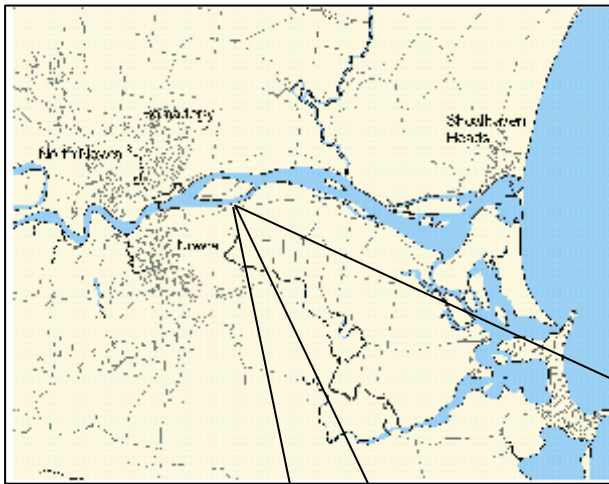


TERARA VILLAGE FLOODPLAIN MANAGEMENT PLAN



Shoalhaven River, 1978 Flood

FEBRUARY 2002

SHOALHAVEN CITY COUNCIL

TERARA VILLAGE FLOODPLAIN MANAGEMENT PLAN

FEBRUARY 2002

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TERARA VILLAGE FLOODPLAIN MANAGEMENT PLAN

TABLE OF CONTENTS

	PAGE
FOREWORD	
1. INTRODUCTION	1
1.1 Floodplain Management Study - Outcomes	2
2. BACKGROUND	3
2.1 Catchment Description	3
2.2 Terara Village	3
2.2.1 Description	3
2.2.2 Zoning	4
2.2.3 Heritage	5
2.2.4 Environmental	5
3. RECOMMENDATIONS	6
4. REFERENCES	12

LIST OF APPENDICES

APPENDIX A:	FLOOD EVACUATION PLAN - INDIVIDUAL BUILDINGS
APPENDIX B:	DISSEMINATION OF FLOOD INFORMATION TO THE PUBLIC

LIST OF TABLES

Table 1:	Peak Levels of Major Floods (mAHD)	1
Table 2:	Terara Village - Damages to Residential Buildings	4
Table 3:	Proposed Upgrades to Council's Flood Policy - Further Development	10
Table 4:	Flood Education Methods	11

LIST OF FIGURES

Figure 1:	Locality Plan
Figure 2:	Buildings Inundated

FOREWORD

The State Government's Flood Prone Land Policy is directed at providing solutions to existing flooding problems in developed areas and to ensuring that new development is compatible with the flood hazard and does not create additional flooding problems in other areas.

Under the Policy, the management of flood liable land remains the responsibility of local government. The State Government subsidises flood mitigation works to alleviate existing problems and provides specialist technical advice to assist Councils in the discharge of their floodplain management responsibilities.

The Policy provides for technical and financial support by the Government through the following four sequential stages:

1. *Flood Study*
 - determines the nature and extent of the flood problem.
2. *Floodplain Management Study*
 - evaluates management options for the floodplain in respect of both existing and proposed development.
3. *Floodplain Management Plan*
 - involves formal adoption by Council of a plan of management for the floodplain.
4. *Implementation of the Plan*
 - construction or implementation of floodplain management measures to protect existing development,
 - use of Local Environmental Plans to ensure new development is compatible with the flood hazard.

The Terara Village Floodplain Management Plan constitutes the third stage of the management process and has been developed by the Shoalhaven Floodplain Management Advisory Committee. It was prepared for the Committee by Webb, McKeown & Associates and provides the basis for the future management of flood liable lands at Terara.

The terminology used in this report is in accordance with the NSW Government's Floodplain Development Manual (1986 edition) and draft Floodplain Manual (1999 edition). Subsequently the final Floodplain Management Manual was released in January 2001. This latter document provided several changes in terminology which have not been included in this report.

1. INTRODUCTION

The Shoalhaven River catchment covers an area of 7000 square kilometres with approximately 120 square kilometres of floodplain downstream of Nowra. The village of Terara (Figure 1) is located on the floodplain approximately 2.5 kilometres downstream of Nowra Bridge.

Terara was the original settlement on the south bank. The devastation of the 1860 and 1870 floods caused most of the population to move to the higher ground at Nowra with the subsequent decline of Terara. The village has continued to be flooded periodically, but people are still attracted to the area as a place to live. The population is now housed in a collection of heritage listed buildings and more modern premises, and there is some pressure for further development.

The Shoalhaven River has a well documented history of flooding going back to 1860 (Reference 1). The Lower Shoalhaven River Flood Study (Reference 2) was completed in April 1990 and established design flood levels across the floodplain (Table 1). The Terara Village Floodplain Management Study (Reference 3) identified the existing flood problem and canvassed the various measures to mitigate the effects of flooding and minimise the damages for future development.

