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ABSTRACT

To improve public awareness and preparedness for local flooding and encourage a better response to flood warnings, the New South Wales State Emergency Service is in the process of developing a comprehensive public education strategy.

This report describes the results of a survey about flood perceptions and warnings undertaken in four communities in the Hawkesbury-Nepean Valley, New South Wales, Australia. The survey was conducted in Penrith, McGraths Hill, Windsor and Richmond in February 2006. A total of 1000 questionnaires were delivered directly to houses in all four areas, with an overall return rate of 22%. The questionnaire included questions on: awareness, risk perception, previous exposure to flooding, information received concerning preparedness activities, information sought for preparedness purposes and the extent to which people engaged or plan to engage in preparedness activities.

The results of the survey provide a baseline understanding of current issues regarding flooding for respondents in the four communities. Having a baseline survey such as this also allows for the evaluation of future flood education programmes (by way of a comparison survey), and the identification and utilisation of effective strategies for flood preparedness and warnings.

KEYWORDS

Flood, hazard, education, warnings, perception, preparedness, understanding, community, New South Wales, Australia, Windsor, Richmond, Penrith, McGraths Hill, Hawkesbury-Nepean Valley.

1.0 INTRODUCTION

Floods are the most damaging natural hazard in New South Wales, resulting in annualised losses in excess of \$150 million (State Emergency Service, 2001). Flood risk management is shared in partnership by a number of agencies and is outlined in the New South Wales flood plan.

Flood protection works are one of the most common mitigation options adopted over the last 100 years. However, due to a public desire to make use of floodplains, land-use planning and flood protection works do not mitigate the entire risk. Warning systems have been developed to address remaining residual risk.

In New South Wales flood warnings are disseminated by the State Emergency Service (SES) from information provided by the Bureau of Meteorology (State Emergency Service, 2001). The Bureau of Meteorology uses a 'Flood Watch' category to warn of the possible onset of weather which could lead to flooding. When floods are developing, the Bureau of Meteorology predicts flood categories (minor, moderate and major), based on nationally-agreed definitions of consequence (e.g. roads closed, isolation, inundation of rural areas and towns/suburbs) and using gauges as the target points. The New South Wales State Emergency Service has taken on the role of adding value to the Bureau's quantitative flood-height predictions, building up levels of flood intelligence which are used to 'translate' the prediction by indicating likely consequences in the 'reference areas' around the gauges for which the predictions are issued (pers. comm. Chas Keys June 2006). This value-adding task is being done state-wide.

Warnings are broadcast by local radios, and supplemented by door-knocking by SES volunteers and police when evacuations are required. The effectiveness of these systems has recently been under review (Handmer, 2002a,b; Pfister, 2002) due to the often low evacuation compliance. In the review of the 2001 Grafton floods in New South Wales (Pfister, 2002), around 97% of residents surveyed reported hearing the flood warning and evacuation order, however, only around 18% complied with the request to leave.

To improve public awareness, including warning response, the New South Wales SES is in the process of developing a comprehensive public education strategy. The work presented in this report is aimed at evaluating the effectiveness of flood education programmes and improving response to warnings.

2.0 METHOD

2.1 Questionnaire

The primary research method used for researching flood risk perception, education and warnings in New South Wales communities was a self-administered questionnaire. These types of questionnaires provide an effective way to gather data from large, geographically-dispersed populations. It is also possible to cover more complex issues in self-administered surveys than over the telephone (Bartley, 1999). However, these surveys can also be slow; no interviewer is present in person to answer any questions respondents may have; there may be lower response rates in comparison with other methods; and the problem of respondent self selection may occur, which can lead to demographic biases.

Self-administered questionnaires were our preferred survey method because of their ability to allow respondents to make considered responses to complex and interlinked questions. However, we acknowledge that demographic bias may be present in the sample associated with this method. Demographic data for respondents from each community compared with census data are addressed in Section 4.3. As a consequence, the conclusions and recommendations suggested here should be viewed with this in mind.

The questionnaire was developed in consultation with New South Wales State Emergency Service and local SES offices. A copy of the questionnaire can be found in Appendix 1.

