field teams conducting doorknocks will record and report back the following information to their Sector Commander/Division Commander/Local Incident Controller:
   a. Addresses and locations of houses doorknocked and/or evacuated.
   b. The number of occupants and animals.
   c. Details of support required (such as transport, medical evacuation, assistance to secure house and/or property and raise or move belongings).
   d. Details of residents who refuse to comply with the Evacuation Order.

3.18.21 Refusal to evacuate. Field teams cannot afford to waste time dealing with people who are reluctant or refuse to comply with any Evacuation Order. These cases are to be referred to the NSW Police Force.

Withdrawal

3.18.22 Evacuations will generally be carried out in stages starting from the lowest areas, low flood islands and low trapped perimeters; and progressively from higher areas.

3.18.23 The most desirable method of evacuation is via road using private transport. This may be supplemented by buses for car-less people. However, other means of evacuation may also be used if available and as necessary (eg by foot, rail, air).

3.18.24 Evacuees who require emergency accommodation or disaster welfare assistance will be directed to designated evacuation centres. Evacuees who have made their own accommodation arrangements will not be directed to evacuation centres. It is not possible to determine in advance how many will fall into this category.

3.18.25 Evacuees will:
   a. Move under local traffic arrangements from the relevant Sectors/Community.
   b. Continue along the suburban/regional/rural road network to allocated Evacuation Centres.

3.18.26 Health Services. The Health Services Functional Area will coordinate the evacuation of hospitals, health centres, and aged care facilities (including nursing homes).
3.18.27 **Schools.** School administration offices (Department of Education and Communities, Catholic Education Office and Private Schools) will coordinate the evacuation of schools if not already closed.

3.18.28 If there is sufficient time between the start of response operations and the evacuation of communities, the NSW SES Illawarra South Coast Region Incident Controller will discuss the temporary closure of appropriate schools with the Regional Director, Illawarra South East Region, Department of Education and Communities. This will enable pupils to stay at home or be returned home so they can be evacuated (if required) with their families.

3.18.29 Note that in the Shoalhaven City Council LGA, school principals may close some schools affected by flooding in the early stages of flooding.

3.18.30 **Caravan parks.** When an evacuation order is given occupiers of non-movable vans should:

   a. Secure their vans by tying them down to prevent flotation.
   b. Isolate power to their vans by unplugging all leads.
   c. Collect personal papers, medicines, a change of clothing, toiletries and bedclothes.
   d. Lift the other contents of their vans as high as possible within the van.
   e. Move to friends, relatives or a designated evacuation centre if they have their own transport, or move to the caravan park office to await transport and contact the NSW SES.

3.18.31 Where possible, vans that can be moved will be relocated by their owners in accordance with the caravan park's Flood Emergency Plan. Park managers may arrange for the relocation of mobile vans whose owners do not have a vehicle. Council, Nowra 4WD club and NSW SES personnel will assist if required and may be able to provide additional vehicles if resources are available.

3.18.32 Caravan park managers will ensure that their caravan park is capable of being evacuated within the allocated time.

3.18.33 Caravan park managers will advise the NSW SES Shoalhaven City Local Controller of:

   a. The number of people and animals requiring transport.
   b. Details of any medical evacuations required.
   c. Whether additional assistance is required to effect the evacuation.

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

3.18.35 Inform the NSW SES Shoalhaven City Local Controller when the evacuation of the caravan park has been completed.

3.18.36 Provide the NSW SES Shoalhaven City Local Controller with a register of people that have been evacuated.
3.18.37 **Assistance Animals, Pets and Companion Animals of Evacuees:** Assistance animals (guide dogs, hearing assistance animals, etc) will remain in the care of their owners throughout the evacuation. This includes transport and access into evacuation centres etc. Due to safety restrictions, it may not be possible to allow companion animals to accompany their owners when being transported via aircraft or flood rescue boats. Agriculture and Animal Services will make separate arrangements for the evacuation and care of companion animals.

3.18.38 **Transport and storage:** Transport and storage of furniture from flood and/or coastal erosion threatened properties will be arranged as time and resources permit.

3.18.39 **Security:** The NSW Police Force will coordinate the provision of overall security for evacuated areas.

3.18.40 The NSW SES Local Incident Controller is to provide the following reports to the NSW SES Illawarra South Coast Region Headquarters:
   a. Advice of commencement of the evacuation of each Sector
   b. Regular progress reports (by Sectors) during evacuations including numbers evacuated
   c. Advice of completion of the evacuation of each Sector.

3.18.41 **Assembly areas.** An assembly area is a designated location established by the NSW SES away from the hazard or danger area. It is used for the assembly of affected persons prior their movement to temporary accommodation or a nominated evacuation centre. As such these areas do not provide welfare assistance, nor are they used for long term sheltering or provision of meals.

**Shelter**

3.18.42 **Evacuation.** Evacuees will be advised to go to friends or relatives or else be taken to the nearest accessible evacuation centre, which may initially be established at the direction of the NSW SES Local Incident Controller, but managed as soon as possible by Welfare Services.

3.18.43 The following locations may be suitable for use as evacuation centres or assembly areas dependant on the scale and type of the event. Appropriate evacuation centres and/or assembly areas will be confirmed at the time of the event:
   a. **Berry:**
      - School of Arts, Alexander Street (Can be flood affected)
      - Showgrounds, Alexander Street (Can be flood affected)
   b. **Bomaderry:**
      - Bomaderry High School, Cambewarra Road
      - Bomaderry Bowling Club, 154 Meroo Road
● Community Centre, 13-17 Birrelly Street
● Basketball Stadium, Cambewarra Road

c. Nowra:
● Nowra Showgrounds, West Street
● Shoalhaven Entertainment Centre, 44 Bridge Road
● Senior Citizens Centre, Graham Place
● Police Boys Club, Park Road

d. Kangaroo Valley:
● Showgrounds, Moss Vale Road

e. Shoalhaven Heads:
● Community Centre, Shoalhaven Heads Road
● Celia Hall, Celia Place

f. Greenwell Point:
● RSL Hall, Greenwell Point Road (Note: Greenwell Point may become isolated)

g. Culburra:
● Community Centre, Prince Edward Drive

h. Currarong:
● Tennis Courts, Walton Way

i. Callala Bay:
● Community Centre
● Callala Bay Hall

j. Callala Beach:
● Community Hall

k. Huskisson:
● Senior Citizens Centre, Huskisson Road
● Lady Denman Complex, Dent Street

l. Sanctuary Point:
● Community Centre, Paradise Beach Road
● Sanctuary Point, Primary School

m. St Georges Basin:
● Community Centre, Meriton Street

n. Erowal Bay:
• Progress Hall
o. Vincentia:
  • Sailing Club
  • Vincentia Public School, The Wool Road
p. Sussex Inlet:
  • Community Facilities, Thompson Street
  • RSL Club
q. Lake Conjola:
  • Lake Conjola Bowling Club, Lake Conjola Road
r. Milton:
  • Showgrounds, Croobyar Road
  • Milton Public School, Thomas Street
s. Mollymook:
  • Surf Club, Mitchell Parade (Note: Potentially affected by coastal erosion)
t. Ulladulla:
  • Civic Centre, Princes Highway
  • Ulladulla Oval, Deering Street
  • Ulladulla High School, South Street
u. Kioloa:
  • Community Centre, Murramarang Road
v. Lake Tabourie:
  • Tabourie Lake Motor Inn, Princes Highway

3.18.44 Registration: The NSW Police Force NSW Police Force will facilitate the requirement of Disaster Victim Registration for people evacuated to designated evacuation centres.

3.18.45 Animal shelter compounds: Animal shelter compounds will be set up for the domestic pets and companion animals of evacuees if required. Facilities will be managed by Agriculture and Animal Services.

Return

3.18.46 The NSW SES Local Incident Controller will advise when return to evacuated areas is safe after flood waters have receded and reliable access is available.

3.18.47 The NSW SES Local Incident Controller will determine when it is safe for evacuees to return to their homes in consultation with:
  a. the Recovery Coordinating Committee (if established),
b. Welfare Services Functional Area Coordinator (welfare of evacuees),

c. Engineering Services Functional Area Coordinator (electrical safety of buildings, structural integrity of levees/dams),

d. Energy and Utility Services Functional Area Coordinator,

e. Health Service Functional Area Coordinator (public health),

f. Transport Services Functional Areas Coordinator (arrangement of transport),

g. the Shoalhaven LEOCON,

h. the Shoalhaven City Council,

i. NSW SES Illawarra South Coast Region Incident Controller,

j. Other appropriate agencies/functional areas as required (mitigation and advice regarding identified risks resulting from the flood and/or coastal erosion event).

3.18.48 Once it is considered safe to do so, the NSW SES Local Incident Controller will authorise the return of evacuees.

3.18.49 The return will be controlled by the NSW SES Local Incident Controller and may be conducted, at their request, by the Recovery Coordinator.

3.19 MANAGING RESUPPLY OPERATIONS

3.19.1 The NSW SES is responsible for the coordination of the resupply of isolated communities and properties.

3.19.2 If isolation is expected to occur, residents should be encouraged to consider their needs and suitability for an unknown period of isolation.

3.19.3 If properties/communities are going to remain in locations expected to become isolated, households/retailers should be encouraged to stock up on essential supplies.

3.19.4 Where practicable, once supplies are delivered to the NSW SES designated loading point, the NSW SES Local Incident Controller will arrange for the delivery of essential foodstuffs, fuels or urgent medical supplies required by an isolated property or community.

3.19.5 All reasonable efforts will be made to deliver supplies, however where necessary the NSW SES will prioritise the delivery of items.

Resupply of Isolated Towns and Villages

Strategy

3.19.6 Minimise disruption upon the community by resupplying towns and villages which have become isolated as a consequence of flooding.
Actions

3.19.7 The NSW SES is responsible for the coordination of the resupply of isolated communities.

3.19.8 If flood predictions indicate that areas are likely to become isolated, the NSW SES Local Incident Controller should advise retailers that they should stock up.

3.19.9 When isolation occurs, retailers will be expected to place orders with 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 NSW SES.

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

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

Resupply of Isolated Properties

Strategy

3.19.12 Ensure supplies are maintained to properties by coordinating the resupply of properties which have become isolated as a consequence of flooding.

Actions

3.19.13 The resupply of isolated properties is a common requirement during floods and coordination can be difficult because requests can emanate from a variety of sources. Isolated properties may call their suppliers direct, place their orders through their own social networks or contact the NSW SES.

3.19.14 The principles to be applied when planning for the resupply of isolated properties are:

a. The NSW SES will coordinate resupply and establish a schedule.

b. Some isolated households will not have the ability to purchase essential grocery items due to financial hardship. If an isolated household seeks resupply from the NSW SES and claims to be, or is considered to be, in dire circumstances, he/she is to be referred to Welfare Services for assessment of eligibility. Where financial eligibility criteria are met, Welfare Services will assist with the purchase of essential grocery items. Welfare Services will deliver the essential grocery items to the NSW SES designated loading point for transport.

c. Local suppliers will liaise with the NSW SES regarding delivery of resupply items to the designated loading point.

d. Local suppliers are responsible for packaging resupply items for delivery.

3.19.15 A flowchart illustrating the Resupply process is shown in Attachment 1. Please note that the flowchart outlines the resupply process but does not encompass all potential situations and/or outcomes.
PART 4 - RECOVERY

4.1 RECOVERY COORDINATION AT THE LOCAL LEVEL

4.1.1 The NSW SES Shoalhaven City Local Controller will ensure that planning for long-term recovery operations begins at the earliest opportunity, initially through briefing the Local Emergency Management Committee (LEMC). As soon as possible the LEMC will meet to discuss recovery implications including the need for a Local Recovery Committee. The LEMC will consider any impact assessment in determining the need for recovery arrangements. This is conveyed in the first instance to the State Emergency Operations Controller (SEOCON) for confirmation with the State Emergency Recovery Controller (SERCON).

4.1.2 Once the need for recovery has been identified, the SERCON, in consultation with the SEOCON, may recommend the appointment of a Local Recovery Coordinator and nominate an appropriate candidate to the Minister for Police and Emergency Services.

4.1.3 The SERCON may send a representative to the LEMC and subsequent recovery meetings to provide expert recovery advice and guidance.

4.1.4 The NSW SES Shoalhaven City Local Controller and Local Emergency Operations Controller (LEOCON) attend recovery meetings to provide an overview of the emergency response operation.

