



Urban City Consulting Pty Ltd

# Flood Risk Assessment and Evacuation Plan

168 Church Lane, Castlereagh

August 2017

PLANNING  
PROJECT MANAGEMENT  
ENGINEERING  
CERTIFICATION

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Attachment A – Flood Evacuation Route

Attachment B – Home Floodsafe Toolkit Plan

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## 1 Introduction

Barker Ryan Stewart Pty Ltd has been engaged by Urban City Consulting Pty Ltd to prepare a Flood Risk Assessment and Evacuation Plan for the proposed development at 168 Church Lane, Castlereagh.

The site has been flagged as subject to flooding according to the State Environmental Planning Policy (Penrith Lakes Scheme) and falls within the Penrith Lakes Scheme which requires a Flood Risk Assessment and Evacuation Plan.

In preparation of this report, the requirements of the following documents have been considered:

1. The Penrith Development Plan Section 3.5 Flood Planning, 2014
2. State Environmental Planning Policy (Penrith Lakes Scheme) Amendment 2017
3. Floodplain Development Manual, the management of flood liable land, April 2005.

## 2 Site Location and Development Proposal

### 2.1 Existing Site & Location

The subject site is located at 168 Church Lane also described as Lot 6 in DP 1209152. The site is currently vacant with some vegetation located adjacent to Church Lane and dense vegetation at the rear of the site.

The location of the site is shown in Figure 2.1 below.



**Figure 2.1 Location of Subject Site**

The site is currently affected by flooding from Nepean River, however only at the rear of the site where there is a drop of approximately 30m.

### 2.2 Proposed Development

The proposed development seeks to construct a new dwelling with associated driveways located on the northern side of the site on the higher side. All of which would be above the 100 year ARI flood plus 0.5m freeboard.

### 3 Legislative Requirement

#### 3.1.1 Development Control Plan (DCP) 2014– Part C Section 3.5 Flood Planning

The subject site is classified as a flood control lot and the following considerations for point 3 Residential – New Developments – Single Dwellings applies:

##### 3) Residential – New Developments – Single Dwellings

- b) Residential – upper storey additions will not be considered as ‘New Development’ provided; the first- floor additions are above the Flood Planning level and the additions and alterations do not increase the building footprint at ground level beyond 35m<sup>2</sup>. (Ground floor additions include all non-habitable buildings such as garages, storage areas, carports and the like).

*This requirement does not apply.*

- c) Floor levels of habitable rooms shall be at least 0.5m above the 1% AEP (100 year ARI) flood; i.e. the flood planning level.

*The design 100 year flood level as per the Hawkesbury-Nepean Valley Flood Management Review Stage one shows 25.9m AHD at Penrith and 17.3m AHD at Windsor. Castlereagh would be lower than the water level at Penrith and higher than Windsor, for this study we have adopted the higher water level at RL 25.9m. The location of the new dwelling is above RL 30m AHD which is much higher than the 100 year ARI flood level plus 0.5m freeboard.*

- d) The lowest floor level of habitable rooms shall be not more than 3.0m above ground level.

*This requirement does not apply.*

- e) Any portion of buildings subject to inundation shall be built from flood compatible materials

*This requirement does not apply.*

- f) Flood safe access and emergency egress shall be provided to all new developments and for dwelling replacements where practicable. Flood safe access means access that is generally considered satisfactory when the depth of flooding over vehicular driveways and roads is limited to approximately 0.25m with low velocities.

*The driveways have access to Church Lane which is not affected by flooding.*

- g) All services associated with the development shall be adequately flood proofed

*This does not apply.*

- h) A certificate, prepared by a registered surveyor to verify the lowest floor level of a habitable room of a residential building to the required Australian Height Datum (AHD) level, shall be submitted to the Council upon completion of the building to that level. The building shall not be further constructed until approval is given by Council to proceed with construction works.

This requirement may not be relevant as the site where the dwelling is proposed is above the 100 year level plus 0.5m freeboard. However, council may condition this.