2.2 Selection of communities

The Hawkesbury-Nepean floodplain stretches from south of Windsor, down the Hawkesbury-Nepean river system to Penrith and to Wallacia. It covers several hundred square kilometres and is the home of tens of thousands of people (Hartcher et al., 1995; Hawkesbury/Nepean Flood Emergency Sub-Plan, 2005). Today, the Western Sydney region is the fastest growing region of the Hawkesbury-Nepean catchment as it provides homes to Sydney's expanding population (Hawkesbury Nepean Catchment Management Authority, 2006).

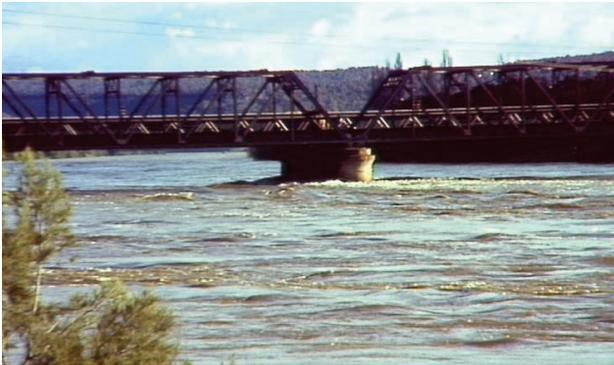
The area has a history of flooding since the earliest days of European settlement. Major floods have been recorded since the 1790s and still occur in the present day (Gillespie et al., 2002). The highest recorded flood occurred in 1867 when a height of 19.2 metres Australian Height Datum (AHD) was recorded at Windsor. This flood caused the loss of lives and the destruction of property and livestock deaths. Both major and minor floods have occurred since that date, with the most recent major floods occurring in 1988 and 1990 (Hawkesbury/Nepean Flood Emergency Sub-Plan, 2005).

The consequences of flooding in the area can be severe. Floodwaters can back-up and rise to very high levels, inundating large areas of the valley where settlement has already occurred. In addition the rising waters can create 'shrinking islands', where certain locations become cut off and surrounded by floodwaters, making evacuation difficult or

impossible (Gillespie et al., 2002; Hawkesbury/Nepean Flood Emergency Sub-Plan, 2005).

The communities selected to be part of this survey were chosen based on their vulnerability to flooding and the current arrangements that they have in place to manage flood risk. In total, four communities in Hawkesbury-Nepean Valley were selected, including Penrith, McGraths Hill, Windsor and Richmond. Details of these communities are outlined in Table 1.

Table 1 Communities selected for the survey of flood risk perception, education and warnings (showing previous flood events)

<p><i>Penrith</i></p> <p>Population size: (2001 census): 11,620 (adjustment for 2004 not available)</p> 	<p><i>McGraths Hill</i></p> <p>Population size: 3,165 (Based on the 2001 census and adjusted for 2004: Hawkesbury/Nepean Flood Emergency Sub-Plan, 2005)</p> 
<p><i>Windsor</i></p> <p>Population size: 7,784 (Based on the 2001 census and adjusted for 2004: Hawkesbury/Nepean Flood Emergency Sub-Plan, 2005)</p> 	<p><i>Richmond</i></p> <p>Population size: 7,575 (Based on the 2001 census and adjusted for 2004: Hawkesbury/Nepean Flood Emergency Sub-Plan, 2005)</p> 

2.3 Questionnaire Delivery

In all, 1000 questionnaires were distributed throughout the pre-selected Hawkesbury-Nepean Valley communities. Penrith, McGraths Hill, Windsor and Richmond received 250 questionnaires each.

Questionnaires were delivered by the method of hand-delivery to letterboxes with the help of local SES volunteers in February 2006. To gain an understanding of the perspectives of residents living in areas of different elevation, questionnaires were distributed randomly to houses both within known floodable areas (i.e. areas of 1% flood probability) and areas outside of the high risk flood zone. Figures 1 to 4 show the delivery areas for the different communities.

Questionnaires were delivered in Penrith the day after a thunderstorm and heavy rain had occurred, causing surface flooding in the area. This event however does not seem to have had any strong influence on how respondents answered questions within the survey.