Table 1: Peak Levels of Major Floods (mAHD)

	Historical Events				Design Events (AEP)				
	1860	1870	1974	1978	5%	2%	1%	0.5%	Extreme
Nowra Bridge	5.5E	6.55E	4.9*	5.3*	5.3	5.8	6.3	6.8	8.9
Riverview Road East (River)	U	U	U	U	5.1	5.5	6.0	6.3	8.2
Vacant land west of Ferry Lane	U	U	2.8#	4.3#	LR	3.7	4.5	5.1	8.0
Shoalhaven Caravan Park	U	U	U	U	3.7	4.8	4.9	5.2	7.5
Shoalhaven River at Terara	4.8E	5.7E	4.4*	4.7*	4.7	5.0	5.4	5.7	7.4
Terara (Hyams Hotel - at the intersection of Forsyth and South Streets)	4.6*	5.5*	3.7*	3.9*	3.6	3.9	4.7	5.1	7.2
Estimated AEP at Nowra Bridge	3%	0.7%	8%	5%					
Estimated Average Recurrence Interval at Nowra Bridge	30 years	150 years	12 years	20 years					

- NOTES:**
- * Recorded level taken from the Lower Shoalhaven River Flood History at Nowra Bridge 1860-1980.
 - E Estimated level based on other historical flood data taken from the Lower Shoalhaven River Flood History at Nowra Bridge 1860-1980.
 - U Unknown: # Taken from Reference 2: LR - subject to local runoff which has not been accurately determined.
- Note 1: The more recent floods show a much greater difference in level between Terara (Hyams Hotel) and the river at Terara than the 1860 and 1870 events. This is due to the different heights of the river bank levee.
- Note 2: The design levels at Ferry Lane near Terara Road for floods smaller than a 0.5% AEP event reflect the benefit provided by the Riverview Road levee and are the result of backwater flooding.
- Note 3: The levels for the 1860 and 1870 floods at Nowra Bridge and in the Shoalhaven River at Terara are estimated as no actual levels were recorded.
- Note 4: Residents on the riverbank at Terara have provided levels of 4.3mAHD and 4.6mAHD for the 1974 and 1978 floods respectively.
- AEP: Annual Exceedance Probability

1.1 Floodplain Management Study - Outcomes

The main outcomes of the Floodplain Management Study were:

- land within the village first becomes inundated in approximately a 10% AEP event (an event slightly smaller than the March 1978 flood). Buildings first become inundated in a 5% AEP event. In a 1% AEP event the study area is a high hazard floodway (1.3 m depth of inundation and 0.4 m/s velocity),
- in a 1% AEP event the entire study area (Figure 1) is inundated by floodwaters,
- there are approximately 55 residential buildings in the village. One building is inundated above floor level in a 5% AEP event, 13 in a 2% AEP event and 44 in a 1% AEP event. In a 0.5% AEP event 51 (93% of the buildings) are inundated,
- an extensive public consultation program was undertaken to ensure that the community was fully informed about the floodplain management process and was able to effectively contribute during the course of the study,
- the average annual damages for the village are \$25 000,
- major flood modification measures (dams, levees) to reduce the flood levels are not financially, socially or environmentally acceptable,
- property modification measures (house raising, flood proofing) will assist but will not eliminate the flood hazard. These measures may be limited on account of heritage issues,
- response modification measures (flood warning, evacuation planning) offer the most cost effective and socially and environmentally acceptable solutions,
- bank erosion is of significant concern and needs to be addressed,
- development outside the study area is already controlled under Council's existing development policies. However a review of the deposition of silt on Pig Island (since 1992) should be undertaken as well as monitoring of the Greenhouse Effect,
- the existing 1(g) Rural zoning for the area was found to be applicable. The flood planning issues for the entire study area should be formalised in an updated Flood Policy,
- the flood awareness of the community is continuing to drop as the time since the last significant flood (1978) increases and new residents move in to the area.

2. BACKGROUND

2.1 Catchment Description

The Shoalhaven River rises approximately 50km inland of Moruya and follows a northerly direction for 170km before turning east for a further 90km to reach the Pacific Ocean at Crookhaven Heads. Two hundred years ago the main entrance was at Shoalhaven Heads. This entrance is now intermittent following the construction of the Berry's Canal link to the Crookhaven River in 1822.

The valley can be categorised into three broad regions:

- upstream of Welcome Reef where the terrain is rolling plateau,
- between Welcome Reef and Nowra where the catchment consists of steep forested country with the main streams entrenched in deep gorges,
- downstream of Nowra where an expansive floodplain has developed.

The floodplain area was formed by the infilling of an old coastal lagoon. The southern part of the floodplain is drained by the Crookhaven River, which rises near Nowra, while the northern section is drained by Broughton Creek, which rises upstream of Berry. Flood behaviour in the area has been extensively modified since European settlement through the construction of flood mitigation and bank protection works. The excavation of Berry's Canal has also had a major impact by opening up a second entrance at Crookhaven Heads.