4.1.5 The NSW SES Region Incident Controller, the Regional Emergency Management Officer and appropriate Regional Functional Area Coordinators will be invited to the initial local meeting and to subsequent meetings as required.

4.1.6 The recovery committee will:

a. develop and maintain a Recovery Action Plan with an agreed exit strategy
b. monitor and coordinate the activities of agencies with responsibility for the delivery of services during recovery
c. ensure that relevant stakeholders, especially the communities affected, are involved in the development and implementation of recovery objectives and strategies and are informed of progress made
d. provide the SERCON with an end of recovery report
e. ensure the recovery is in line with the National Principles of Disaster Recovery and the NSW tenets
4.2  RECOVERY COORDINATION AT THE REGION AND STATE LEVEL

4.2.1 In the event that an emergency affects several local areas, a Regional Emergency Management Committee (REMC) will meet to discuss recovery implications including the need for a Region Recovery Committee. This is conveyed in the first instance to the SEOCON for confirmation with the SERCON.

4.2.2 In the event of an emergency which affects multiple Regions, or is of state or national consequence, or where complex, long term recovery and reconstruction is required, it may be necessary to establish a State Recovery Committee and the appointment of a State Recovery Coordinator.

4.3  ARRANGEMENTS FOR DEBRIEFS / AFTER ACTION REVIEWS

4.3.1 As soon as possible after flooding has abated, the NSW SES Shoalhaven City Local Controller will advise participating organisations of details of response operation after action review arrangements.

4.3.2 The NSW SES Shoalhaven City Local Controller will ensure that adequate arrangements are in place to record details of the after action review and each item requiring further action is delegated to an organisation or individual to implement.

4.3.3 Follow-up to ensure the satisfactory completion of these actions will be undertaken by the Shoalhaven Local Emergency Management Committee.
ATTACHMENT 1 - RESUPPLY FLOWCHART

Please Note: The chart outlines the resupply process, but does not encompass all potential situations and outcomes.
ATTACHMENT 2 - DAM FAILURE ALERT NOTIFICATION ARRANGEMENTS FLOWCHART

Notification Arrangements for Potential Dam Failure

**DAM OWNER/OPERATOR**
**ISSUES WHITE/ AMBER / RED ALERT**

**PRIMARY CONTACT**

NSW SES State Operations Communications Centre (OCC)
Ph: (see note 4 below)

Confirms message received and that appropriate support is being arranged

**ALTERNATE CONTACT (To be used ONLY if SES cannot be contacted)**

Duty Officer, State Emergency Operations Centre (SEOC)
Ph: (see note 4 below)

NSW SES Region HQ Operations Controller / After Hours Duty Officer

Regional Emergency Management Officer(s) (REMO(s))
Confirms REMO(s) is aware of dam failure warning and that SES is Combat Agency

NSW SES Local Controller(s) / After Hours Duty Officer

Local Emergency Operations Controllers (LEOCON(s))

Response Controlled through Local Flood Plan(s) with reference to DSEP for potential inundation area

Activation of the Local Flood Plan includes notification to the LEOCON and activation of supporting arrangements within the Local EMPLAN.

**NOTES:**

1. Dam owners should only contact the SEOC if the SES State Operations Communications Centre (OCC) cannot be contacted.

2. The first priority for notification is to contact the next SES HQ or the next level of EOC down the flowchart. The second notification should always be across the flow chart to confirm the message is received. If the first priority notification fails or is not picked up for any reason, the second priority notification should be made before any further attempts to contact the first priority (this is why an alternate or backup system of contacts is in place).

3. The triple zero (000) number for emergency services should not be used unless contact cannot be made with SES or the SEOC, as it is likely the triple zero (000) operations will have difficulty dealing with the very unusual case of potential or actual dam failure.

4. Dam owners must contact the SEES State Headquarters during the preparation of the DSEP to obtain the appropriate emergency contact numbers.
ATTACHMENT 3 - SHOALHAVEN CITY COUNCIL LGA MAP.
HAZARD AND RISK IN SHOALHAVEN CITY

Volume 2 of the Shoalhaven City Local Flood Plan

Last Update: February 2004
ANNEX A - THE FLOOD THREAT

1. The Shoalhaven City Local Government Area (LGA) is located within the lower Shoalhaven River catchment and the upper Clyde River catchment. The LGA also includes the smaller catchments of St Georges Basin, Lake Conjola, Burrill Lake, and Lake Tabourie.

SHOALHAVEN RIVER

The Shoalhaven River Catchment

2. The Shoalhaven River is 300 kilometres long and has a catchment area of approximately 7,500 square kilometres. The river is subjected to a tidal influence until 50 kilometres upstream of the river mouth. The headwaters rise on the eastern slopes of the Great Dividing Range some 40 kilometres inland of Moruya at an elevation of 1,350 metres. The river flows in a northerly direction, parallel to the Great Dividing Range through undulating terrain, being joined by the Jembaicumbene, Gillamatong, Reedy and Boro Creeks and the Mongarlowe River. These various tributaries drain the Great Dividing Range and the Minuma, Bendoura, Benmanang, Durran Durra and Budawang ranges.

3. The river below Welcome Reef enters a narrow gorge and travels eastward through mountainous terrain. On this reach it is joined by Nerrimunga and Bungonia creeks, which drain between Lake Bathurst and Goulburn, and the Corang and Endrick rivers that flow from the Budawang Range.

4. The major tributary downstream of the Endrick River, the Yalwal River, drains a large plateau area bounded by the Turpentine Range on the south-east and reaches the Shoalhaven River about 18 kilometres upstream of Nowra. The remaining tributary the Kangaroo River originates in the Robertson-Moss Vale Plateau. The Kangaroo River flows through steep, mountainous terrain for 48 kilometres, being joined by Tallowa Creek and Bundanoon Creek just before entering the Shoalhaven River approximately 30 kilometres upstream of Nowra.

5. The river downstream of Burrier is an estuarine reach. Between Burrier and Nowra, the Shoalhaven is contained in a deep incised valley with narrow floodplain pockets. At Nowra, Nowra Creek enters the Shoalhaven River. Below Nowra, the Shoalhaven flows through a wide alluvial floodplain (approx 120 square kilometres in size) extending northward up the valley of Broughton Creek, the river’s final tributary, to the town of Berry and southward to the vicinity of Jervis Bay beyond the Crookhaven River. It appears that historically the Shoalhaven River has had several different courses through the floodplain that have divided it into a number of basin areas separated by higher land which was once the natural levee beside old river courses. The present Shoalhaven River channel has extensive natural levees along its course. Various flood mitigation projects have been completed in this reach, including the establishment of major drainage channels, installation of floodgates on drains, construction of levee banks and bank stabilisation. These works were aimed at augmenting natural levees, reducing permanent swamp levels, draining floodwaters from low lying areas and preventing back-up of floodwaters into low lying areas.
6. The Shoalhaven River discharges into the Pacific Ocean via two outlets, Shoalhaven Heads and Crookhaven Heads. Transfer of flow from the Shoalhaven River into the Crookhaven River is via an artificial canal, Berry’s Canal, which was cut in the 1820’s. It appears that Berry’s Canal is gradually capturing the Shoalhaven River flow. The river entrance at Shoalhaven Heads is intermittent, thus reducing tidal flushing flows, and this is aggravated by discharge via Berry’s Canal involving erosion, which increases the canal’s capacity. However, high river levels cause the Shoalhaven Heads outlet to open due to the overtopping or piping of dunes. A notch is normally maintained to facilitate scouring of the entrance so as to keep flood levels down in the Shoalhaven Heads area.

7. Numerous swamps also occur near the coast, including Foys, Coomonderry, Worrigee, Terara, Numbaa and Brundee swamps. These wetlands act as retention basins during flood times and can overflow during periods of heavy rain.

**Characteristics of Flooding in the Shoalhaven Catchment**

8. Upstream of Burrier, the Shoalhaven catchment is rugged, forested and virtually unpopulated, resulting in no significant flooding problems. Downstream of Burrier a floodplain of more than 12,000 hectares is subject to inundation when natural levees are overtopped. Most of this land is below Nowra and Berry. In significant events a very large area between Nowra and Greenwell Point south of the river is inundated and the Worrigee, Terara, Numbaa and Brundee swamps are joined by floodwaters, which extend south to the Crookhaven River. Within the river itself, the low lying Pig, Numbaa, Old Man (Kurrajong), Nobles and Haven islands are completely inundated, and large parts of Comerong and Apple Orchard islands are flooded. Significant flooding also occurs on the north bank to Shoalhaven Heads, and on Broughton Creek upstream to Berry.

9. Design flood studies for the Shoalhaven water supply scheme indicate that the Kangaroo River and the area downstream of Hillview on the Shoalhaven River are the most significant flood producing areas of the catchment. These areas of the catchment have a substantially higher water yield on an annual basis than others. However, it should be noted that moderate or major flooding at Nowra is unlikely to occur from storm rainfall confined to the Kangaroo River catchment. Whilst for major floods to occur, heavy storm rainfall is required over the headwaters of the Shoalhaven River upstream of Hillview.

10. Flooding on Broughton Creek, or on the small creeks which feed the swamps downstream of Nowra, is not sufficient by itself to create more than nuisance flooding on the Shoalhaven floodplain. However, such flooding can aggravate existing problems caused by floods on the main river.

11. Storm surge offshore of the river’s entrances can also aggravate flooding effects within the Shoalhaven floodplain. The record flood of 1870 produced a very high peak at Greenwell Point because it occurred simultaneously with strong wave set-up and surge conditions in the ocean. In June 1975, wind and wave action caused the pushing up of water levels in Crookhaven Bight to the extent that water levels at Nowra were higher than those caused by greater up-river flows during previous floods. Consequently, significant backwater effects occurred in the lower reaches of the river.
12. Flood behaviour in the lower river is very dependent on entrance conditions at Shoalhaven Heads. Flood levels in this area can be raised by up to one metre in a 1% AEP event if the Shoalhaven River is closed to the ocean at Shoalhaven Heads.

Indicative Peak Flow Times for the Shoalhaven River

13. Estimated river flow times from the following to Nowra are:
   a. Braidwood: 24 hours.
   b. Mountview: 17—24 hours.
   c. Mongarlowe: 14—21 hours.
   d. Hampton Bridge: 8—9 hours.
   e. Tallowa Dam: 4 hours.
   f. Grassy Gully: 2—3 hours.

14. Estimated river flow time from Nowra are:
   a. Broughton Creek: 30 minutes.
   b. Crookhaven Heads: 2 hours.

15. A minimum of 6 to 9 hours warnings will be available of significant river rises at Nowra.

Storage Dams

16. Large dams in the Shoalhaven catchment consist of Fitzroy Falls Reservoir, Kangaroo Pipeline Control Structure and Tallowa Dam.

17. Fitzroy Falls Reservoir, an earth and rock fill dam, is a water supply reservoir located on Yarrunga Creek upstream of Fitzroy Falls, approximately 16 kilometres south east of Moss Vale. Constructed in 1974 the dam has a storage capacity of 23,500 megalitres. The dam’s catchment area is about 31 square kilometres. The dam owner, the Sydney Catchment Authority, has prepared a dam safety emergency plan, addressing procedures and actions to be followed by Sydney Catchment Authority personnel in the event of the dam’s failure. The dam has limited flood mitigation affects and can safely pass the Probable Maximum Flood.

18. Kangaroo Pipeline Control Structure was constructed in 1997. The structure is concrete, buttressed and flanked by earth/rockfill embankments. Located 18 kilometres south-east of Moss Vale, the structure was constructed to act mainly as an inlet and outlet structure for flow between Fitzroy Canal and Kangaroo Pipeline for power generation and water supply purposes. It has a capacity of 24,000 Megalitres (including Fitzroy Falls Reservoir). The structure owner, the Sydney Catchment Authority, has prepared a dam safety emergency plan, addressing procedures and actions to be followed by Sydney Catchment Authority personnel in the event of the dams failure. The structure has limited flood mitigation affects.
19. **Tallowa Dam**, a concrete gravity structure, is a water supply dam located immediately downstream of the confluence of the Shoalhaven and Kangaroo Rivers forming Lake Yarrunga. Constructed in 1976 the dam has a storage capacity of 85,500 Megalitres and the lake has a surface area of 8.8 square kilometres. The dam collects water from a 5,750 square kilometre catchment that extends from Kangaroo Valley in the north-east to the upper Shoalhaven River south-west of Braidwood. The dam owner, the Sydney Catchment Authority, has prepared a dam safety emergency plan, addressing procedures and actions to be followed by Sydney Catchment Authority personnel in the event of the dam's failure. The dam's spillway cannot pass the Probable Maximum Flood. The dam has limited flood mitigation affects.