In order to boost response rates, a reminder letter and survey were posted to addresses where the first questionnaires had been distributed. The reminder letter and survey was posted out in March 2006.

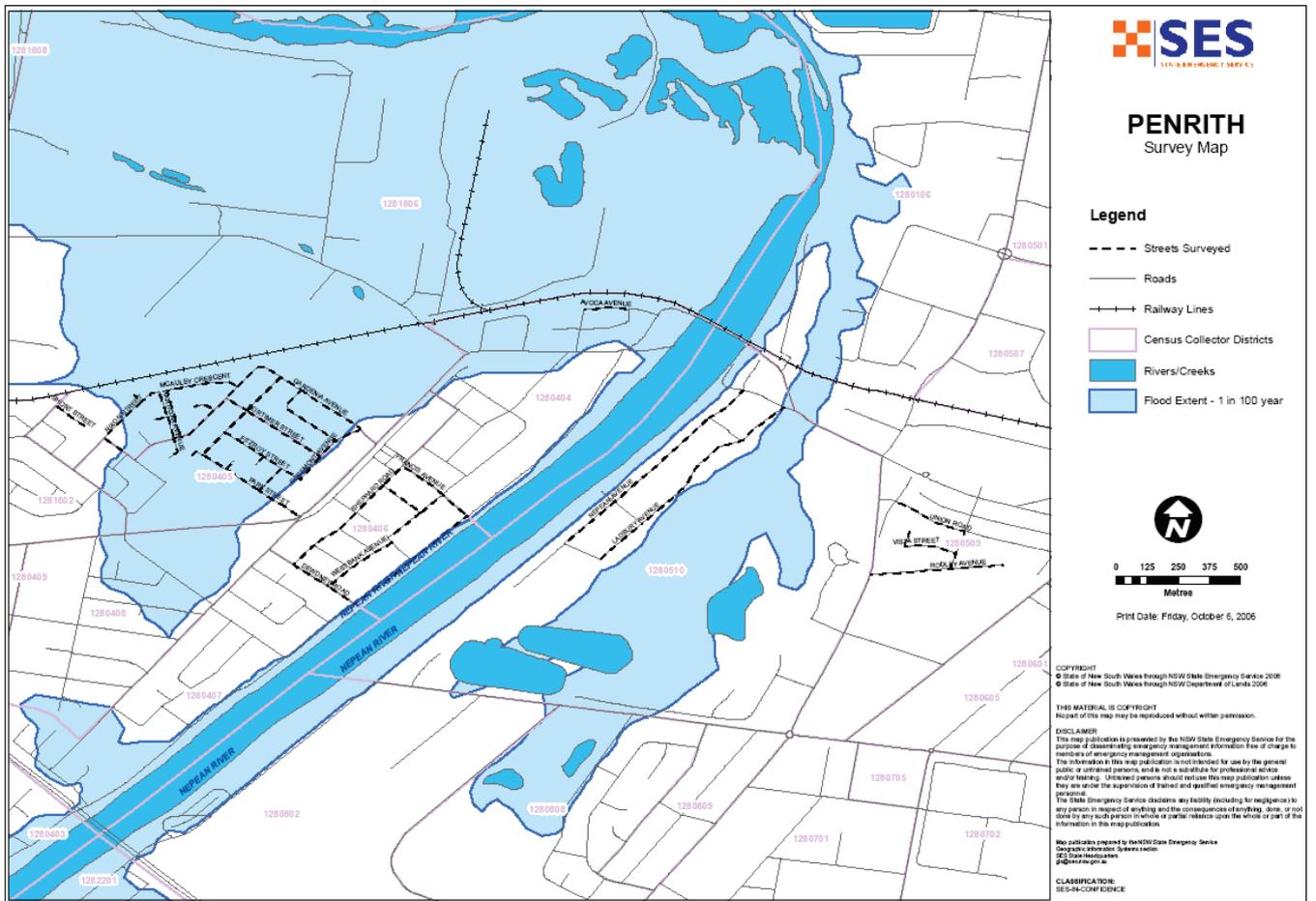


Figure 1 Survey delivery areas for Penrith with associated census data from relevant Collector Districts.