2.2 Terara Village

2.2.1 Description

The village of Terara (Figure 1) was the site of the original European settlement on the southern bank of the Shoalhaven River. In the early and middle part of the nineteenth century it was a thriving centre for commerce and agriculture. It was the major trading centre of the district and ocean going vessels berthed at the Illawarra Steam Navigation Company (ISN) wharf. In 1870 the population of Terara was almost 1000 whilst the township of Nowra had barely been formed. As discussed in Section 1, the village was extensively damaged in the floods of 1860 and 1870 and consequently the population centre moved to Nowra.

Today the village of Terara and adjoining properties consist of approximately 60 residential buildings and a school. The houses are a mixture of modern brick buildings and historic timber or stone buildings.

The village is currently protected (to the height of the levee bank) from direct inundation from the Shoalhaven River by an earthen grassed levee which is generally up to 1 m above natural surface. There is considerable vegetation along the river bank and on the levee. The bank is extensively eroded in parts posing a clear threat to the levee by undermining. The levee crest is at approximately 4.4 mAHD to 4.7 mAHD along West Berry Street and will not be overtopped until approximately a 10% AEP event. It is understood that the levee was raised to its present height following the 1978 flood.

The average ground level within the village is approximately 3.4 mAHD and the majority of the ground in the village will be inundated by backwater from the floodplain in a 5% AEP event. The lowest floor level within the village is at 3.4 mAHD and details of the number of buildings flooded in different events are given in Table 2.

Table 2: Terara Village - Damages to Residential Buildings

Flood	Buildings Inundated	Tangible Damages (\$1999)
Extreme	55	2 000 000 *
0.2% AEP	52	1 800 000 *
0.5% AEP	51	1 500 000 *
1% AEP	44	1 000 000 *
2% AEP	13	200 000
5% AEP	1	20 000
10% AEP	Nil	Nil

Note: * Damages will be higher if buildings are completely destroyed.

The flood hazard classification is low for flood events less than the 5% AEP and high for larger events. However, major levee failure or river bank erosion may increase the hazard causing building collapse and loss of land.

2.2.2 Zoning

The village of Terara (bounded by Nobblers Lane, Terara Road/South Street, Southern Road and West Berry Street) was originally zoned Village. The Local Environmental Plan (LEP) of May 1985 changed the zoning to 1(g) Rural. The existing lots containing a dwelling house retain existing use rights. The remaining, vacant lots cannot be developed for residential buildings under the 1(g) zoning unless, among other considerations, Council is satisfied that the dwelling house is essential for the proper and efficient use of the land for agriculture or turf farming. The size of the lots is a major factor in this consideration. Three of these vacant lots are presently for sale (August 1999).

There is no industrial/commercial or proposed industrial/commercial zoning at Terara.

A Rural Environmental Plan was gazetted in July 1999. This plan amends the 1985 LEP. The main features of this plan as they relate to flooding are:

The policy position of minimising development and settlement in flood prone areas has been retained..... The 1(g) zone remains the principal control in conjunction with Clauses 29 and 30. Zone objectives and provisions have been redrafted as a result of Council's 1993 working party debate.

The only development permitted in a 1(g) zone without development consent is agriculture, and even this is subject to other controls embodied in the LEP.

2.2.3 Heritage

Items of Environmental Heritage were identified both in the LEP 1985 (2 items) and the Illawarra REP 1986 (2 items). Since then, Terara Village has been identified as a heritage conservation area under a Draft Heritage LEP (9 items identified) and the associated floodplain is also identified as a pastoral landscape in the Shoalhaven Heritage Study. These documents now identify thirteen heritage buildings in total: five within the "township" area between Nobblers Lane and Bryant Street; four near the school on Millbank Road; and four west along Terara Road. These are shown on Figure 1.

There are no identified Aboriginal sites within the study area.

2.2.4 Environmental

A preliminary review of the environmental qualities of the area has indicated that:

- the presence of acid sulfate soils and the release of acid into the river system is becoming of increasing importance and is currently being investigated. Some floodplain management measures (levees, drains) may upset the existing regime,
- at this point in time, no record of threatened or endangered species of flora or fauna has been identified within the study area.

3. RECOMMENDATIONS

MEASURE	DISCUSSION	RECOMMENDATION	PRIORITY
FLOOD MODIFICATION:			
Levee Audit	The existing levee provides protection to approximately a 10% AEP event. The main concern at present is possible failure due to structural collapse or erosion of the river bank.	A full levee audit should be undertaken (geotechnical, survey) and the outcomes considered. The cost of such an audit would be \$20 000. The cost of any upgrading works cannot be defined at this stage but may include minor upgrading works (see below). One of the outcomes of the audit would be to establish an ongoing levee audit procedure.	High - 1
Improving Local Drainage	Local runoff ponds in the roads approximately twice a year causing inconvenience. It is not a threat to property or lives.	The local residents association and Council should address the problem and seek solutions. The costs of any works cannot be defined at this stage. One of the outcomes would be to ensure that an ongoing inspection and maintenance program be undertaken.	High - 2
Upgrading of the Levee	If further earthworks are required as a result of the levee audit (see above) these could be combined with minor upgrading to (say) the 2% AEP level. At a minimum the crest of the levee should be graded to an even level.	The upgrading works may cost up to \$50 000.	High - 3
Opening the Entrance at Shoalhaven Heads	Maintenance of an open entrance will marginally reduce flood levels. A permanent open entrance cannot be justified solely on the grounds of reducing flood levels at Terara. Maintenance of the entrance berm and opening (if possible) prior to a flood is currently undertaken by Council. The annual cost is minimal.	Council should formalise its entrance opening policy.	Medium
Flood Mitigation Dams	Flood mitigation dams will reduce flood levels in the Lower Shoalhaven valley. Dams are expensive to build and their construction may have a significant impact upon the environment.	Inclusion of some flood storage should be considered on a catchment wide basis when new dams (or upgrading works) are proposed.	Low
Catchment Treatment	Reafforestation and the encouragement of methods and materials to reduce runoff will have negligible impact on flood levels. However, they will assist in reducing the adverse impacts of development, such as the increase in sedimentation and pollution, and an increase in local catchment runoff.	As a general policy Council should encourage the use of appropriate and targeted catchment treatments. Assumed to be no cost to Council.	Low