**Shoalhaven River Flood History**

20. The worst period of flooding on record on the Shoalhaven River was between 1860 and 1873. There were several major floods during this period, the two largest occurring in April 1870 and February 1873. Both of these events devastated the then thriving settlement of Terara, which was subsequently, relocated to the present site of Nowra. Serious floods occurred in 1891, 1916, 1925, 1974, 1975 and 1978.

21. Since 1860 there appears to have been 41 floods recorded at Nowra which have equalled or exceeded the currently accepted 'minor' flood level of 2.3 metres. Of these, 25 have exceeded the 'moderate' flood level of 3.3 metres including 19, which have exceeded the 'major' flood level of 4.3 metres. It is likely that more floods have occurred which have not been recorded, particularly in the minor or moderate flood ranges.

22. The following table notes the peak heights of the floods known to have reached or exceeded the 3.5 metre level at Nowra Gauge. For events prior to 1960 the levels have been assessed by extrapolation of data from other locations. After 1960, the levels are as read at Nowra itself.

<table>
<thead>
<tr>
<th>Month, Year</th>
<th>Gauge Height (metres)</th>
<th>Approximate Average Recurrence Interval (ARI; years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 1860</td>
<td>5.7</td>
<td>40</td>
</tr>
<tr>
<td>June 1864</td>
<td>5.2</td>
<td>16</td>
</tr>
<tr>
<td>April 1867</td>
<td>5.1</td>
<td>15</td>
</tr>
<tr>
<td>April 1870</td>
<td>6.5</td>
<td>100+</td>
</tr>
<tr>
<td>May 1871</td>
<td>4.7</td>
<td>10</td>
</tr>
<tr>
<td>February 1873</td>
<td>6.2</td>
<td>60</td>
</tr>
<tr>
<td>June 1891</td>
<td>5.3</td>
<td>20</td>
</tr>
<tr>
<td>February 1898</td>
<td>5.0</td>
<td>14</td>
</tr>
<tr>
<td>July 1900</td>
<td>4.4</td>
<td>&lt;10</td>
</tr>
<tr>
<td>July 1904</td>
<td>3.7</td>
<td>&lt;10</td>
</tr>
<tr>
<td>January 1911</td>
<td>3.6</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Month, Year</td>
<td>Gauge Height (metres)</td>
<td>Approximate Average Recurrence Interval (ARI; years)</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>October 1916</td>
<td>5.5</td>
<td>25</td>
</tr>
<tr>
<td>December 1920</td>
<td>4.2</td>
<td>&lt;10</td>
</tr>
<tr>
<td>July 1922</td>
<td>4.4</td>
<td>&lt;10</td>
</tr>
<tr>
<td>May 1925</td>
<td>5.7</td>
<td>30</td>
</tr>
<tr>
<td>June 1949</td>
<td>4.0</td>
<td>&lt;10</td>
</tr>
<tr>
<td>February 1956</td>
<td>4.6</td>
<td>&lt;10</td>
</tr>
<tr>
<td>October 1959</td>
<td>4.7</td>
<td>10</td>
</tr>
<tr>
<td>March 1961</td>
<td>4.2</td>
<td>&lt;10</td>
</tr>
<tr>
<td>June 1964</td>
<td>3.5</td>
<td>&lt;10</td>
</tr>
<tr>
<td>August 1974</td>
<td>4.9</td>
<td>12</td>
</tr>
<tr>
<td>June 1975</td>
<td>4.9</td>
<td>12</td>
</tr>
<tr>
<td>October 1976</td>
<td>4.1</td>
<td>&lt;10</td>
</tr>
<tr>
<td>March 1978</td>
<td>5.3</td>
<td>20</td>
</tr>
<tr>
<td>April 1988</td>
<td>4.8</td>
<td>11</td>
</tr>
<tr>
<td>August 1990</td>
<td>4.5</td>
<td>&lt;10</td>
</tr>
<tr>
<td>June 1991</td>
<td>4.2</td>
<td>&lt;10</td>
</tr>
<tr>
<td>August 1998</td>
<td>3.5</td>
<td>&lt;10</td>
</tr>
<tr>
<td>October 1999</td>
<td>3.5</td>
<td>&lt;10</td>
</tr>
</tbody>
</table>

Table 1 - Historical Flood Heights for the Shoalhaven River

23. The design heights at Nowra and Shoalhaven Heads for floods of particular annual exceedence probabilities (AEPs) and average recurrence intervals (ARIs) are as follows:

<table>
<thead>
<tr>
<th>Gauge Height (metres)</th>
<th>Flood Probability (AEP; chance of occurrence in any one year)</th>
<th>Estimated Average Recurrence Interval (ARI: years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nowra Bridge</td>
<td>Shoalhaven Heads (Entrance Closed)</td>
<td></td>
</tr>
<tr>
<td>5.3</td>
<td>2.7</td>
<td>5%</td>
</tr>
<tr>
<td>5.8</td>
<td>2.9</td>
<td>2%</td>
</tr>
<tr>
<td>6.3</td>
<td>3.3</td>
<td>1%</td>
</tr>
<tr>
<td>8.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Design flood heights at Nowra and Shoalhaven Heads
24. The 1974, 1975 and 1978 floods at Nowra were all of magnitudes which can be expected once every 12 to 20 years on average.

25. The 1978 flood had an average rate of rise of 0.135 metres per hour.

**Extreme Flooding**

26. On very rare occasions, flooding of extreme proportions will occur. Extreme floods can reach far greater heights than any previously recorded flooding. Moreover, such floods are generally both faster to rise and more dangerous in terms of depth and velocity than previous floods. It has been estimated that the Probable Maximum Flood at the Nowra Gauge could reach 8.8m, which is 2.5m above the 1% AEP (1 in 100 year) flood.

**THE CLYDE RIVER CATCHMENT**

27. The Clyde River catchment, which has an area of 2,900 square kilometres, is located south of the Shoalhaven catchment. The main topographic feature of the valley is the Budawang Range, which extends along the western and north-western boundaries of the catchment. A plateau with an average elevation of 550 metres branches towards the south-east from the northern extremities of the Bundawang Range, and the headwaters of the Clyde River rise on this plateau and in the mountainous terrain to the west.

28. From its source, the Clyde River flows in a southerly direction. After flowing through steep, heavily vegetated land and falling over 300 metres in elevation, it emerges from undulating hill country. Its major tributaries in the upper and middle reaches are Claydons, Pidgeon House, Yadboro and Boyne creeks and the Bimberamala River. Between Brooman and Currawan the river leaves the Shoalhaven Council area. Floodplain development within the Council area is limited and flooding causes few problems.

**Clyde River Flood History**

29. The two highest recorded floods on the Clyde River at Brooman were in 1961 and 1963 when the river reached 13.18 and 12.62 metres respectively. Earlier (ungauged) floods were recorded in 1860 (when rainfall of 475 mm was experienced in a four-day period), 1914, 1916, 1925, 1934, 1941, 1942 and 1945. The 1934 event was apparently more severe on the Clyde River than the 1925 one which created records on many of the other rivers of the South Coast.

**ST GEORGES BASIN**

30. St Georges Basin is located 15 kilometres south of Nowra. The basin is a coastal lagoon with an estimated surface area of 37 square kilometres. The basin discharges through the Sussex Inlet Channel to the Pacific Ocean at Bherwerre Beach. The channel is approximately six kilometres long and ranges between 50 metres and 300 metres wide. If this channel becomes blocked or constricted flooding can intensify. The total catchment area to the Pacific Ocean is approximately 327 square kilometres.
31. The two main creeks flowing into the Basin are Wandandian and Tomerong, contributing 49% and 13% respectively to the total catchment area. Other streams include Cows Creek, Tullarwalla Creek, Pats Creek, Home Creek, Worrowing Waterway, Erowal Creek and Stony Creek.

32. The upper catchment is predominantly rural land, which has been cleared of natural vegetation. The lower slopes close to the Basin contain a number of urban centres, including Sussex Inlet, Wandandian, Bewong, Basin View, St Georges Basin, Sanctuary Point, Old Erowal Bay and Wrights Beach.

### St Georges Basin Flood History

33. Most recent flooding in St Georges Basin occurred in February 1971 and June 1991.

34. The design heights at Sussex Inlet for floods of particular annual exceedence probabilities (AEPs) are as follows:

<table>
<thead>
<tr>
<th>AEP</th>
<th>Height (m AHD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme</td>
<td>5</td>
</tr>
<tr>
<td>1-100</td>
<td>2.3</td>
</tr>
<tr>
<td>1-50</td>
<td>2.05</td>
</tr>
<tr>
<td>1-20</td>
<td>1.74</td>
</tr>
</tbody>
</table>

Table 3 Design flood heights for Sussex Inlet

### LAKE CONJOLA

35. Lake Conjola is located approximately 50 kilometres south of Nowra. The lake has a surface area of approximately 4.3 square kilometres and a catchment area of 145 square kilometres. There are 19 tributaries that flow into Lake Conjola with most joining at the upstream end of the lake. The majority of the catchment is State Forest with the towns of Fisherman’s Paradise and Lake Conjola located upon the shores of the lake.

### BURRILL LAKE

36. Burrill Lake is located approximately 60 kilometres south of Nowra. The lake has a catchment area of approximately 78 square kilometres and an estimated surface area of 4.1 square kilometres. The principal tributary is Stony Creek, which enters from the north. The lakes entrance is generally open and untrained. There are five urban centres in the catchment: Dolphin Point, Burrill Lake, King’s Point, Milton and West Ulladulla.

37. The most significant recorded flood event occurred in 1971, which followed 630mm of rain over an eleven-day period and reached a maximum height of 2m AHD on the flats adjoining the channel. Most recent flooding occurred in 1991 after 150mm
of rain fell, resulting in the flooding of foreshores and the Bungalow Park Caravan Park.

**OTHER COASTAL LAKES**

38. There are numerous other coastal lakes and embayments along the coast, nearly all of them tidal. The major lakes are Wollumboola Lake, Swan Lake, Lake Tabourie, Termeil Lake, Meroo Lake, Willinga Lake, and Durras Lake. Most of these water bodies are fed by creeks and by local runoff and their levels rise when the creeks are in flood.

**COASTAL FLOODING**

39. Along the coast proper, sea conditions can have a pronounced effect on flood character. High tides, wave set-up and storm surge can all be influential.

40. Storm surge is an increase in the sea water level at the coast. The principal factors in the generation of a storm surge are:

   a. The wind stress on the sea surface, piling up water.

   b. The atmospheric pressure reduction in the storm area raising sea water level.

   c. The net water transport shoreward due to waves and swell breaking in the shallows.

   d. The local surge modification due to bottom topography, abnormally heavy rainfall and the presence of currents, tides and natural oscillations.

41. In addition to wind and barometric set-up there is an additional rise in water level on the beach due to wave set-up. The wave set-up occurs between the zone of breaking waves and the beach, and can be as much as 10 to 20 per cent of the incident wave height.

42. The maximum water levels from a combination of high tides, wave set-up and storm surge could be greater than 2.0 metres AHD. Of this, high tide levels and wave set-up would account for much more than storm surge, which is estimated to be able to contribute only about 0.4 metres.

43. A small risk exists of coastal flooding from tsunami.

**CAUSES OF FLOODING IN COASTAL LAKES AND STREAMS**

44. Flooding within coastal catchments may be caused by:

   a. An elevated lake level due to intense rainfall over the catchment. The lake level rises when runoff inflow into the basin is greater than outflow into the sea from the lake.
b. Elevated water levels within individual creeks as a result of intense rainfall over local catchments.

c. Local runoff over a small area accumulating in low spots.

d. Elevated ocean levels. Frequently elevated ocean levels are caused by storm surge.

e. Local wind conditions generating waves and setup across the fetch of the lake.

17. These factors may occur in isolation or in combination with each other. In particular, the combination of elevated ocean levels, strong winds and peak inflows into the basin are considered to be particularly hazardous.

**WEATHER SYSTEMS AND FLOODING**

18. There are pronounced differences in average rainfalls within the Council area. These are governed by physical conditions relating to the orographic triggering of rainfall by the escarpment and range country, and by the rain shadow effect of the Australian Alps, which shelter parts of the South Coast from south-westerly airstreams during winter. The areas with the highest annual rainfall levels are the Kanagroo Valley and the Budawang Range. These areas have annual rainfalls of greater than 1270mm. Some coastal and near coastal areas receive, on average, less than 900mm per year.