### 3.1.2 State Environmental Planning Policy (Penrith Lakes Scheme) Amendment 2017

The proposal is to address the requirements of Part 6 of Section 33 of the State Environmental Planning Policy (Penrith Lakes Scheme).

#### 33 Flood planning

- (1) The objectives of this clause are as follows:
  - (a) to minimise the flood risk to life and property associated with the use of the land,
  - (b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,
  - (c) to avoid significant adverse impacts on flood behaviour and the environment.
- (2) Development consent must not be granted for development on land to which this Policy applies that is at or below the flood planning level unless the consent authority is satisfied that the development:
  - (a) is compatible with the flood hazard of the land, and
  - (b) is not likely to significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and
  - (c) incorporates appropriate measures to manage risk to life from flood, and
  - (d) is not likely to significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and
  - (e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.
- (3) Development consent must not be granted for development on land zoned Employment, Residential or Tourism unless the consent authority is satisfied that the development will not adversely affect the safe and effective evacuation of the land and the surrounding area.
- (4) A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005, unless it is otherwise defined in this Policy.

#### Comment

*The location of the site where the dwelling is proposed is much higher than the 100 year flood level plus 0.5m freeboard and the access road to the site is also much higher than the 100 year flood level plus 0.5m freeboard.*

### 3.1.3 Floodplain Development Manual

Consideration was also given to the guidelines outlined in NSW Government's "Floodplain Development Manual – the management of flood liable land, April 2005" with respect to flood risk evacuation.

The Manual provides Councils with a framework for implementing NSW Government's Flood Prone Land Policy to achieve its primary objectives being:

*Flood prone land is a valuable resource that should not be sterilised by unnecessarily precluding its development; and*

*If all development applications and proposals for rezoning of flood prone land are assessed according to rigid and prescriptive criteria, some appropriate proposals may be unreasonably disallowed or restricted, and equally, quite inappropriate proposals may be approved.*

Note also that the Floodplain Manual states,

*At a site- specific level, the merit approach involves consideration of the best way of conditioning development allowable under the floodplain risk management plan, the local floodplain risk management policy and EPIs. These considerations include site specific issues such as minimum floor levels, building location within the site, access to the site, structural stability, and flood proofing, etc., as appropriate.*

#### Comments

*Provided the 'Home Flood Safe Toolkit and Plan' (see Attachment B) is implemented, people are moved from the site in accordance with the Flood Evacuation Plan (see Attachment A) and the structures are constructed in accordance with Councils Development Control Plan (DCP) 2014–Part C Section 3.5 Flood Planning and the State Environmental Planning Policy (Penrith Lakes Scheme) Amendment 2017, then the proposed development will meet the requirements of the Floodplain Development Manual and will not have any significant impact on flood levels or flood behaviour on adjoining properties or adjacent road network.*



## 4 Flood Impact Assessment

The impact of flooding was assessed in the Hawkesbury-Nepean Valley Flood Management Review Stage one which showed the design 100 year flood level at Penrith to be 25.9m AHD and at Windsor to be 17.3m AHD. Castlereagh would be lower than the water level at Penrith and higher than Windsor, for this study we have adopted the higher water level at RL 25.9m. The location of the new dwelling is above RL 30m AHD which is much higher than the 100 year ARI flood level plus 0.5m freeboard.

Adequate warning time will be available for such an event due to the official flood warnings provided and the media coverage received. Residents on site should monitor the Bureau of meteorology and weather warnings.

Should consent be granted for the development then a flood evacuation plan should be developed for the site.

## 5 Site Flood Emergency Response Plan

### 5.1 General

Flood warning time and evacuation procedures used by the State Emergency Service (SES) are widely used throughout NSW to reduce flood damage and to protect lives.

The main reasons to provide an appropriate flood emergency response plan and evacuation route to or from affected areas and flood evacuation procedures are to ensure that:

1. Occupants have a chance to evacuate themselves and valuables/belongings before becoming inundated or trapped by rising floodwaters.
2. Emergency Services such as the SES, ambulance and police are not restricted or exposed to unnecessary hazards in carrying out their duties.
3. Isolated areas for extended periods of time are to be minimised where ever possible.