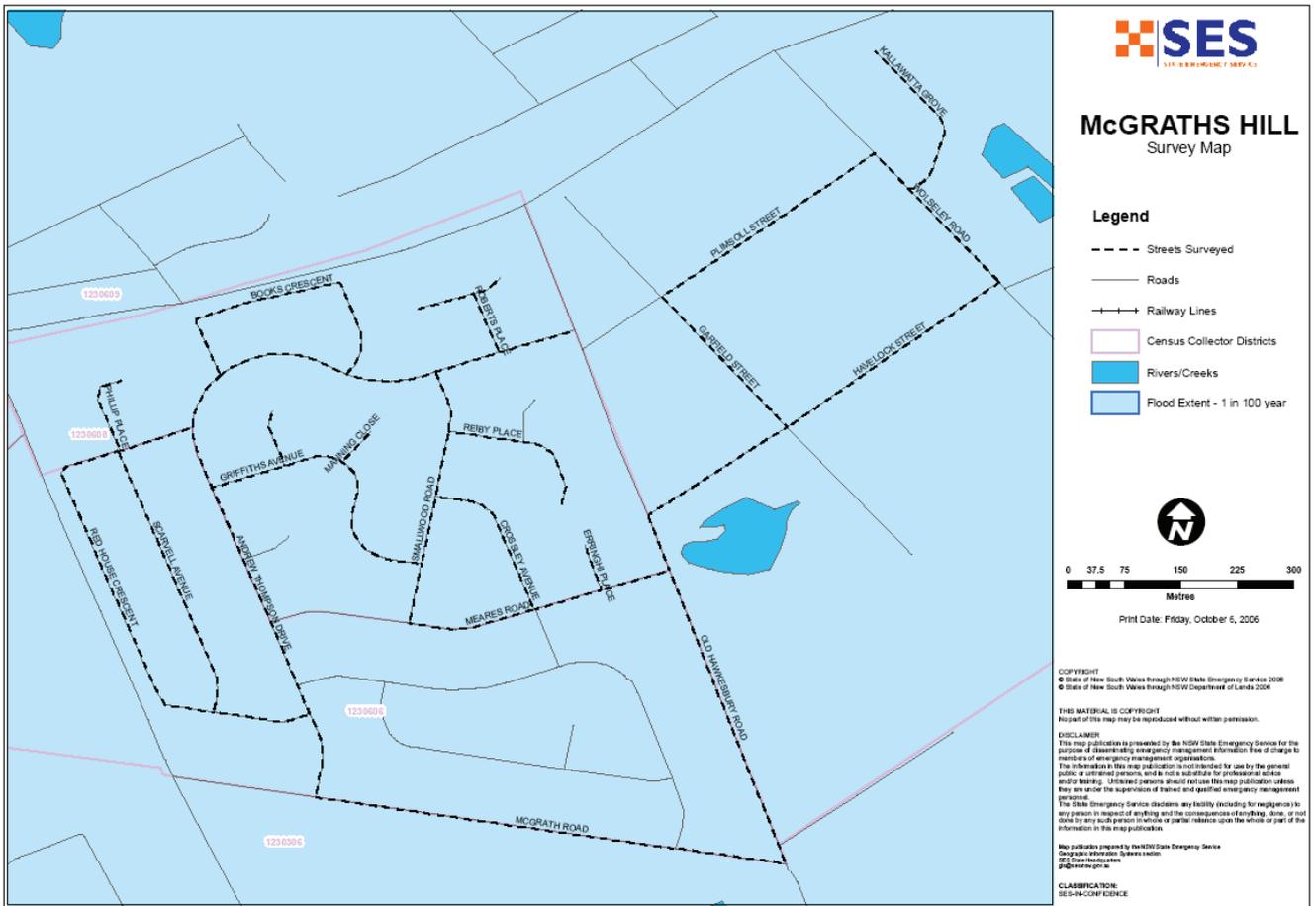


Figure 2 Survey delivery areas for McGraths Hill with associated census data from relevant Collector Districts.