19. Rainfall tends to be highest in the summer and autumn months and lowest in late winter and spring. Historically, floods have been most frequent in the February-June period, though this does not mean that other periods are flood-free. The following graph indicates the temporal distribution of flood events on the Shoalhaven River since flood records were first kept.
20. Summer rainfall can be caused by tropical air-mass incursions or occasionally by the passage of cold fronts, whereas the progression of low-pressure systems is responsible for much of the winter rainfall. The more severe flood-producing weather systems are those in which a high pressure system over Tasmania or Victoria combined with a deep, slow moving low-pressure cell situated over the NSW coast produces vigorous on-shore flows of moist, warm air. This air is subjected to orographic uplift, and can produce very heavy rainfall. Oceanic storm surges and large waves may also be associated with such events. These conditions may result in incursions of seawater onto land and the retarding of flood flows.

21. Short-term, high intensity convective thunderstorms can cause local ‘flash’ flooding, especially during summer months when thunderstorms are most frequent. Minor creeks may rise, but main river levels are not affected. When such thunderstorms occur over built-up areas stormwater flooding may occur.

**COASTAL EROSION/INNUNDATION**

22. Storm surge and large waves may cause erosion of sand dunes, threatening properties and exposing landward areas to seawater inundation. Callala Beach located within Jervis Bay, 30 kilometres south of Nowra has been identified as being particularly susceptible to coastal erosion during storm events. In May and June of 1974, 6 to 9 metres of dunes were lost in this area, leaving many houses within 3 to 4 metres of the dunes edge.
ANNEX B - EFFECTS OF FLOODING ON THE COMMUNITY

SHOALHAVEN RIVER VALLEY

1. Flood prone locations in the Shoalhaven River Catchment are located in areas upstream of Norwa, Kangaroo Valley, Nowra-Bomaderry, Riverview Road Estate, Terara, Berry, Shoalhaven Heads, Greenwell Point and Culburra Orient Point. These areas are described in the following sections. Table 3 below shows the number flood-prone buildings across the Shoalhaven floodplain for different design floods at the Nowra Gauge.

<table>
<thead>
<tr>
<th>Area</th>
<th>Extreme (8.8m AHD Nowra)</th>
<th>1% AEP (6.3m AHD Nowra)</th>
<th>2% AEP (5.8m AHD Nowra)</th>
<th>5% AEP (5.3m AHD Nowra)</th>
<th>10% AEP (4.8m AHD Nowra)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nowra</td>
<td>104</td>
<td>34</td>
<td>12</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Riverview Road Estate</td>
<td>117</td>
<td>7</td>
<td>2</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Terara Village</td>
<td>55</td>
<td>44</td>
<td>13</td>
<td>1</td>
<td>Nil</td>
</tr>
<tr>
<td>Bomaderry</td>
<td>77</td>
<td>33</td>
<td>27</td>
<td>24</td>
<td>11</td>
</tr>
<tr>
<td>Shoalhaven Heads</td>
<td>199</td>
<td>134</td>
<td>92</td>
<td>60</td>
<td>39</td>
</tr>
<tr>
<td>Greenwell Point</td>
<td>382</td>
<td>350</td>
<td>275</td>
<td>211</td>
<td>137</td>
</tr>
<tr>
<td>Orient Point / Culburra</td>
<td>207</td>
<td>132</td>
<td>90</td>
<td>64</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>1141</td>
<td>734</td>
<td>611</td>
<td>365</td>
<td>217</td>
</tr>
</tbody>
</table>

Table 4 Number of flood prone buildings in the Shoalhaven Catchment

Areas upstream of Nowra

2. Access to two large caravan parks can be lost at depths less then the minor flood classification. At peak holiday periods this could result in up to 1,500 people becoming isolated. An additional caravan park becomes isolated during major flooding. Burrier pumping station, which supplies drinking water to Nowra, is also flood prone along with a gravel works.
Kangaroo Valley (population 360)

3. Flooding of the Kangaroo River and landslides can cause numerous properties to become isolated (approx 50 persons). The Bendella Picnic and Camping ground owned by the Sydney Catchment Authority is flood prone and may require evacuation.

Nowra-Bomaderry (population 28,900)

4. Flood prone properties exist in the Bomaderry, Riverview Road, Scenic Drive, North Nowra, South Nowra, East Nowra, Worrigee and Terara areas.

5. Bomaderry, located on the northern side of the river contains several large industrial premises in Bolong Road including a paper mill, dairy factory, machinery service and milling activities. This area was flooded in 1978. Further flood liable properties are located in Brinawarr, Beinda, Meroo and Railway streets. Properties in this area flood during low frequency events only. Table 3 lists the estimated number of buildings inundated during floods of various magnitudes in Bomaderry.

6. Riverview Road area, located at Nowra, on the southern bank of the Shoalhaven River is a residential area consisting of approximately 180 buildings in Riverview Road, Elia Avenue, Lyrebird Drive, Hawthorn Avenue, Campbell Place, Brereton Street, Moss Street, Terara Road, Pleasant Way and Ferry Lane. Two caravan parks are also located in this area. The area is currently protected from direct inundation from the Shoalhaven River by an earthen grassed levee. The levee crest is at approximately 6.4m AHD, providing protection up to a 1% AEP event (6.3m AHD Nowra). However, backwater flooding will occur in smaller events, with floodwaters entering via Ferry Lane. In an extreme flood the levee will be overtopped by more than two metres resulting in severe flooding to all properties. Average velocities through the area will exceed 1.8m/s, with localised velocities between buildings likely to be much higher, presenting a significant hazard to life and possibly causing structural damage to buildings. Table 3 lists the estimated number of buildings inundated during floods of various magnitudes in the Riverview Road area.

7. Scenic Drive, located on the southern bank of the Shoalhaven River has previously suffered flooding. A motel and several other properties are at risk in this area.

8. North Nowra: The Golf Course is affected and evacuations may be needed in three houses in Coolong Road off McMahon's Road.

9. South Nowra: Flash flooding from local rainfall may cause flooding in Central Avenue, Yalwal Road, Berry St, Quinns Lane, Albatross Road and Hillcrest Road.

10. East Nowra and Worrigee: Flooding occurs in Amalfi and Tarraba Crescents, Bennett Place, Dryden Close, Greenwell Point and Worrigee Roads, Jane and Plunkett Streets, Morton Parade, and Salisbury Drive. Flooding in many of these streets will only be experienced in major floods.

11. Terara is located on the southern floodplain 2.5 kilometres downstream of Nowra. The village was the original settlement in the area, but the devastation of the
1860 and 1870 floods caused most of the population to relocate to higher ground at Nowra. Today the village consists of approximately 60 residences and a school. The village is currently protected from direct inundation from the Shoalhaven River by a well-vegetated earthen grassed levee. The levee crest ranges from approximately 4.4m AHD to 4.7m AHD and will not be overtopped until 4.9 metres on the Nowra Gauge. The bank is extensively eroded in parts posing a clear threat to the undermining of the levee and some buildings. Buildings first become inundated in a 5% AEP event (4.5m AHD Terara). During a 1% AEP (5.24m AHD Terara) event the entire area is flooded and the land within 200 metres of the river channel becomes a high hazard floodway (1.3m depth and 0.4m/s velocity). Table 3 lists the estimated number of buildings inundated during floods of various magnitudes in Terara.

**Berry (population 2,420)**

12. Berry is located 14 kilometres north of Nowra on relatively high ground. Low lying parts of the town can be flooded from Broughton Mill Creek, a tributary of Broughton Creek and from minor natural watercourses running parallel to Princes and Albert streets. In a 1% AEP event the Bowling club and nearby premises could be inundated and the Princes Highway cut to the north. There is considerable flood liable land to the north, east and south of the town, and rural properties can become isolated. David Berry Hospital located on Tannery Road can become isolated, requiring resupply.

**Shoalhaven Heads (population 2,740)**

13. Shoalhaven Heads is located approximately 12 kilometres east of Nowra at one of the outlets for the Shoalhaven River. Approximately 199 properties could be inundated during extreme floods. The 5% AEP flood at Shoalhaven Heads could cause over-floor inundation of about 60 of these, requiring evacuations. Properties located in Renown Avenue, Wharf Road, River Road, Jerry Bailey Road, Hay Avenue, Berry’s Bay and the western end of Shoalhaven Heads Road are at most risk. Six caravan parks can be affected. Large numbers of people living in Shoalhaven Heads are elderly (census 2001, 796) and may need assistance with raising furniture and/or evacuating. Table 3 lists the estimated number of buildings inundated during floods of various magnitude in Shoalhaven Heads.

**Greenwell Point (population 1,270)**

14. Greenwell Point is located approximately 15 kilometres east of Nowra at the confluence of the Crookhaven River and Berry’s Canal. During relatively frequent events less than 5% AEP, 211 properties are at risk of over-floor flooding. The total number of flood prone properties in the area is 382, making Greenwell Point the township with the greatest concentration of flood prone properties on the Shoalhaven floodplain. Flood prone properties are located in the streets listed below

   a. Adelaide Street
   b. West Street
   c. Church Street
d. Comarong Street

e. Taylors Parade

f. Crookhaven Drive

g. Fraser Avenue

h. Leonore Avenue

i. South Street

j. Greenwell Point Road

k. Haiser Road

l. Keith Avenue

m. Pyree Street

n. Bailey Avenue

o. Greens Road

15. Flooding in the area splits the village into two islands. The south island encompassing Bartlett Drive and Spies Avenue will be without any facilities for evacuees and residents. This area may be isolated for up to two days and may lose utilities such as water, sewerage, electricity and telephone.

16. Large numbers of people living in Greenwell Point are elderly (census 2001, 310) and would be likely to need assistance with raising furniture and/or evacuating. It is likely that Greenwell point will become isolated during flooding and require resupply. Table 3 lists the estimated number of buildings inundated during floods of various magnitudes in Greenwell Point.

**Culburra-Orient Point (population 3,620)**

17. Culburra-Orient Point is located at Crookhaven Heads. Approximately 207 properties in Prince Edward Avenue, Sunshine, Raglan and Whistler streets, Brighton Parade, The Triangle, The Strand, Orient Point and Addison Roads, Greenback Grove, and West and Orana Crescents are flood prone. Flooding may also occur from Wollumboola Lake in Greenback Grove and West Crescent. Many of the permanent residents are elderly. It is likely that the area will become isolated and require resupply. An alternative supply route may be along Forest Road, which is unsealed. However, this road is often closed during wet weather. Table 3 lists the estimated number of buildings inundated during floods of various magnitudes in Culburra-Orient Point.
Comerong Island

18. Comerong Island consists of approximately 11 residences most of which are above the moderate flood level. The island becomes isolated once the Comerong Island Ferry is withdrawn from service at 1.8 metres on the Nowra Gauge.

OTHER AREAS

19. Various small local communities adjacent to coastal lakes and embayments in the Shoalhaven local government area are subject to flooding in their low-lying areas. These communities are popular holiday areas, especially during summer months when caravan park populations are high. The permanent populations of small towns like Sussex Inlet and the centres located on the shores of Jervis Bay and St Georges Basin contain large numbers of elderly people. Specific risk areas include Sanctuary Point, Sussex Inlet, Callala Bay / Callala Beach, Woollamia, Old Erowal Bay, Lake Conjola and Burrill Lake.

Sanctuary Point (population 7,620)

20. Sanctuary Point, located upon St Georges Basin consists of 118 flood prone properties in Mountain Street, The Park Drive, Fairway Drive, Larmer Avenue, The Wool Road, Loralyn Avenue, MacGibbon Parade, Roulstone Crescent, Prentice Avenue, Kallaroo Road and Sanctuary Park North Road.

Sussex Inlet (population 3,000)

21. In Sussex Inlet 396 residential properties, 13 caravan parks and a shopping centre are flood prone. Property inundation can occur in the streets listed below.

   a. Jacobs Drive
   b. River Road
   c. Wunda Avenue
   d. Banksia Street
   e. Poole Avenue
   f. Neilsen Lane
   g. Neilsen Road
   h. Ridge Avenue
   i. Fairview Crescent
   j. Lagoon Crescent
   k. Paradise Crescent
l. Lakehaven Drive  
m. Edgewater Avenue  
n. Ellmoos Avenue  
o. Thora Street  
p. Whimbrel Drive  
q. Riviera Avenue  

22. Sussex Inlet, Cudmirrah and Berrara become isolated once Sussex Inlet Road is flooded and require resupply. Badgee located immediately north of Sussex Inlet can become isolated from Sussex Inlet once River Road becomes inundated. Large numbers of people living in Sussex Inlet are elderly (census 2001, 1,017) and may need assistance with raising furniture and/or evacuating.