The objective of a Flood Emergency Response Plan is to ensure that the occupants are aware of the possibility of flooding and are aware of the plan for evacuation and procedures to follow if a flood occurs.

### 5.2 Occupant Flood Awareness

Flood warning systems, emergency management and flood awareness are the most cost effective means of reducing the flood danger to occupants.

It is recommended that all residents and property owners be made aware of the flood threat in the locality and;

1. At what time the site might be inundated, and
2. The contents of the Flood Evacuation Plan and the procedure that needs to be followed.

Owners are to ensure that they have in place an appropriate evacuation plan known to all residents. The awareness of individuals to a potential flood and the evacuation routes and procedures if an event occurs would increase the safety of the occupants while evacuating from the site.

### 5.3 Flood Evacuation Route

When preparing for evacuation from the site during an extreme flood event, a flood evacuation route which maximises the safety of the occupants of the site is paramount. The nature of flooding at the site is backwater flooding/ flood storage from the Nepean River.

The rear of the site is subject to flooding however there is a big difference in levels between the back to the dwelling pad and the access road (Church Lane) into the site.

There is ample formal flood warning time from the Bureau of Metrology or SES as to the potential impending flood waters which would affect only the rear portion of the site. Evacuation of the premises should proceed if necessary once the early warnings have been made by these agencies.

There is adequate warning time for evacuation of the site if required, however the site is located much higher than the 100 year flood level plus 0.5m freeboard.

The safest evacuation route from the site if required is via the main entry into the site from Church Lane, head south onto northern road and then east to the M4 Western Motorway. Refer to Attachment A from the Hawkesbury Nepean Flood Emergency Sub Plan (EMPLAN) June 2014.

### 5.4 Flood Emergency Response Plan

It is recommended that the proprietor(s) of this property use the *'Home FloodSafe Toolkit and Plan'* (see Attachment B), to prepare a detailed response plan tailored to their needs and incorporating the recommendations of that document and this Flood Risk Assessment and Evacuation Plan. It is also considered that where the proprietor(s) prepare the final detailed plan it is more likely to be followed during a flood event.

The Residents should be instructed to instigate the site emergency flood response plan either;

1. When a formal warning is received from the SES (or other authority), or
2. At the first sighting of flood waters in the stormwater channel that runs through the site.
3. When intense rainfall events are predicted for the locality.

As outlined above, the safest evacuation route from the site if required is via the main entry into the site from Church Lane, head south onto northern road and then east to the M4 Western Motorway. Refer to

The emergency assembly points can be at the dwelling as this is well above the 100 year level plus 0.5 m freeboard.

The following matters should be addressed;

#### Preparation – Prior to flood

1. Ensure that a Flood Evacuation and Procedure Plan is located in a prominent position within the Premises.
2. The property owner is responsible for ensuring any residence of the property are aware of potential flood hazards and the Flood Emergency Response Plan.
3. The owner is to be responsible for the implementation of the plan.

4. A safety kit is to be available at all times in a prominent position and is to include a torch with spare batteries, a first aid kit and manual, battery operated radio, waterproof bags (for storage), a mobile phone and a list of emergency numbers.
5. Obtain and update staff and other emergency contact numbers.
6. Details regarding evacuation centres is to be obtained from the SES on 132 500.

#### Responding – When a flood is likely

The Flood Emergency Response Plan is to be triggered once a warning has been given by the Bureau of Meteorology or the State Emergency Service or at the first sighting of rising Flood Waters of the river system.