MEASURE	DISCUSSION	RECOMMENDATION	PRIORITY
PROPERTY MODIFICATION MEASURES:			
Planning	The village is in a 1(g) Rural zone which prohibits further residential development unless it is justified and demonstrated as essential for the proper and efficient use of the land for agriculture. The FMS has confirmed that this is an appropriate zoning taking into account the flood hazard. A rigorous search of Council's records was undertaken to identify whether any vacant property had development rights which may override the conditions of the 1(g) Rural zone. None were identified. The main issue is to upgrade Council's Flood Policy.	<p>Council needs to clarify its conditions regarding future development in this area in an updated Flood Policy. This would take account of the 2001 Floodplain Management Manual and the outcomes of this study.</p> <p>Updates to the Flood Policy include:</p> <ol style="list-style-type: none"> 1. Formalisation of the process of dissemination of flood information to the public (Appendix B). 2. Determine the 1% AEP and Extreme Flood extents. 3. How should land inundated in the Extreme Flood be treated? 4. Identification of areas which may suddenly become hazardous (levee failure or overtopping and major river bank erosion). 5. Proposed upgrades to the Flood Policy are shown on Table 3. 6. One of the requirements for development approval (if appropriate) is the preparation of a Flood Evacuation Plan by the developer and demonstration of a capacity to self evacuate. Preparation of a Plan does not imply consent for approval. 	High
Flood Proofing of Buildings	Flood proofing of residences (sealing of openings) costs approximately \$10 000 per house. Eight houses may be suitable.	Further investigation of this measure and discussion with the eight property owners are required.	Medium
Voluntary Purchase	Voluntary purchase of the entire village cannot be economically or socially justified. However, if a suitable opportunity arises, Council should assist in reducing the population of the village in an equitable manner which takes into account the social and heritage status of the village. Examples of such opportunities are when a building is lost due to fire or the costs for structural improvement works are uneconomic.	Consider opportunities as and when required.	Low
House Raising	House raising costs approximately \$40 000 per house and is suitable for most non-brick single storey buildings. There is a low level of acceptance by the community for this measure. Heritage issues may need to be addressed.	Council should inform residents that grants are available for house raising and consider any applications.	Low

MEASURE	DISCUSSION	RECOMMENDATION	PRIORITY
RESPONSE MODIFICATION MEASURES:			
Improve the Flood Warning System	The existing ALERT system could be improved by installation of additional gauges and minor system upgrades. These works will reduce the future flood damages and are likely to have a high benefit/cost ratio.	Install river gauges at Terara (automatic) and Grassy Gully (manual), install rainfall gauges in Colyers Creek and the Yalwal catchment, undertake the minor system upgrades, and prepare a Flood Warning Manual (to ensure that the existing knowledge is fully documented). There is already a manual gauge on Bryant Street (for use by the residents) which requires minor upgrading works. The residents have requested an additional manual gauge within the main part of the village. The costs of the proposed works are \$25 000 and would benefit other floodplain users.	High
Update the Evacuation Planning System	The SES has a comprehensive Local Flood Plan. This could be updated by inclusion of more quantitative data on flood depths and the houses which require evacuation. This measure will reduce the risk to life and future damages.	Update the Local Flood Plan to include the latest information as provided in the Floodplain Management Study. In particular that the entire village will require evacuation in (say) the 1% AEP and greater events. The costs will be borne by the SES. Suggestions for inclusion in Flood Evacuation Plans for individual buildings are provided in Appendix A. The SES must ensure that it has sufficient information regarding the evacuation from all existing developments.	High
Improve Flood Awareness and Preparedness	A more heightened awareness of the flood problem and level of preparedness by the community and the SES will reduce flood damages.	A flood awareness program should be initiated (refer Table 4). Flood depth indicators are required in the village and along Terara Road. The cost will depend upon the nature of the program.	High
OTHER ISSUES:			
Assess and Control the extent of River Bank Erosion	There is a continuing river bank erosion problem at Terara which is of major concern to the residents.	Council should assess the extent of the problem and suggest appropriate works as part of the Estuary Management Program. The possibility of a set-back for development from the riverbank should be considered.	High