Callala Beach/Callala Bay (population 2340)  

23. More than 100 residential lots have been identified as potentially being flood prone from Callala Creek and Bid Bid Creek. These properties are essentially in Queen Mary Street and Roskell Road, Callala Beach and in the area south of Wearne Street in Callala Bay. The area north of Wearne Street and west of Lackersteen Street is also flood prone. Due to the shortage of flood studies conducted little is known about the characteristics of flooding in this area.

Woollamia (population 590)  

24. There may be more than 100 current residential properties and one caravan park at risk of flooding from Currambene Creek. Due to the shortage of flood studies conducted little is known about the characteristics of flooding in this area.

Old Erowal Bay (population 910)  

25. Old Erowal Bay, located upon St Georges Basin, may be inundated by floodwaters from St Georges Basin as well as excessive runoff from Warrowing Creek. Floodwaters may divide the village in two, flooding McGowen Street, Page Street and Prentice Avenue.

Lake Tabourie (population 530)  

26. Lake Tabourie, located approximately 80 kilometres south of Nowra, consists of approximately 100 flood prone houses and a caravan park. Due to the shortage of flood studies conducted little is known about the characteristics of flooding in this area.
St Georges Basin (population 950)

27. St Georges Basin is located on the northern shore of the St Georges Basin. Properties in Walmer Avenue, Island Point Road, Loralyn Avenue and Graham Avenue may be subject to over-floor flooding.

Lake Conjola (population 340)

28. Lake Conjola is located approximately 60 kilometres South of Nowra. Around 260 residences and 5 caravan parks have been identified as potentially being affected by floodwaters. These properties are located in Milham St, Edwin Ave, Garrad’s Way, Carroll Ave and Lake Conjola Entrance Rd.

Narrawallee

29. Narrawallee, located north of Mollymook may experience flooding in streets close to Narrawallee Inlet.

Burrill Lake (population 570)

30. Burrill Lake, located approximately 60 kilometres South of Nowra, consists of approximately 57 dwellings and 3 caravan parks, which are flood prone. These properties are located in the streets listed below McDonald Parade, Princes Highway, Kendall and Rackham Crescents, Princes, Commonwealth, Federal, Queanbeyan and Ronald Avenues, Thistleton and Lake View Drives and Balmoral Road.

ROAD CLOSURES

31. The Princes Highway can be cut at several locations, especially at Berry, Jaspers Creek (between Berry and Bomaderry), Browns Creek (Nowra), Wandandian and Burrill Lake. Numerous minor roads, especially in rural areas downstream of Nowra, are also liable to closure. Known locations of closure include the following.

<table>
<thead>
<tr>
<th>Road</th>
<th>Usual Point of Closure</th>
<th>Comments/Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Princes Highway</td>
<td>Berry (Broughton Mill Creek)</td>
<td>Can be closed for more than 24 hours; road access from highway to David Berry Hospital lost. Rail line also subject to closure</td>
</tr>
<tr>
<td>Princes Highway</td>
<td>South Nowra (Browns Creek, near BTU Road)</td>
<td>Can be closed for some hours to light traffic; severe event may deny access to heavy vehicles. Possible alternative route to BTU Road and Albatross Road.</td>
</tr>
<tr>
<td>Princes Highway</td>
<td>Falls Creek (3km south of Currumbene Creek)</td>
<td>Can be closed for hours at most to light traffic</td>
</tr>
<tr>
<td>Road</td>
<td>Usual Point of Closure</td>
<td>Comments/Implications</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Princes Highway</td>
<td>Wandandian (north of Wandean Road)</td>
<td>Can be closed for 12 hours to all traffic; no practical detour.</td>
</tr>
<tr>
<td>Princes Highway</td>
<td>Conjola (at Conjola Creek)</td>
<td>Possibly closed for more than 24 hours; no detour available.</td>
</tr>
<tr>
<td>Princes Highway</td>
<td>South of Ulladulla (Racecourse Creek, north of Kings Point Road)</td>
<td>Frequent closure for some hours; occurs even in non-serious events including storms. Emergency detours via Wood stock Road.</td>
</tr>
<tr>
<td>Princes Highway</td>
<td>Burrill Lake (north of bridge approach)</td>
<td>Closure for a few hours to light traffic.</td>
</tr>
<tr>
<td>Bomaderry / Moss Vale Road</td>
<td>Can be closed in Barrenbarrg and Cambewarra Mountains by landslides and by floodwaters in the vicinity of Nugents Creek.</td>
<td></td>
</tr>
<tr>
<td>Beach Road (Berry to Gerroa Road)</td>
<td>Broughton Creek Bridge</td>
<td>David Berry Hospital can be isolated from the east; closure may last for more than 24 hours.</td>
</tr>
<tr>
<td>Coolangatta Road (Berry to Gerroa Road)</td>
<td>Along Wharf Road and near Broughton Creek Bridge</td>
<td>Can be closed for more than 24 hours.</td>
</tr>
<tr>
<td>Bolong Road (Bomaderry to Shoalhaven Heads)</td>
<td>Broughton Creek and along Shoalhaven River floodplain</td>
<td>Can be closed for 3-4 days; closure may occur when Shoalhaven River Gauge at Nowra reaches 2.25 metres</td>
</tr>
<tr>
<td>Comerong Island Road (Nowra to Comerong Ferry)</td>
<td>Between Nowra and Terara and Numbaa to Comerong Island ferry ramp</td>
<td>Closure occurs at about 4.5 metres on Nowra Gauge; may last for 2 days.</td>
</tr>
<tr>
<td>Road</td>
<td>Usual Point of Closure</td>
<td>Comments/Implications</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Greenwell Point and Culburra Roads (Nowra to Greenwell Point and Culburra)</td>
<td>Brundee and Pyree, at Crookhaven Creek; Mayfeild Road to Crookhaven Creek</td>
<td>Closure for more than 24 hours.</td>
</tr>
<tr>
<td>Albatross Road (Nowra to HMAS Albatross), Berry Street</td>
<td>Nowra Creek</td>
<td>Possible closure for more than 24 hours.</td>
</tr>
<tr>
<td>Woollomia Road</td>
<td>Near Pritchard Avenue</td>
<td>Closure for up to 24 hours.</td>
</tr>
<tr>
<td>Jervis Bay Road (Falls Creek to Jervis Bay)</td>
<td>Duck Creek</td>
<td></td>
</tr>
<tr>
<td>Sanctuary Point Road North</td>
<td>Tomerong Creek</td>
<td>Closure in severe events only; local streets may be inundated. Alternative access via Grange Road to Princes Highway.</td>
</tr>
<tr>
<td>Sussex Inlet Road/Jacobs Drive (Princes Highway to Sussex Inlet)</td>
<td>Near Sandpiper Way and Elmoos Avenue</td>
<td>Closure for up to 4 days; numerous local streets also inundated and access lost. Badgee can be isolated except to emergency vehicles.</td>
</tr>
<tr>
<td>Bawley Point Road (Termeil to Bawley Point)</td>
<td>Willinga Lake</td>
<td>Closure for hours only.</td>
</tr>
<tr>
<td>Battunga Drive, Tomerong</td>
<td></td>
<td>Access lost to Princes Highway; problem for school bus travel and Battunga Estate.</td>
</tr>
<tr>
<td>Yalwal Road (Nowra to Burrier)</td>
<td>Nowra Creek; possibly other closure points upstream of Barringella Creek.</td>
<td>Closure occurs at about 3.5m on Nowra Gauge when backwater flooding occurs from the Shoalhaven River.</td>
</tr>
</tbody>
</table>
# CARAVAN PARKS

32. The following caravan parks are flood-prone

<table>
<thead>
<tr>
<th>Name</th>
<th>Permanent Cabins &amp; Vans</th>
<th>Lived in permanently</th>
<th>Easily removed</th>
<th>Casual Van Sites</th>
<th>Tent Sites</th>
<th>Minimum ground height (mAHD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nowra</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoalhaven Caravan Village, Terara Road, Nowra</td>
<td>117</td>
<td>85</td>
<td>0</td>
<td>13</td>
<td>50</td>
<td>5.3 m Nowra Gauge water first enters.</td>
</tr>
<tr>
<td>East –The Willows Caravan Park, Pleasant Way, Nowra</td>
<td>52</td>
<td>10</td>
<td></td>
<td>10</td>
<td></td>
<td>4.9</td>
</tr>
<tr>
<td>Coolendel Nature and Camping Reserve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Animal Farm and Camping Reserve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoalhaven Ski Park</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.1</td>
</tr>
<tr>
<td>Grady’s Riverside Retreat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td><strong>Greenwell Point</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coral Tree Lodge, Greens Road</td>
<td>84</td>
<td>29</td>
<td></td>
<td>55</td>
<td></td>
<td>1.62</td>
</tr>
<tr>
<td>Anglers Rest, 113 Adelaide Street</td>
<td>39</td>
<td>6</td>
<td></td>
<td>23</td>
<td></td>
<td>1.36</td>
</tr>
<tr>
<td>Pine Park Tourist Ground and Marina, 15 West Street</td>
<td>135</td>
<td>14</td>
<td></td>
<td>121</td>
<td></td>
<td>1.57</td>
</tr>
<tr>
<td><strong>Shoalhaven Heads</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoalhaven Heads Tourist Park, Shoalhaven Heads Road</td>
<td>230</td>
<td>5</td>
<td>0</td>
<td>100</td>
<td>50</td>
<td>1.455</td>
</tr>
<tr>
<td>Name</td>
<td>Permanent Cabins &amp; Vans</td>
<td>Lived in permanently</td>
<td>Easily removed</td>
<td>Casual Van Sites</td>
<td>Tent Sites</td>
<td>Minimum ground height (mAHD)</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>----------------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Jans Riverside Caravan Park, 32 Hay Avenue</td>
<td>29</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td></td>
<td>1.655</td>
</tr>
<tr>
<td>Tall Timbers Caravan Park, Shoalhaven Heads Road</td>
<td>160</td>
<td>70</td>
<td>0</td>
<td>7</td>
<td>30</td>
<td>1.96</td>
</tr>
<tr>
<td>Mountain View Caravan Park and Mobile Home Village, 14 Shoalhaven Heads Road</td>
<td>105</td>
<td>98</td>
<td>0</td>
<td>104</td>
<td>10</td>
<td>1.7</td>
</tr>
<tr>
<td>Coastal Palms, 40 Shoalhaven Heads Road</td>
<td>175</td>
<td>50</td>
<td>0</td>
<td>120</td>
<td>8</td>
<td>2.48</td>
</tr>
<tr>
<td>Camellia Caravan Park, 102-104 Jerry Baily Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.42</td>
</tr>
<tr>
<td><strong>Sussex Inlet</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Badgee Park Caravan and Camping Area, 148 River Road</td>
<td>44</td>
<td>0</td>
<td>36</td>
<td></td>
<td></td>
<td>1.17</td>
</tr>
<tr>
<td>Riviera Caravan Park, 158 River Road</td>
<td>33</td>
<td>3</td>
<td>10</td>
<td></td>
<td></td>
<td>1.38</td>
</tr>
<tr>
<td>Laguna Lodge Holiday Units, 160 River Road</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.1</td>
</tr>
<tr>
<td>Bentley Waterfront Motel, 164 River Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.71</td>
</tr>
<tr>
<td>Talofa Caravan Park, 178 River Road</td>
<td>32</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>1.28</td>
</tr>
<tr>
<td>Inlet Anchorage Caravan Park, 200 River Road</td>
<td>20</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>1.51</td>
</tr>
<tr>
<td>Name</td>
<td>Permanent Cabins &amp; Vans</td>
<td>Lived in permanently</td>
<td>Easily removed</td>
<td>Casual Van Sites</td>
<td>Tent Sites</td>
<td>Minimum ground height (mAHD)</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-------------------------</td>
<td>----------------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Cedar Pines Caravan Park, 204 River Road</td>
<td>37</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>1.51</td>
</tr>
<tr>
<td>Shang-Ri La Caravan Park, 212 River Road</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>1.42</td>
</tr>
<tr>
<td>Riverside Caravan Park, Sussex Inlet Road</td>
<td>96</td>
<td>0</td>
<td>6</td>
<td>8</td>
<td></td>
<td>1.09</td>
</tr>
<tr>
<td>Kerri Ann Caravan Park, 40 Sussex Road</td>
<td>18</td>
<td>8</td>
<td>10</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Seacrest Caravan Park, Sussex Inlet Road</td>
<td>86</td>
<td>12</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alamien Caravan, Alamien Road</td>
<td>90</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Sussex House Caravan Park, Jacobs Drive</td>
<td>32</td>
<td>0</td>
<td>1</td>
<td></td>
<td>1.54</td>
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</table>