#### Responding – During a flood prior to impacting the site

The Flood Emergency Response Plan is to be triggered once a warning has been given by the Bureau of Meteorology or the State Emergency Service or at the first sighting of Flood Waters in Joseph Street

#### Responding – During a flood prior to impacting the site.

1. Keep radio turned to local radio station for flood warnings.
2. Seek instructions from Management.
3. Obtain safety kit and make available when necessary.
4. Assist neighbours if required.
5. Inform all staff and visitors of flood warning details.
6. Remind staff of OH&S procedures relating to flooding.
7. Turn off electricity, gas and water when leaving.
8. Evacuate all occupants by along the specified evacuation route
9. For emergency help contact the SES on 132 500.
10. Avoid driving or walking through flood water as these are the main causes of death during a flood.

The plan is to be located in an easily located prominent positions and another copy kept off site.

The SES also publishes flood awareness brochures in various languages other than English. It is recommended that these be obtained by any occupants and kept on the premises for the information of clients from non-English speaking backgrounds if required.

The plan is to be reviewed on an annual basis or immediately after a flood event that activates the plan.

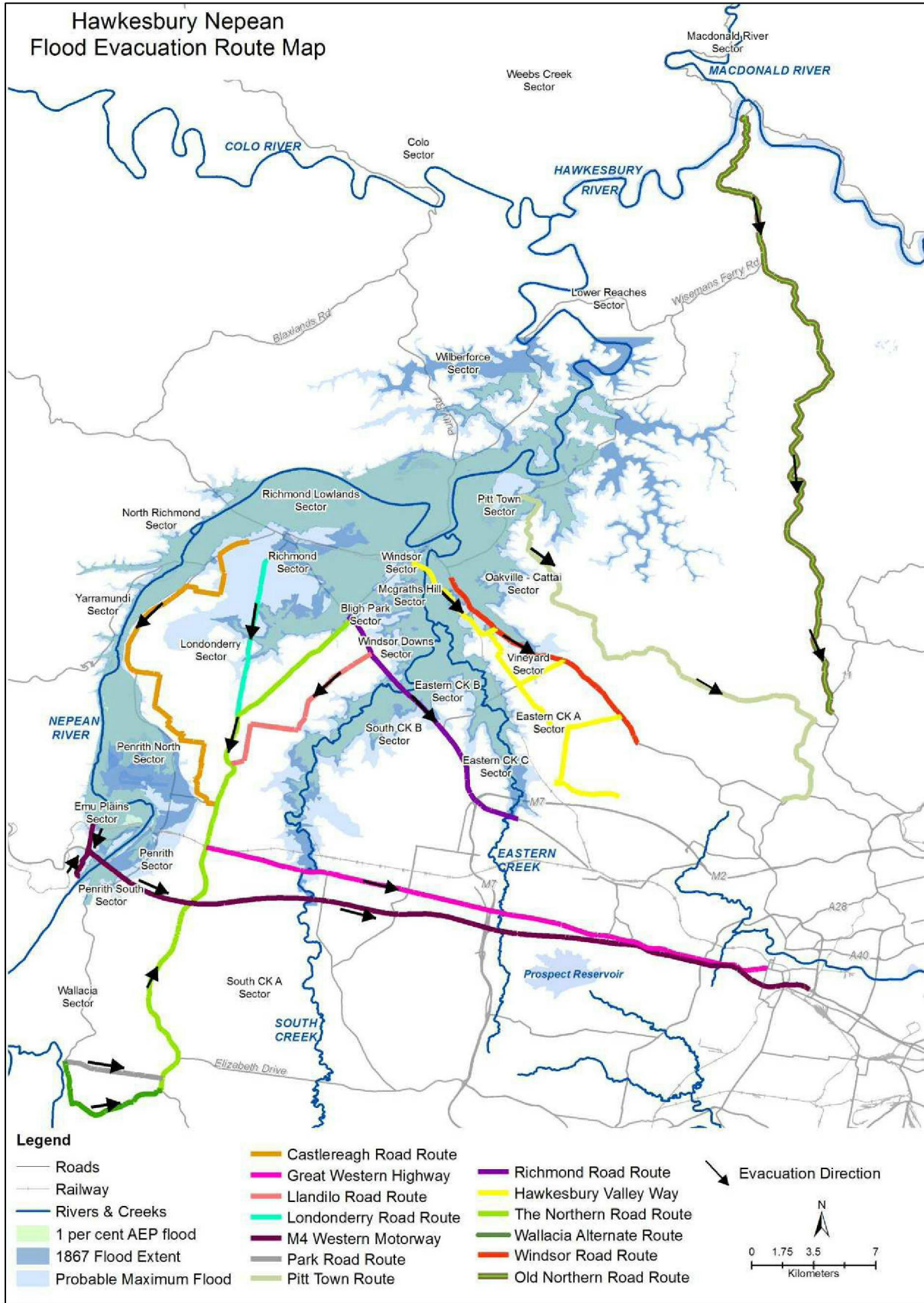
The 'Home Floodsafe Toolkit' document prepared by the SES is attached in Attachment B.