MEASURE	DISCUSSION	RECOMMENDATION	PRIORITY
Raising of Terara Road to ensure that vehicles leaving Terara during a flood are able to reach high ground at Ferry Lane.	Terara Road has a low spot 300 m east of Ferry Lane which may cause problems during an evacuation.	Flood depth indicators should be installed. An approximate cost is \$5000. Terara Road should be raised to at least 3.0 mAHD between the village and Nowra as part of road upgrading work. The cost of this work has not been determined.	High
DEVELOPMENT MEASURES:			
Deposition of Silt on Pig Island	Since approximately 1992 the residents of Terara have been concerned about the impacts of sediments (from a dredge operator) pumped onto Pig Island. The main problem appears to be a lack of quantitative information which may allay the residents' concerns.	Council needs to address this issue, resolve it and implement a program of communication.	High
The Greenhouse Effect	The Greenhouse Effect has the potential to affect flood levels in the Lower Shoalhaven River.	Council should monitor the available literature and reassess Council's Flood Policy annually.	Low
Control of Development Outside the Study Area	Developments elsewhere on the floodplain or upstream have the potential to affect the erosional and sedimentational regime of the river, cause adverse hydraulic impacts and increase the amount of pollutants and sediments.	This issue is already addressed under Council's existing development controls.	No action required

Table 3: Proposed Upgrades to Council's Flood Policy - Further Development

REQUIREMENTS	EXTENSIONS/ALTERATIONS TO EXISTING RESIDENTIAL DEVELOPMENT
Floor Level	To be considered on its merits to a maximum of 50 m ² if the floor is below the 1% AEP + 0.5 m level or 100 m ² if above. This is to include the total area of extensions since March 1999.
Building Components	To be considered on its merits.
Structural Soundness	To be considered on its merits.
Impact upon Others	Not to be considered unless the works are greater than 100 m ² in area.
Flood Evacuation	No additional works required.
Flood Awareness	Approval will only be provided if the owners have measures in place which demonstrate their commitment to increased flood awareness (signs, literature available, evacuation plan).
REQUIREMENTS	NEW RESIDENTIAL BUILDINGS WHERE ASSESSED WITH AGRICULTURE
Floor Level	1% AEP level plus a 0.5 m freeboard
Location	Development in a Floodway will only be permitted if it can be shown that there is no other viable alternative. Further consideration would then need to be made regarding the specific location of the development.
Building Components	The proponent should demonstrate that where possible all building components are designed to withstand inundation up to the 1% AEP +0.5 m level with minimal affectation.
Structural Soundness	The structural integrity of the completed works to withstand water and debris damage up to the 0.2% AEP (1 in 500y) is to be certified by a professional structural engineer.
Impact upon Others	Not to be considered unless the works are greater than 250 m ² in area.
Flood Evacuation	Any new development will require that the owners advise the SES of their development and evacuation requirements.
Flood Awareness	Approval will only be provided if the owners have measures in place which demonstrate their commitment to increased flood awareness (signs, literature available, preparation of an Evacuation Plan).
Other Issues	A report is required from the Department of Agriculture to confirm the economic viability of the agricultural enterprise. A number of other planning issues are required to be addressed including the relationship of the dwelling to the agricultural activity.
REQUIREMENTS	COMMUNITY SERVICES (schools)
Floor Level	To be considered on its merits, preferably at the 1% AEP level plus a 0.5 m freeboard
Location	Not to be located in a Floodway.
Building Components	The proponent should demonstrate that where possible all building components are designed to withstand inundation up to the 1% AEP +0.5 m level with minimal affectation.
Structural Soundness	The structural integrity of the completed works to withstand water and debris damage up to the 0.2% AEP (1 in 500y) is to be certified by a professional structural engineer.
Impact upon Others	Not to be considered unless the works are greater than 250 m ² in area.
Flood Evacuation	Any new development will require that the owners advise the SES of their development and evacuation requirements.
Flood Awareness	A Flood Awareness Plan must be prepared by the developer to the satisfaction of the Floodplain Management Committee. This will document what actions are to be taken in a flood (Evacuation Plan - example provided in Appendix A) and what measures have been adopted to heighten flood awareness (Awareness Plan).