**St Georges Basin**

- Aloha Caravan Park, Island Point Road
- Leisure Haven Caravan Park, 785 Woolamia Road

**Lake Conjola**

- Lake Conjola Entrance Caravan Park, Entrance Road | 194 | 110 |
- Lake Conjola Caravan Park, Gerrad Way
- Conjola Lakeside Caravan Park, Norman Street | 187 | 0   | 12  |
<table>
<thead>
<tr>
<th>Name</th>
<th>Permanent Cabins &amp; Vans</th>
<th>Lived in permanently</th>
<th>Easily removed</th>
<th>Casual Van Sites</th>
<th>Tent Sites</th>
<th>Minimum ground height (mAHD)</th>
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<tr>
<td><strong>Burrill Lake</strong></td>
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<tr>
<td>Pacific Caravan Park, Dolphin Point Road</td>
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<td>Bangalow Park Caravan Park</td>
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<td>Burrill Lake Tourist Caravan Park, Princes Highway</td>
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<td></td>
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<tr>
<td><strong>Lake Tabourie</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Lake Tabourie Holiday Haven Tourist Park, Princes Highway</td>
<td>20</td>
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<td>0</td>
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<td>12</td>
</tr>
</tbody>
</table>
SES RESPONSE

ARRANGEMENTS FOR

SHOALHAVEN CITY

Volume 3 of the Shoalhaven City Local Flood Plan

Last Update: February 2004
# ANNEX C - GAUGES MONITORED BY THE SHOALHAVEN CITY SES LOCAL HEADQUARTERS

<table>
<thead>
<tr>
<th>Gauge Name</th>
<th>Type</th>
<th>AWRC No</th>
<th>Stream</th>
<th>Flood Classification</th>
<th>Reading Arrangements</th>
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<tr>
<td><strong>Shoalhaven River</strong></td>
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<tr>
<td>Crookhaven Heads</td>
<td>Telemeter</td>
<td>215413</td>
<td>Crookhaven</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Danjera Dam</td>
<td>Alert</td>
<td>215904</td>
<td>Danjera Creek</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fossickers Flat</td>
<td>Alert/Tele</td>
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</tr>
<tr>
<td>Grassy Gully</td>
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<tr>
<td>Greenwell Point†</td>
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<td>Hampden Bridge</td>
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<td>Kangaroo</td>
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<tr>
<td>Mongarlowe</td>
<td>Telemeter</td>
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<tr>
<td>Nowra* ‡</td>
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<td>215903</td>
<td>Shoalhaven</td>
<td>2.3 3.3 4.3</td>
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<td>Tallowa Dam</td>
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<tr>
<td>Terara*</td>
<td>Manual</td>
<td>215905</td>
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<tr>
<td>Burrier</td>
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<td>215900</td>
<td>Shoalhaven</td>
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<tr>
<td><strong>Other Areas</strong></td>
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<tr>
<td>Island Point†</td>
<td>Telemeter</td>
<td>10354</td>
<td>St Georges Basin</td>
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<tr>
<td>Sussex Inlet†</td>
<td>Telemeter</td>
<td></td>
<td>St Georges Basin</td>
<td></td>
<td></td>
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<tr>
<td>Swan Lake</td>
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<td>Swan Lake</td>
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<td>10210</td>
<td>Lake Conjola</td>
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<td>Tabourie Lake†</td>
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<td>10361</td>
<td>Lake Tabourie</td>
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<tr>
<td>Burrill Lake Bridge†</td>
<td>Telemeter</td>
<td>10065</td>
<td>Burrill Lake</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

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

The Illawarra South Coast SES Division Headquarters distributes SES Flood Bulletins and other flood related information (including Flood Warnings) to the following regional media outlets:

**Television Stations:**

<table>
<thead>
<tr>
<th>Station</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Win TV</td>
<td>Wollongong</td>
</tr>
<tr>
<td>Prime TV</td>
<td>Wollongong</td>
</tr>
</tbody>
</table>

**Radio Stations:**

<table>
<thead>
<tr>
<th>Station</th>
<th>Location</th>
<th>Frequency</th>
<th>Modulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC Radio Illawarra</td>
<td>Wollongong</td>
<td>97.3</td>
<td>FM</td>
</tr>
<tr>
<td>Power FM</td>
<td>Nowra</td>
<td>94.9</td>
<td>FM</td>
</tr>
<tr>
<td>2UUU</td>
<td>Nowra</td>
<td>104.5</td>
<td>FM</td>
</tr>
<tr>
<td>i98 FM</td>
<td>Wollongong</td>
<td>98.1</td>
<td>FM</td>
</tr>
<tr>
<td>Wave FM</td>
<td>Wollongong</td>
<td>96.5</td>
<td>FM</td>
</tr>
<tr>
<td>2ST</td>
<td>Nowra</td>
<td>999</td>
<td>AM</td>
</tr>
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**Newspapers:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milton and Ulladulla Times</td>
<td>Ulladulla</td>
</tr>
<tr>
<td>Nowra News</td>
<td>Nowra</td>
</tr>
<tr>
<td>Shoalhaven Independent</td>
<td>Nowra</td>
</tr>
<tr>
<td>South Coast Register</td>
<td>Nowra</td>
</tr>
<tr>
<td>Illawarra Mercury</td>
<td>Wollongong</td>
</tr>
</tbody>
</table>
ANNEX E - TEMPLATE EVACUATION WARNING MESSAGE

Evacuation Warning for [ ]

Date/Time of Issue: [ ]

Authorised By: [ ]

The Bureau of Meteorology has predicted a flood level of [ ] metres at [ ] (place) at [ ] (time). This means that the following area(s) may be inundated [ ].

It is recommended that you prepare to evacuate/for evacuation 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 other animals.

If evacuation is necessary:

- 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, buses will operate where possible on normal routes. 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 patrol evacuated areas.
ANNEX F - EVACUATION ARRANGEMENTS FOR THE SHOALHAVEN CITY COUNCIL AREA

SITUATION

1. Evacuations will be necessary in areas where over-floor flooding is likely, prolonged isolation is likely or utility loss (loss of water, power, sewerage, phone) occurs. Evacuations may be necessary in areas upstream of Nowra, Terara, Riverview Road, Bolong Road, Shoalhaven Heads, Greenwell Point, Culburra-Orient Point, Sanctuary Point, Sussex Inlet, Old Erowal Bay, St Georges Basin, Lake Conjola, Narrawallee, Burrill Lake and Lake Tabourie.

2. While numerous elevated buildings on the floodplain have floor levels likely to remain above all but the most extreme floods, these buildings cannot be considered safe refuges because of likely water supply, sewerage and telephone system failure. Residents of highset houses will therefore need to evacuate when severe floods are predicted so as to avoid the necessity for later operations to rescue them.

3. In some cases evacuation routes are lost before the inundation of homes and businesses occurs. Evacuations should be completed before evacuation routes are closed.

4. Some flood-free areas may require evacuation as a result of the loss of utilities.

MISSION

5. The SES is to coordinate the evacuation of areas at risk of flooding in order to ensure the safety of residents.

EXECUTION

Control

6. During floods, the NSW SES will control evacuations.

The Decision to Evacuate

7. The responsibility for issuing any general evacuation order during flooding rests with the Shoalhaven City SES Local Controller who exercises his/her authority in accordance with section 22 (1) of The State Emergency Service Act 1989. During the possibility of large-scale evacuations the decision to evacuate will usually be made after consultation with the Shoalhaven City LEOCON and the Illawarra South Coast Division Controller.

8. As far as possible, evacuation will be carried out before inundation occurs.

9. Some people will make their own decision to evacuate earlier and move to alternative accommodation using their own transport. These evacuees will be
advised, via the media, to inform the Police or SES of their evacuation and their temporary address.

**Conduct**

10. Evacuations will be controlled by the Shoalhaven City SES Local Controller and conducted by personnel from the State Emergency Service, NSW Police, Rural Fire Service and NSW Fire Brigades.

   a. Phase 1 - Warning.
   b. Phase 2 – Withdrawal.
   c. Phase 3 – Shelter.
   d. Phase 4 – Return.

**Groupings and Tasks**

11. **Operational Sectors.** For the purpose of managing flood response operations and evacuations during severe floods the Shoalhaven local government area will be divided into two operational sectors based on SES unit boundaries as detailed in Part 3 of this plan. The Sectors are:

   a. Shoalhaven City
   b. Southern Shoalhaven

12. **Tasks**

   a. **Shoalhaven City Sector:**

   - Shoalhaven City SES:
     - Control evacuations in the Shoalhaven City Sector.
     - Conduct evacuation operations.
   - Shoalhaven City Council
     - Warn and/or evacuate Council owned caravan parks.
     - Assist in the relocation of caravans from Council and privately owned parks.
     - Set-up and operate animal shelter compound facilities in conjunction with NSW Agriculture for the domestic pets and companion animals of evacuees.
   - NSW Police, Berry, Culburra, Huskisson, Kangaroo Valley, Nowra and Sussex Inlet:
- Assist with the delivery of evacuation warnings and the conduct of evacuations.
- Conduct road and traffic control operations in conjunction with Council and/or RTA.
- Ensure all evacuees are registered.
- Secure evacuated areas.
- Rural Fire Service:
  - Provide personnel and vehicles to assist with the delivery of evacuation warnings and the conduct of evacuations.
- Ambulance Service of NSW, Kangaroo Valley, Bomaderry, Culburra and Huskisson:
  - Assist with the evacuation of elderly and/or infirm people.
- NSW National Parks and Wildlife Service:
  - Warn and evacuate campers and walkers from flood prone areas within the Morton, Booderee, Comerong Island and Jerrawangala National Parks.
- NSW State Forests:
  - Warn and evacuate campers and walkers from flood prone areas within Yalwal and Yerriyong State Forests.
- NSW Fire Brigades, Nowra and Berry:
  - Provide personnel and vehicles to assist with the delivery of evacuation warnings and the conduct of evacuations.
- Sydney Catchment Authority
  - Close and evacuate the Bendella Picnic and Camping Ground.

b. **Southern Shoalhaven Sector:**

- Southern Shoalhaven SES:
  - Control evacuation operations in the Southern Shoalhaven sector.
  - Conduct evacuations.
• Shoalhaven City Council
  • Warn and/or evacuate Council owned caravan parks.
  • Assist in the relocation of caravans from Council and privately owned parks.
  • Set-up and operate animal shelter compound facilities in conjunction with NSW Agriculture for the domestic pets and companion animals of evacuees.

• NSW Police, Ulladulla:
  • Assist with the delivery of evacuation warnings and the conduct of evacuations.
  • Conduct road and traffic control operations in conjunction with Council and/or RTA.
  • Ensure all evacuees are registered.
  • Secure evacuated areas

• Rural Fire Service
  • Provide personnel and vehicles to assist with the delivery of evacuation warnings and the conduct of evacuations.

• Ambulance Service of NSW, Ulladulla:
  • Assist with the evacuation of elderly and/or infirm people.

• NSW National Parks and Wildlife Service:
  • Warn and evacuate campers and walkers from flood prone areas in the Conjola, Morton and Meroo National Parks.

• NSW State Forests:
  • Warn and evacuate campers and walkers from flood prone areas in the Yerriyong, McDonald, Brooman and Clyde State Forests.

• NSW Fire Brigades, Ulladulla:
  • Provide personnel and vehicles to assist with the delivery of evacuation warnings and the conduct of evacuations.
Phase 1 – Warning

11. Evacuation Triggers

a. Shoalhaven River: Due to the nature of the Shoalhaven River floodplain, evacuations as a result of flooding are geographically scattered. The following is a description of some areas that may require evacuations.

- **Areas upstream of Nowra**, consisting of Coolendel, Shoalhaven Ski Park and Grady’s Riverside Retreat caravan parks may require evacuation. Evacuations will become necessary if floodwaters at the Nowra Gauge are expected to exceed the following heights,
  - 2.8 metres - Shoalhaven Ski Park to be evacuated.
  - 2.8 metres - Coolendel Camping Reserve to be evacuated
  - 3.0 metres - Grady’s Riverside Retreat to be evacuated.