## 6 Conclusions and Recommendations

The proposal is for the construction of a new dwelling and associated driveways, only the rear of the site is affected by flooding with a level difference of 18m. Provided the following recommendations are implemented it is considered that the construction of the new dwelling and associated driveways will not have an increased impact on flood behaviour or pose an increased flood risk to residents.

1. The proposed units are to be constructed in accordance with the Architectural plans.
2. The Flood Evacuation Plan prepared by Barker Ryan Stewart is to be implemented.
3. A customised Home Safe Toolkit is to be prepared and implemented and must be reviewed at the start of daylight savings every year.

## Attachment A Flood Evacuation Route



**Map 2: Hawkesbury Nepean Flood Evacuation Routes**

## Attachment B SES Home Floodsafe Toolkit Plan







*Where possible,  
use floor coverings, furniture and fittings  
that are water resistant*

## Tick the actions off and review every year

- Fill in the list of emergency numbers on the emergency contact numbers page and add the SES emergency 132 500 number into your mobile phone
- Fill in the local radio frequencies on the critical flood information page
- Complete evacuation details and other flood details on the critical flood information page
- Make up a Home Emergency Kit (e.g. in a large plastic container) consisting of:
  - A portable radio with spare batteries
  - A torch with spare batteries
  - A first aid kit with appropriate contents necessary to the needs of the household
  - Candles and waterproof matches
  - A waterproof bag for valuables
  - A copy of the emergency contact numbers list
- Put important documents in the document wallet and store in an accessible place
- Consider the needs of pets and other domestic animals in a flood
- Always consider the potential for flooding when storing items around the house and identify high points for stacking and storing possessions and furniture
- Check insurance policy
- Check torch and radio batteries and review the Toolkit at the beginning of daylight savings each year
- Other preparations for a flood: \_\_\_\_\_



*A Flood Watch is issued by the Bureau of Meteorology  
when a flood is likely  
[www.bom.gov.au](http://www.bom.gov.au)*

*Weather information and advice  
is broadcast on local radio stations*

*Natural indicators such as heavy rain should  
also be triggers that flooding is likely*

## Tick the actions to consider when a flood is likely

- Check your FloodSafe Guide (in this Toolkit) for specific information
- Turn on and listen to the radio for information, updates and advice. Be prepared to act should flooding develop
- Contact others from the household who are away from home using the list on the emergency numbers contact page. Tell them to return home only if it is safe
- Refer to the critical flood information page to refresh your knowledge of evacuation routes and critical river heights
- Keep in contact with neighbours and others who might be affected by flooding. Make sure they are aware of this possibility
- Place plastic document wallet, medication containers and prescriptions into the emergency kit
- If there is the potential for your home to become isolated if a flood develops, make sure you have enough food and water for the time predicted
- Think about the following points in case a flood develops:
  - Where pets are located and what has to be done to ensure their safety
  - What objects need securing (including fridges, freezers and outdoor furniture - those that are likely to float and cause damage)
  - What furniture and possessions need to be stacked and where is the best place to stack them (electrical items on top)
  - Where waste containers, chemicals and poisons can be relocated to or stacked
  - How to block toilets and floor drains (sand bags, etc) to prevent sewage backing up
- Other actions if a flood is likely: \_\_\_\_\_