Table 4: Flood Education Methods

METHOD	COMMENT
Letter/Pamphlet from Council	These may be sent (annually or bi-annually) with the rate notice or separately. A Council database of flood liable properties/addresses makes this a relatively inexpensive and effective measure. The pamphlet can inform residents of subsidies, changes to flood levels or any other relevant information.
School Project or Local Historical Society	This provides an excellent means of informing the younger generation about flooding. It may involve talks from various authorities and can be combined with water quality, estuary management, etc.
Displays at Council Offices, Library, Schools, Local Fairs	This is an inexpensive way of informing the community and may be combined with related displays.
Historical Flood Markers or Depth Indicators on Roads	Signs or marks can be prominently displayed in parks, on telegraph poles or such like to indicate the level reached in previous floods. Depth indicators on roads advise drivers of potential hazard.
Articles in Local Newspapers	Ongoing articles in the newspapers will ensure that the problem is not forgotten. Historical features and remembrance of the anniversary of past events (1860, 1870) make good copy.
Collection of Data from Future Floods	Collection of data assists in reinforcing to the residents that Council is aware of the problem and ensures that the design flood levels are as accurate as possible. A Post-Flood Evaluation Program (in the Floodplain Management Study) documents the steps to be taken following a flood.
Notification of 149 Certificate Details	All property owners were notified that they were flood affected as part of the public consultation program. Future owners are advised during the property searches at the time of purchase (through a Section 149 Certificate).
Types of Information Available	A recurring problem is that new owners consider they were not adequately advised that their property was flood affected on the 149 Certificate during the purchase process. Council may wish to advise interested parties, when they inquire during the property purchase process, regarding flood information currently available, how it can be obtained and the cost.
Establishment of a Flood Affection Database	A database would provide information on (say) which houses require evacuation, which roads will be affected (or damaged) and cannot be used for rescue vehicles, which public structures will be affected (e.g. sewage pumps to be switched off, telephone or power cuts). This database should be reviewed after each flood event. It could be developed by various authorities (SES, Police, Council).
Flood Preparedness Program	Providing information to the community regarding flooding informs it of the problem. However, it does not necessarily adequately prepare people to react effectively to the problem. A Flood Preparedness Program would ensure that the community is adequately prepared. One of the elements of this is preparation of a Flood Evacuation Plan (Appendix A). The SES would take a lead role in this.
Foster Community Ownership of the Problem	Flood damage in future events can be minimised if the community is aware of the problem and takes steps to find solutions. For example, Council should have a maintenance program to ensure that its drainage systems are regularly maintained. Residents have a responsibility to advise Council if they see a maintenance problem such as a blocked drain. This process can be linked to water quality or other water related issues including estuary management.

4. REFERENCES

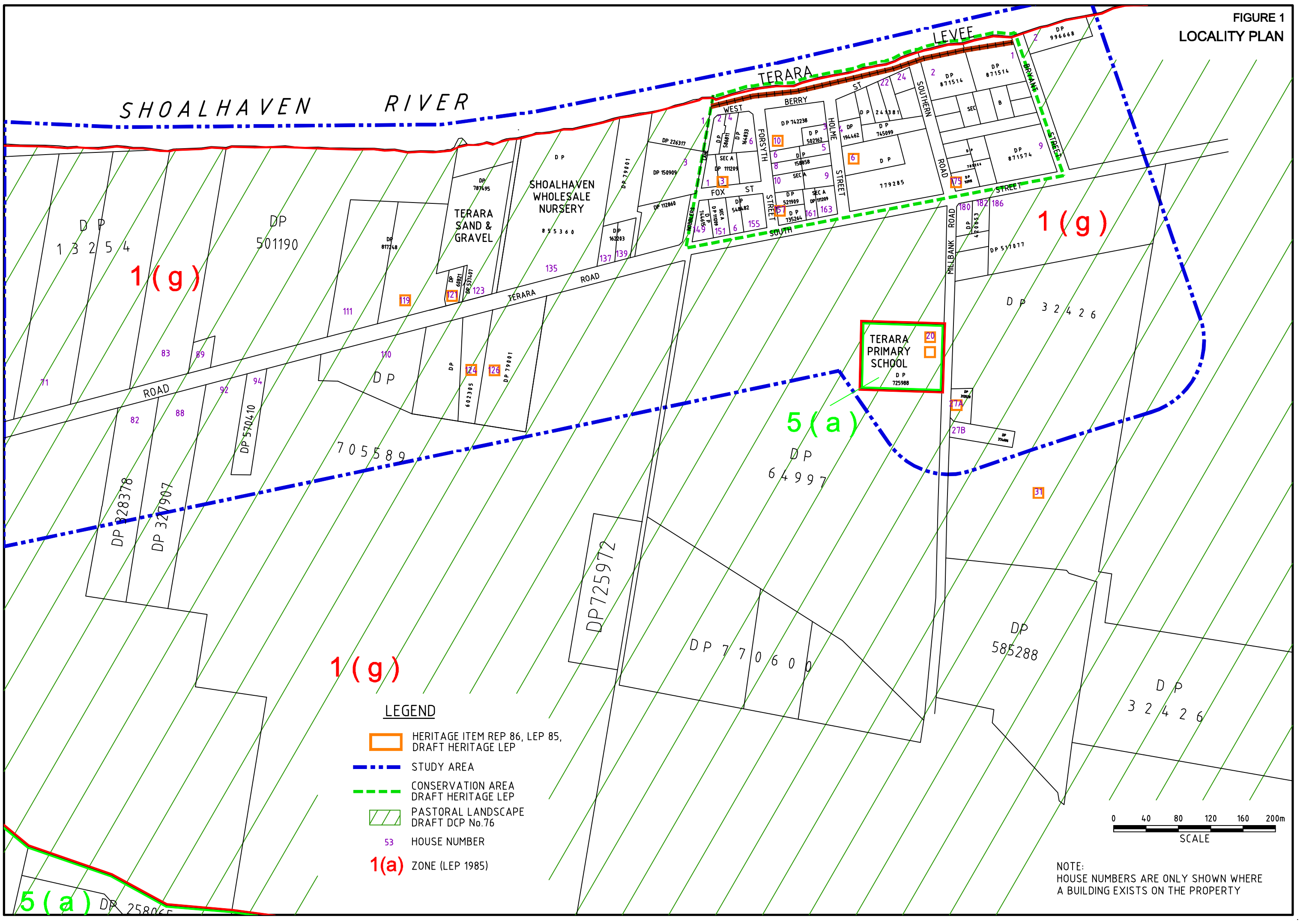
1. Public Works Department
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Draft Report, July 1981.
2. Public Works Department
Lower Shoalhaven River Flood Study
Webb, McKeown & Associates Pty Ltd, April 1990.
3. Shoalhaven City Council
Terara Village Floodplain Management Study
Webb, McKeown & Associates Pty Ltd, February 2002.