  Evacuations of Coolendel Camping Reserve and Grady’s Riverside Retreat to Nowra should be completed before the primary evacuation route is cut at 1.3 metres on the Nowra Gauge. During peak tourist season up to 1500 people may occupy these parks. The complete evacuation of the Shoalhaven Ski Park should be completed before 4.8 metres at which point road access is lost.

- **Shoalhaven Heads**, consists of approximately 199 flood prone properties. Due to both ocean and upstream river influences upon flood levels it is difficult to accurately establish a height at the Nowra Gauge at which evacuations will be required. It is recommended that the following areas be monitored during flooding for potential evacuations: Hay Avenue, Wharf, Jerry Bailey and Shoalhaven Heads Roads and Berrys Bay. There are at least four caravan parks that may require evacuation.

- **Greenwell Point**, consists of approximately 382 flood prone properties. Due to both ocean and upstream river influences upon flood levels it is difficult to accurately establish a height at the Nowra Gauge at which evacuations will be required. It is recommended that the following areas be monitored during flooding for potential evacuations: Haizer, Greens and Greenwell Point Roads, Adelaide, Church and Comarong Streets and Keith and Leonore Avenues.

- **Terara**, consisting of 55 residences will require complete evacuation if floodwaters are expected to exceed 4.9 metres at the Nowra Gauge (4.4 metres Terara Gauge), at which height the Terara levee is predicted to be overtopped. The nearest high
ground is located at Nowra two kilometres west of the village. The principal evacuation route Terara Road becomes flooded at 3.5 metres on the Nowra Gauge and closes at 4.5 metres. By 5.6 metres at the Nowra Gauge parts of Terara Road are flooded by up to 1 metre. An alternative evacuation route exists along Millbank Road, however, it is uncertain at what stage this road becomes closed. Evacuations should be completed before the Terara levee is overtopped at 4.9 metres on the Nowra Gauge.

- **Riverview Road Estate**, consisting of approximately 177 residences, will require complete evacuation if the river is anticipated to exceed 6.4 metres at the Nowra Gauge, at which height the Riverview Road levee is expected to be overtopped. Persons should be evacuated from Riverview Road, Elia Avenue, Lyrebird Drive, Hawthorn Avenue, Ferry Lane, Moss Street and Campbell Place. Several houses may be inundated before this height, requiring early evacuation. Evacuations should be completed before levee overtopping occurs.

- **East Nowra and Worrigee**, will require initial evacuations in Greenwell Point Road, Plunket Street, Dryden Close and Bennett Place if the river at the Nowra Gauge is expected to surpass 3.6 metres. Evacuations of some residents in Plunckett Street and Dryden Close will need to be completed before 3 metres.

- **Bomaderry**: Bolong Road will require evacuations if floodwaters are expected to exceed 3.8 metres at the Nowra Gauge. Evacuations will need to be completed before 2.05 metres, at which height road access to the estate is lost. Many businesses in this area have their own evacuation plans and require early warning to activate them.

- **Culburra-Orient Point**: There are 132 dwellings that may need to be evacuated. However, due to both ocean and upstream river influences upon flood levels it is difficult to accurately establish a height at the Nowra Gauge at which evacuations will be required. It is recommended that the following areas be monitored during flooding for potential evacuations: Addison Road, Orama Crescent, Sunshine Street, Orient Point Road, Raglan Street, Brighton Parade and Prince Edward Avenue.

b. **St Georges Basin**: Due to the nature of the St Georges Basin floodplain, evacuations as a result of flooding are geographically scattered. The following areas may require evacuation

- **Sussex Inlet**, will require initial evacuations if floodwaters at the Sussex Inlet Gauge are expected to reach 0.9 metres. Evacuations will be concentrated in Jacobs and Lake Haven Drives, River and Sussex Inlet Roads, Wunda, Poole, Ridge, Edgewater, Riveria and Ellmoos Avenues, Banksia Street,
Fairview, Lagoon, Carter and Paradise Crescents, Neilsen Lane and Mary and Thora Streets. There are 12 caravan parks in the area, which may need to be evacuated; these parks are mainly located in River Road. These areas should be monitored on receipt of a large wave warning or flood watch. Evacuations proceeding along River Road or Jacobs Drive should be completed by 1.8 metres on the Sussex Inlet Gauge, at which point these roads become flooded.

- **St Georges Basin**, will first require evacuations in Fisherman Road, Walmer Avenue when the Island Point Gauge is expected to reach 1.2 metres. There are seven properties in this area that are flooded over-floor at less than 1.6 metres on the Island Point Gauge. This area should be monitored on receipt of a flood watch. Further evacuations may be necessary in Island Point Road and Loralyn Avenue.

- **Old Erowal Bay**, may require evacuations in Prentice Avenue, Page Street and McGowan Street. Evacuation to Vincentia or Sanctuary Point may be problematic as the village may be isolated by the flooding of The Wool Road by Tomerong and Worrowing Creeks. The Henry Kendall Coastal Waters Retirement Village is also located in this area, it is unlikely that it will require evacuation.

- **Sanctuary Point**, may require initial evacuations in Mountain Street, The Park Drive, MacGibbon Parade, Roulstone Crescent, Prentice Avenue, Kallaroo Road and Larmer Avenue. There are 30 residences located in this area with floor levels less than 1.8m AHD. These properties should be monitored in the event of a flood watch or reports of heavy rain, particularly over the Tomerong Creek Catchment. Tomerong Creek can be monitored from the Princes Highway eight kilometres upstream of the flood liable area.

c. **Lake Conjola**, will require initial evacuations if floodwaters at the Lake Conjola Gauge are anticipated to exceed 1.1 metres. Evacuations are likely to be necessary in Milham Street, Edwin Avenue, Garrads Way, Carrol Avenue, Christmas Island and Lake Conjola Entrance Road. There are three Caravan Parks that may require evacuations in the area. In the absence of quantitative warnings the SES local controller should conduct monitoring of these areas after receiving reports of heavy rain from observers, a flood watch or a large wave warning. Evacuations of Eastern Lake Conjola to the Bowling Club should be completed before road access along Lake Conjola Entrance Road is lost.

d. **Burrill Lake**, will require evacuations if floodwaters at the Burrill Lake Gauge are anticipated to reach 1.35 metres. Evacuations may be necessary in McDonald Parade, Kendall and Rackham Crescents, Princess, Commonwealth, Ronald, Federal and Queanbeyan Avenues,
Balmoral Road, Lake View Drive and the Princes Highway. In the absence of quantitative warnings the SES Local Controller should conduct monitoring of these areas after receiving reports of heavy rain from observers, a flood watch, severe weather warning or a large wave warning. Evacuations northward should be completed before road access along the Princes Highway is lost at less than 2 metres AHD on the Burrill Lake Gauge.

e. **Lake Tabourie.** The Lake Tabourie Holiday Haven Tourist Resort will require evacuation if floodwaters reach 1.4 metres on the Lake Tabourie Gauge, and further rises are anticipated. Evacuations may also be necessary on the eastern side of the Princes Highway and Portland Way. In the absence of quantitative warnings the SES Local Controller should conduct monitoring of these areas after receiving reports of heavy rain from observers, a flood watch, severe weather warning or a large wave warning.

f. **Narrawalle.** Low-lying areas of Narawalle, such as Porter Drive and Normandy, Macleay, Parkinson and Bangalow streets, may experience flooding. Any inundation is likely to be fairly shallow, low-velocity and short-term, but some evacuations may be necessary.

g. **Woollamia,** may require evacuations if the Currambene Creek is in flood. This is an ungauged stream hence no quantitative evacuation triggers exist. On receipt of a flood watch, severe weather warning, large wave warning or reports of heavy rainfall over the catchment the Wollamia area should be monitored.

12. Note: evacuation triggers listed are to be used as guides only. Under certain flood conditions evacuations may become necessary before the listed evacuation trigger heights are reached.

13. **Evacuation Warnings.** On receipt of flood warnings or observations predicting heights which may result in over-floor flooding, public health concerns or prolonged isolation, the Shoalhaven SES Local Controller will consult as necessary to determine the level of the threat and the need to consider evacuations. As soon as possible after the decision to evacuate is made, the Shoalhaven SES Local Controller will issue evacuation warnings to the ‘at risk’ residents, indicating what people should do before evacuating and when actually doing so.

14. **Voluntary Evacuations.** Some people will make their own decision to evacuate earlier and move to alternative accommodation using their own transport. These evacuees will be advised, via the media, to inform the Police or SES of their evacuation and their temporary address. Where possible, people will be given the opportunity to evacuate voluntarily at an early stage of a potentially severe flood. Elderly people and mothers with young children will especially be encouraged to evacuate voluntarily under such circumstances.

15. **General Evacuation Order.** A General Evacuation Order will be issued if it appears likely that land on which dwellings, commercial premises or community facilities are situated will be flooded. Such an order could be issued for the entire
Shoalhaven floodplain or areas within it or entire catchments south of the Shoalhaven Catchment. Points to consider in issuing a General Evacuation Order will include:

a. The predicted flood level and rate of rise at particular gauges.
b. Anticipated oceanic conditions.
c. The rainfall situation and the state of tributaries.
d. The condition of evacuation routes.

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

a. The radio and TV stations listed in Annex D.
b. Door-knocks by emergency service personnel.
c. Public address systems from emergency service vehicles.
d. Telephone.
e. Two-way radio.
f. SES Flood Bulletins.

**Phase 2 – Withdrawal**

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

18. **Movement.** Evacuees are to be encouraged to move using their own transport where possible. The Shoalhaven City SES Local Controller will arrange transport for those people without their own vehicles. This may include the provision of buses. Evacuees will be taken or advised to go to the nearest accessible Assembly Point or Evacuation Centre. Evacuees who cannot reach an evacuation centre unaided will be transported from their homes or from designated assembly points nearby.

19. **Traffic Control.** When large-scale evacuations are likely, evacuation routes are to be secured by the NSW Police and kept clear by the following means:

a. Denying access to all traffic except for emergency vehicles (including buses and private vehicles being used for the purposes of evacuation).
b. Keeping one lane clear at all times for use by emergency vehicles.
c. Positioning a tow truck or similar vehicle at appropriate entry points, road blocks and exit points along the evacuation routes.
## 20. Evacuation routes.

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Evacuation Centre(s)</th>
<th>Evacuation Routes</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burrier</td>
<td>Nowra</td>
<td>Nowra Showgrounds, Senior Citizens Centre or Police Boys Club</td>
<td>Burrier and Yawal Roads</td>
<td>Roads closed at 1.3 metres on Nowra Gauge.</td>
</tr>
<tr>
<td>Shoalhaven Heads</td>
<td>Wollongong</td>
<td>Gerroa Road</td>
<td></td>
<td>Flood Free</td>
</tr>
<tr>
<td>Shoalhaven Heads</td>
<td>Community Centre or Celia Hall</td>
<td></td>
<td>Local roads</td>
<td></td>
</tr>
<tr>
<td>Greenwell Point and Orient Point</td>
<td>Nowra</td>
<td>Nowra Showgrounds, Senior Citizens Centre or Police Boys Club</td>
<td>Greenwell Point Road</td>
<td>Road closed at &lt; 1.8 metres</td>
</tr>
<tr>
<td>Greenwell Point</td>
<td>RSL Hall</td>
<td></td>
<td>Local Roads</td>
<td></td>
</tr>
<tr>
<td>Culburra-Orient Point</td>
<td>Culburra Public Hall or Community Centre</td>
<td></td>
<td>Local Roads</td>
<td></td>
</tr>
<tr>
<td>Terara</td>
<td>Nowra</td>
<td>Nowra Showgrounds, Senior Citizens Centre or Police Boys Club</td>
<td>Terara Road or Millbank Road</td>
<td>Terara Road closes at 4.5 metres on the Nowra Gauge. Lowest point in road is 2.7m AHD 300m east of Ferry Lane</td>
</tr>
<tr>
<td>River Road Estate</td>
<td>Nowra</td>
<td>Nowra Showgrounds, Senior Citizens Centre or Police Boys Club</td>
<td>Pleasant Way</td>
<td>Riverview Road closes at 5.75 metres.</td>
</tr>
<tr>
<td>Bolong Road Industrial Estate</td>
<td>Bomaderry</td>
<td>Bomaderry High School, Community Centre or Basketball Stadium</td>
<td>Bolong Road</td>
<td>Road closed at 2.05 metres on the Nowra Gauge.</td>
</tr>
<tr>
<td>Sussex Inlet</td>
<td>Community Facilities</td>
<td></td>
<td>River Road, Jacobs Drive or Sussex Inlet Road</td>
<td>River Road and Jacobs Drive flood at 1.8 metres on the Sussex Inlet Gauge.</td>
</tr>
<tr>
<td>St Georges Basin</td>
<td>Community Centre</td>
<td></td>
<td>Local Roads</td>
<td></td>
</tr>
<tr>
<td>Sanctuary Point</td>
<td>Community Centre</td>
<td></td>
<td>Local Roads</td>
<td></td>
</tr>
<tr>
<td>From</td>
<td>To</td>
<td>Evacuation Centre(s)</td>
<td>Evacuation Routes</td>
<td>Remarks</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------</td>
<td>----------------------</td>
<td>-------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Old Erowal Bay</td>
<td>Vincentia</td>
<td>Sailing Club</td>
<td>The Wool Road</td>
<td></td>
</tr>
<tr>
<td>Old Erowal Bay</td>
<td>Sanctuary Point</td>
<td>Community Centre</td>
<td>The Wool Road</td>
<td></td>
</tr>
<tr>
<td>Lake Conjola</td>
<td>Bowling Club</td>
<td></td>
<td>Lake Conjola Entrance Road</td>
<td>Road closes at &lt; 2m AHD on the Burrill Lake Gauge.</td>
</tr>
<tr>
<td>Burrill Lake</td>
<td>Community Hall</td>
<td>Princes Hwy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake Tabourie</td>
<td>Tabourie Lake Motor Inn</td>
<td></td>
<td>Access to caravan park may but cut early</td>
<td></td>
</tr>
</tbody>
</table>