*The Bureau of Meteorology issues  
Flood Warnings when a flood is going to occur.  
These warnings will inform of predicted river  
heights that may affect your household*  
[www.bom.gov.au](http://www.bom.gov.au)

*The SES issues Flood Bulletins  
which provide information on what may  
happen at predicted river heights*

***Never drive, ride, walk or play in floodwater***

## Tick *the actions to consider during a flood*

- Keep listening to the radio for further information, updates and advice. Use the critical flood information page to help estimate when flooding may affect you so that you can prepare adequately
- Be aware the home could be a refuge for snakes, spiders and vermin
- If isolated by flooding or for emergency help in floods, call the SES on 132 500
- Prepare pets for evacuation and ensure other animals away from the home are safe
- Secure objects that are likely to float and cause damage
- Securely stack furniture and possessions on benches and tables, placing electrical items on top
- Relocate waste containers, chemicals and poisons well above predicted water level
- Block toilets and floor drains
- When advised to evacuate:
  - Follow all instructions given by authorities
  - Take the Home Emergency Kit
  - Take pets. Put them on leads or in pet containers. Dogs should be muzzled
  - Take required pet medication
  - Turn off electricity and gas at the mains. Secure gas bottles and any other items that could float
  - Stay with others from your household during evacuation
  - Proceed to an evacuation centre if told to do so
  - If not, shelter at a friend's or relative's residence on higher ground away from the floodplain. Advise relatives and authorities of this location
- Other actions during a flood: \_\_\_\_\_



*Keep away from  
fallen trees, power lines  
and damaged structures*

# *Consider these actions after a flood*

- If evacuated, wait for permission from emergency services to return home. There is a possibility of evacuation after a flood for safety and health reasons
- The Department of Community Services (DoCS) may coordinate recovery assistance in your area. For information on welfare assistance after a flood from DoCS call **1800 018 444**
- Before entering any flood-affected part of the home, ensure its safety is checked. Checks should investigate at least:
  - Structural safety of the building
  - Safety of electrical and gas supplies and equipment and whether the sewerage system is working properly. These should be checked by qualified people (note their details on the emergency contact list)
  - Potential slips, trips and falls with mud and water
  - Any venomous spiders and snakes
  - Any debris
- Wear non-slip footwear, protective clothing and puncture-resistant gloves while cleaning up and use disinfectant
- Never consume food or liquid that has been in contact with floodwater
- Help neighbours and others that have been affected by the flood
- Replace damaged floor coverings, furniture and fittings with water resistant ones
- Other actions after a flood: \_\_\_\_\_





***Reminder:***  
***check batteries and review***  
***the Home FloodSafe Toolkit***  
***at the start of daylight savings each year***

***Date to review Toolkit and check batteries:***

---

# WHO

# NAME

# NUMBER

Help in floods and storms

**SES**

**132 500**

Life threatening situations

**Ambulance, Police, Fire**

**000**

Members of the household

Work

Other family and friends

Neighbours

DoCS Disaster Recovery

**DoCS**

**1800 018 444**

Electrical

Gas

Water

Sewerage

Telephone

School

Vet

Other

# HOME FLOODSAFE TOOLKIT

FOR EMERGENCY HELP IN FLOODS AND STORMS  
CALL THE SES ON 132 500  
[www.ses.nsw.gov.au](http://www.ses.nsw.gov.au)

## *Information is available from the SES and Council*

The radio station for flood advice is \_\_\_\_\_ at frequency \_\_\_\_\_  
or \_\_\_\_\_ at \_\_\_\_\_

The best evacuation route is: (draw map of streets or describe)

Evacuation centre or location is \_\_\_\_\_

### *The following information is available from Council*

The river height at which the evacuation route is closed is \_\_\_\_\_ metres  
at the \_\_\_\_\_ gauge.

The river height at which the home is likely to be flooded is \_\_\_\_\_ metres at  
the \_\_\_\_\_ gauge.