FIGURES



FIGURE 1
LOCALITY PLAN

SHOALHAVEN RIVER









1(g)

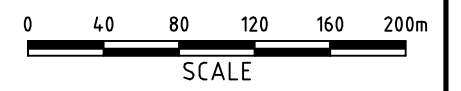
1(g)

5(a)

1(g)

LEGEND

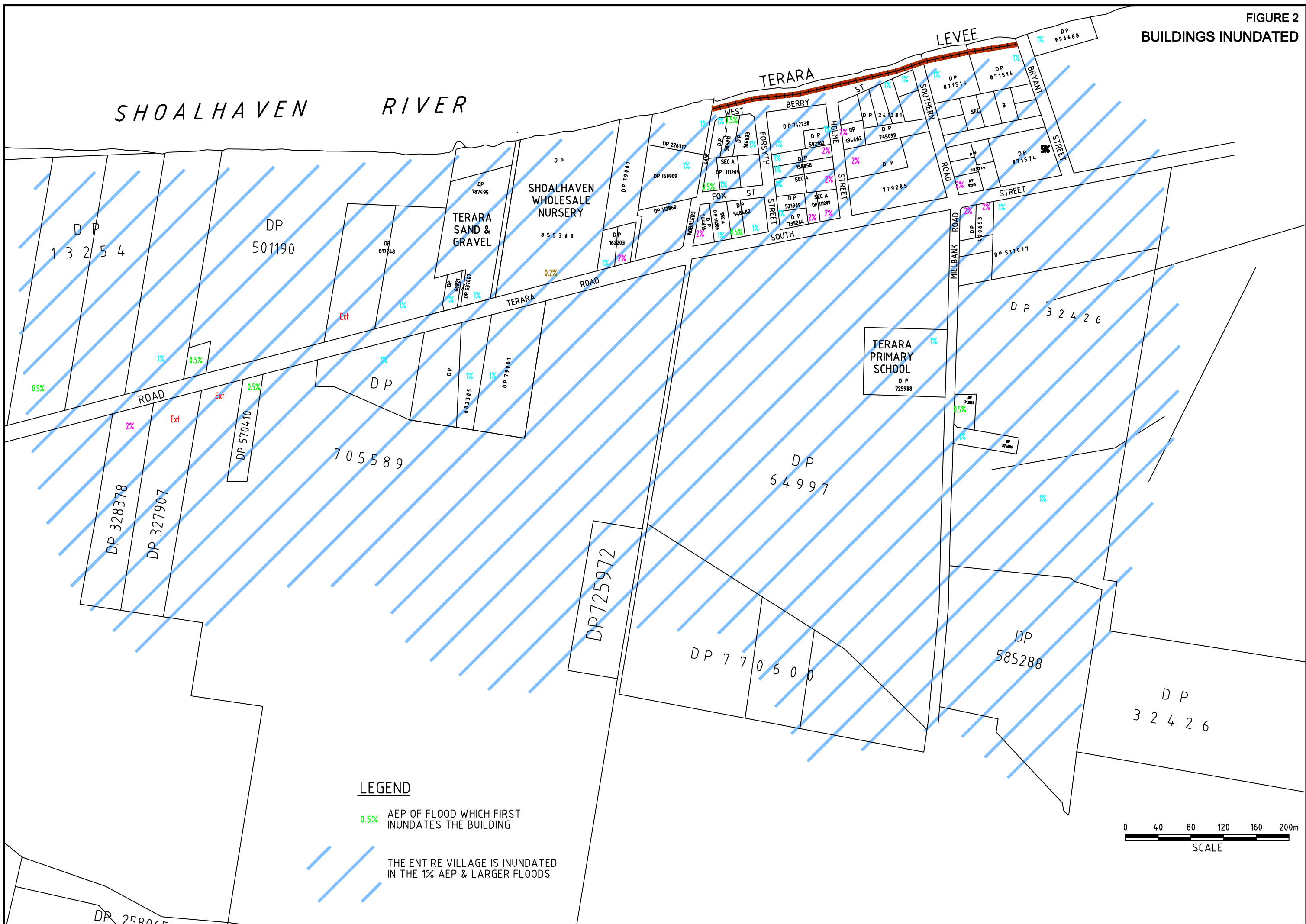
-  HERITAGE ITEM REP 86, LEP 85, DRAFT HERITAGE LEP
-  STUDY AREA
-  CONSERVATION AREA DRAFT HERITAGE LEP
-  PASTORAL LANDSCAPE DRAFT DCP No.76
-  53 HOUSE NUMBER
-  1(a) ZONE (LEP 1985)