21. **Large-scale evacuations.** When large-scale evacuations are likely, the Shoalhaven Local Controller will liaise with Illawarra South Coast Division Headquarters and request the deployment of helicopters to Nowra.

22. **Special Needs Groups.** A large number of elderly persons and tourists reside in urban areas of the Shoalhaven Local Government area. When evacuations are ordered Ambulance Service personnel will be deployed to assist with the safe evacuation of these people.

23. **Animals.** Evacuees with their own transport will be encouraged to take their pet such as cats, dogs and horses with them as they evacuate. These animals will therefore be transported by car, truck or horse float along the evacuation routes designated in this plan. Animals so shifted will be collected from their owners at evacuation centres and taken to facilities to be arranged by NSW Agriculture. Due to safety restrictions, it may not be possible to allow animals to accompany their owners when being transported via aircraft or flood rescue boats. In these cases, provision will be made for animals to be picked up as the people are evacuated. Arrangements will also be made to pick up animals that are left behind. Assistance animals (guide dogs, hearing assistance animals, etc), however, will remain in the care of their owners throughout the evacuation. This includes transport and access into evacuation centres.

24. **Doorknocking.** Field teams conducting doorknocks will record and report back the following information back to the Operations Centre:
   
a. Addresses and locations of houses doorknocked and/or evacuated.
   
b. The number of occupants.
   
c. Details of support required (such as transport, medical evacuation, assistance to secure house and/or property and raise or move belongings).
   
d. Details of residents who refuse to comply with the evacuation order.
25. Properties, which have been doorknocked, should be marked with survey tape. Written on the survey tape should be the name of the doorknocking unit and the time of doorknock.

26. **Refusal to Evacuate.** Field teams should not waste time dealing with people who are reluctant or refuse to comply with any evacuation order. These cases should be referred to the Local Emergency Management Operations Controller who will arrange for Police to ensure their evacuation.

27. **Security.** The NSW Police will provide security for evacuated premises. Details of evacuated premises are to be passed to the Nowra Police Station.

28. **Helicopter Landing Points.**
   
   - Nowra Showgrounds
   - Shoalhaven City Council
   - HMAS Albatross
   - Alf Crump Landing Strip, Burrier
   - Milton Heliport
   - Netball courts West Ulladulla

29. **Airport.**
   
   - HMAS Albatross
   - Albion Park

**Phase 3 – Shelter**

30. **Evacuation centres.** The usual purpose of evacuation centres is to meet the immediate needs of victims, not to provide them with accommodation. Evacuees will be advised to go to or be taken to the nearest accessible evacuation centre, which may initially be established at the direction of the Shoalhaven City SES Local Controller but managed as soon as possible by the Welfare Services. Any of the following sites may be suitable as evacuation centres:

   a. **Berry:**
      
      - School of Arts, Alexander Street.
      - Showgrounds, Alexander Street
      - Sporting Complex, North Street

   b. **Bomaderry:**
      
      - Bomaderry High School, Cambewarra Road
• Community Centre, 13-17 Birrelly Street
• Basketball Stadium, Cambewarra Road

c. Nowra:
• Nowra Showgrounds, West Street
• Senior Citizens Centre, Graham Place
• Police Boys Club, Park Road

d. Kangaroo Valley:
• Showgrounds, Moss Vale Road

e. Shoalhaven Heads:
• Community Centre, Shoalhaven Heads Road
• Celia Hall, Celia Place

f. Greenwell Point:
• RSL Hall, Greenwell Point Road

g. Culburra:
• Culburra Public Hall, Penguin Head Road
• Community Centre, Prince Edward Drive

h. Currarong:
• Tennis Courts, Walton Way

i. Calalla Bay:
• Community Centre
• Callala Bay Hall

j. Calalla Beach:
• Community Hall

k. Huskisson:
• Senior Citizens Centre, Huskisson Road
• Lady Denman Complex, Dent Street
l. Sanctuary Point:
   • Community Centre, Paradise Beach Road
   • Sanctuary Point, Primary School

m. St Georges Basin:
   • Community Centre, Meriton Street

n. Erowal Bay:
   • Progress Hall

o. Vincentia:
   • Sailing Club
   • Vincentia Public School, The Wool Road

p. Sussex Inlet:
   • Community Facilities, Thompson Street
   • RSL Club

q. Lake Conjola:
   • Lake Conjola Bowling Club, Lake Conjola Road

r. Milton:
   • Showgrounds, Croobyar Road
   • Milton Public School, Thomas Street

s. Mollymook:
   • Surf Club, Mitchell Parade

t. Ulladulla:
   • Civic Centre, Princes Highway
   • Ulladulla Oval, Deering Street
   • Ulladulla High School, South Street

u. Kioloa:
   • Community Centre, Murrarang Road
v. Lake Tabourie
   • Tabourie Lake Motor Inn, Princes Highway

31. **Action on arrival.** On arrival, evacuees will be:
   a. registered;
   b. medically checked, if necessary; and
   c. provided with their immediate welfare needs.

32. **Registration.** The NSW Police are responsible for the registration of evacuees.

**Phase 4 – Return**

33. Once it is considered safe to do so, the Shoalhaven City SES Local Controller will authorise the return of evacuees to their normal or alternative place of residence. This decision will be made in consultation with appropriate.

34. The return will be controlled by the Shoalhaven City SES Local Controller and may be conducted, at his/her request, by Welfare Services.

**ADMINISTRATION AND LOGISTICS**

**Transport and storage**

35. Transport and storage of furniture from flood threatened properties will be arranged as time and resources permit, but may not be possible on a large scale in very severe floods. People will be encouraged to store belongings in elevated or multi-story buildings in the vicinity where possible.

**Support provided at evacuation centres**

36. The expected duration of the evacuation will dictate the need for, and level of, facilities and support at the evacuation centres. If evacuations are expected to be of a short duration, evacuees may be provided with short-term accommodation at the centres. If evacuations are, however, expected to last for longer than 24 hours, evacuees will be encouraged to go to alternative accommodation or stay with friends where possible. Alternatively, accommodation will be arranged for them in hotels, motels or by billeting.

**Management of Evacuees’ Pets**

37. Evacuees managing their own evacuations should be encouraged to take their pets with them. Pets cannot, however, be managed at evacuation centres. NSW Agriculture will arrange for appropriate accommodation if required.

38. In the event of large-scale evacuations, animal shelter compound facilities will be set up for companion animals (domestic pets)
39. Assistance animals can accompany their owners on non-private transport provided for evacuees and at evacuation centres.

Control Arrangements

40. Control. Small-scale evacuations will be controlled by the Shoalhaven City SES Local Controller. Should the evacuations operations escalate beyond the capabilities of local resources control may be handed over to the Illawarra South Coast SES Division Controller.
ANNEX G - ARRANGEMENTS FOR THE EVACUATION OF CARAVAN PARKS AND THE RELOCATION OF CARAVANS

General

1. There are 37 flood liable caravan parks in the Shoalhaven City local government area. Details of these parks can be found in Annex B.

Advising Procedures

2. Caravan Park proprietors will be encouraged to ensure that the owners and occupiers of caravans are:
   a. Made aware that the caravan park is flood liable by:
      • Handing a printed notice to occupiers taking up residence. The notice should indicate that the caravan park is liable to flooding and outline the evacuation and van relocation arrangements as detailed in this Annex.
      • Displaying this notice prominently in each van.
   b. Made aware that if they are expecting to be absent from their vans for extended periods, they can:
      • Provide the manager with a key; in a sealed envelope; to the van.
      • Provide a contact address and telephone number.
      • Inform the manager if a vehicle will be required to relocate the van during flood time.
      • Leave any mobile van in a condition allowing it to be towed in an emergency (ie: tyres inflated, jacks wound up, personal effects secured and annexes and lines for water, sewer, electricity and gas readily detachable).
   c. Informed when a flood is rising. At this time, occupiers will be advised to:
      • Ensure that they have spare batteries for their radios.
      • Listen to a local radio station for updated flood information.
      • Prepare for evacuation and van relocation.
3. The Shoalhaven City SES Local Controller will ensure that the managers of caravan parks are advised of flood warnings and the details of any evacuation order.

**Evacuation of Occupants and Relocation of Vans**

4. Caravan park proprietors will be encouraged to install flood depth indicators and road alignment markers within their caravan parks.

5. When an evacuation order is given:
   a. Occupiers of non-movable vans should:
      - Secure their vans by tying them down to prevent flotation.
      - Isolate power to their vans.
      - Collect personal papers, medicines, a change of clothing, toiletries and bedclothes.
      - Lift the other contents of their vans as high as possible within the van.
      - Move to a designated evacuation centre if they have their own transport, or move to the caravan office to await transport.
   b. Where possible, vans that can be moved will be relocated by their owners. Park managers will arrange for the relocation of mobile vans whose owners do not have a vehicle. Council and SES personnel may assist if required and may be able to provide additional vehicles.

6. Occupants of vans that are being relocated should go to a designated evacuation centre if they have their own transport. Those without their own transport are to report to the caravan park office.

7. Caravan park managers should:
   a. Ensure that their caravan park is capable of being evacuated within the following times.
      - Parks located in the lower Shoalhaven catchment, including Nowra and downstream, 12 to 18 hours.
      - Parks located upstream of Nowra 12 hours.
      - Parks located south of the Shoalhaven Catchment 2 hours.
   b. Advise the Shoalhaven City SES Local Controller of:
      - The number of people requiring transport.
      - Details of any medical evacuations required.
8. Caravan parks south of the Shoalhaven Catchment, due to the short warning time available, if any, should concentrate on the evacuation of persons rather than vans.

**Return of Occupants and Vans**

9. The Shoalhaven City SES Local Controller, using Council resources as necessary, will advise when it is safe for the caravan parks to be re-occupied.

10. Vans will be towed back to the caravan parks by van owners or by vehicles and drivers arranged by the park managers. Again, Council and SES personnel will assist if available.
MAP 1 - SHOALHAVEN RIVER CATCHMENT
MAP 3 - CLYDE RIVER AND COASTAL LAKES

Clyde River & Jervis Bay Catchments

Major weirs, storages
Major storages
Uncontrolled streams
Waterways affected by urban development
Estuaries
Town water supply subcatchments
National Parks, Nature Reserves & State Forests
Mainly forested areas

Prepared by NSW EPA's Remote Sensing / GIS Services
IV

MAP 4 - NOWRA STREET MAP
VI

MAP 6 - LAKE CONJOLA STREET MAP
MAP 8 - LAKE TABOURIE STREET MAP
MAP 10 - CULBURRA – ORIENT POINT STREET MAP
MAP 12 - SHOALHAVEN HEADS STREET MAP