NOTE:
HOUSE NUMBERS ARE ONLY SHOWN WHERE
A BUILDING EXISTS ON THE PROPERTY

5(a)

SHOALHAVEN RIVER



LEGEND

0.5% AEP OF FLOOD WHICH FIRST INUNDATES THE BUILDING

(Blue diagonal lines) THE ENTIRE VILLAGE IS INUNDATED IN THE 1% AEP & LARGER FLOODS



APPENDIX A: FLOOD EVACUATION PLAN - INDIVIDUAL BUILDINGS



APPENDIX A: FLOOD EVACUATION PLAN - INDIVIDUAL BUILDINGS

A Flood Evacuation Plan (FEP) provides one of the most cost effective and successful means of mitigating tangible and intangible flood damages. It has no environmental and few social adverse impacts. Generally FEP's are used for non-residential buildings but can also be applied to single dwellings or in a generic form to all householders via the progress association or such like. The following list provides the key elements of a FEP.

TYPICAL FLOOD EVACUATION PLAN

PURPOSE OF THE PLAN:

Advise of the potential for flooding.

List what actions should be undertaken in the event of an impending flood.

Advise who should be contacted for further information or can provide assistance during a flood.

Relate the predicted level of the flood to the premises.

Advise the types of hazards for the range of flood events.

Advise of actions to be undertaken following the flood.

INFORMATION GENERALLY REQUIRED ON THE PLAN:

Name of Business (if applicable), description of location (nearest cross roads) and building.

Name, Address and contact numbers of occupier.

Name, Address and contact numbers of owner.

Primary and Secondary contact - Name and Address.

Nature of development, activity and number of occupants.

Historical flood data (if available).

Flood and Hazard category for the range of flood events.

Types of materials kept on premises.

Flood protection devices and emergency equipment kept at premises.

What assistance will be required (evacuation, sand bags).

POSSIBLE ACTIONS REQUIRED IN THE EVENT OF A FLOOD:

Listen to the local radio.

Secure personal papers, high value items, memorabilia (photographs) and office records.

Install shutters or seal vents.

Raise carpets, furniture and stock.

Remove equipment and vehicles (if possible).

Evacuate occupants to the designated safe point.

Advise the SES.

Turn of power/gas/electricity and the main valves of the water supply.

Collect items likely to be washed away.

Raise poisons or chemicals.

Prevent discharge from the septic or sewer system.

TYPICAL FLOOD EVACUATION PLAN

ACTIONS DURING THE RECOVERY PHASE:

Check with the SES or Police first.

Have electrics and gas fixtures checked by qualified personnel.

Beware of snakes and spiders.

Beware of the health risk of walking or working in muddy water.

Plan which items should be cleaned first.

APPENDIX B: DISSEMINATION OF FLOOD INFORMATION TO THE PUBLIC



APPENDIX B: DISSEMINATION OF FLOOD INFORMATION TO THE PUBLIC

Dissemination of flood information to the public is a key element of the floodplain management process for a number of reasons. Firstly, since this is often the only formal way that a property owner is able to obtain flood information, it must be accurate, concise, easy to read and as unambiguous as possible. Secondly, Council may be exposed to potential liability issues if the information is incorrect or supplied inappropriately. Finally, appropriate dissemination of flood information can be a valuable means of raising the public's flood awareness and preparedness.

Council's existing policy for the dissemination of flood information to the public should be reviewed in light of the recent studies and the public's heightened awareness of flooding. The objectives of this policy should be:

- to ensure that the information supplied is accurate, concise, easy to read and as unambiguous as possible,
- to maximise the potential to increase flood awareness and preparedness within the community and Council's staff,
- to ensure that the release of information is undertaken in a consistent, orderly and efficient manner,
- to ensure that Council meets its statutory obligations,
- to advise owners of Council's policy regarding flooding and any restrictions that may be imposed on developments,
- to ensure that those providing the information understand the policy, the liability issues and the consequences of flooding,
- to minimise Council's liability associated with issuing the use of flood information,
- to provide a flood related information service to other sections of Council.

The exact mechanism for the dissemination of flood information should be developed on a city wide basis and not solely as a result of this study. It will require at least the following elements, legal advice may need to be sought to determine other elements:

- who should provide the information? Possibly two levels may be required depending upon the type of information to be supplied,
- how should the information be updated, by whom and how often?
- preferably standardised procedures should be introduced (handouts),
- record keeping (preferably on a database) of what information was provided, by whom and where,
- which transmittal modes should be used, e.g. telephone, counter, letter, e-mail, fax,
- a procedure for review of the policy and updating,
- flow charts to show the various procedures.