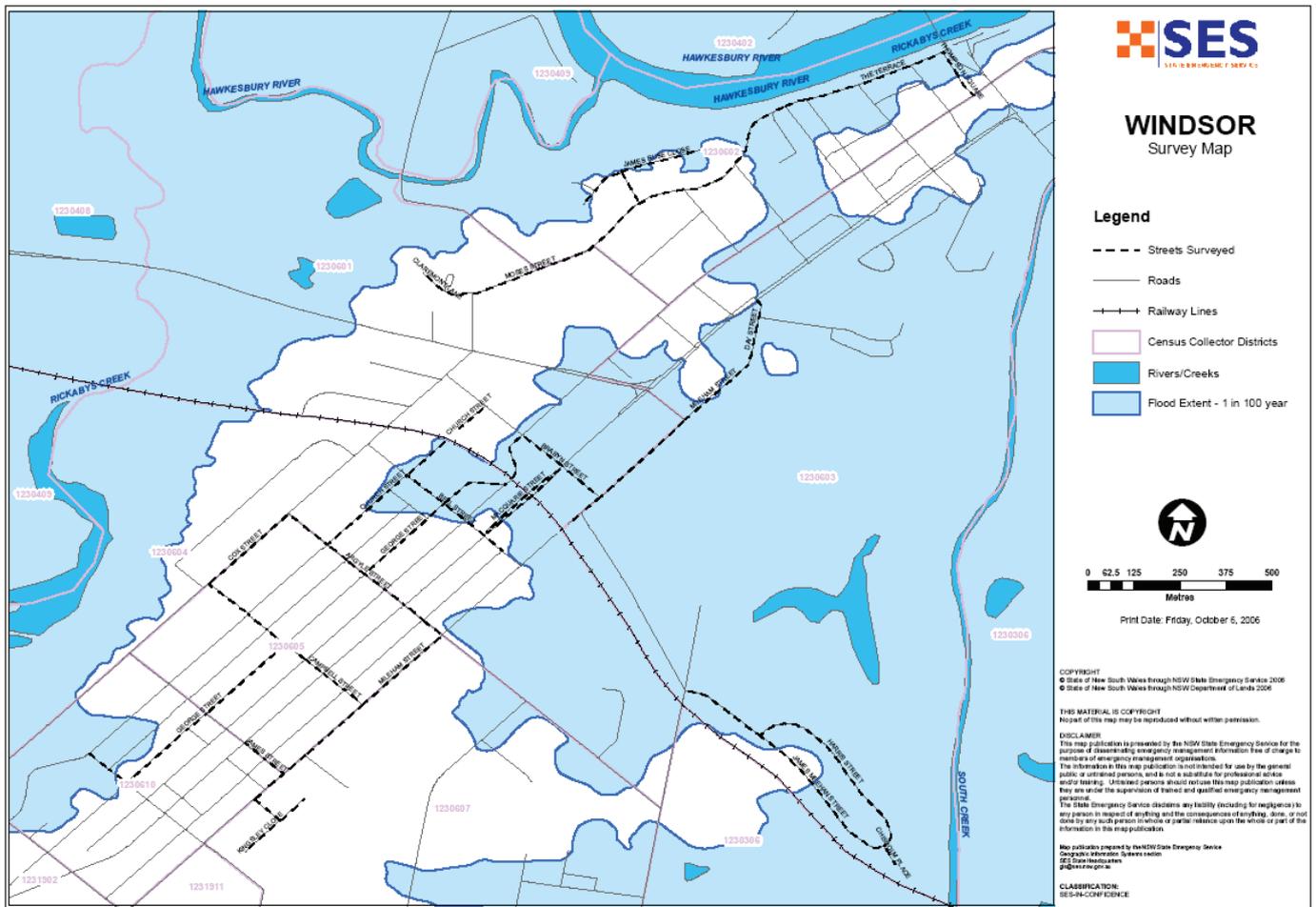


Figure 3 Survey delivery areas for Windsor with associated census data from relevant Collector Districts.

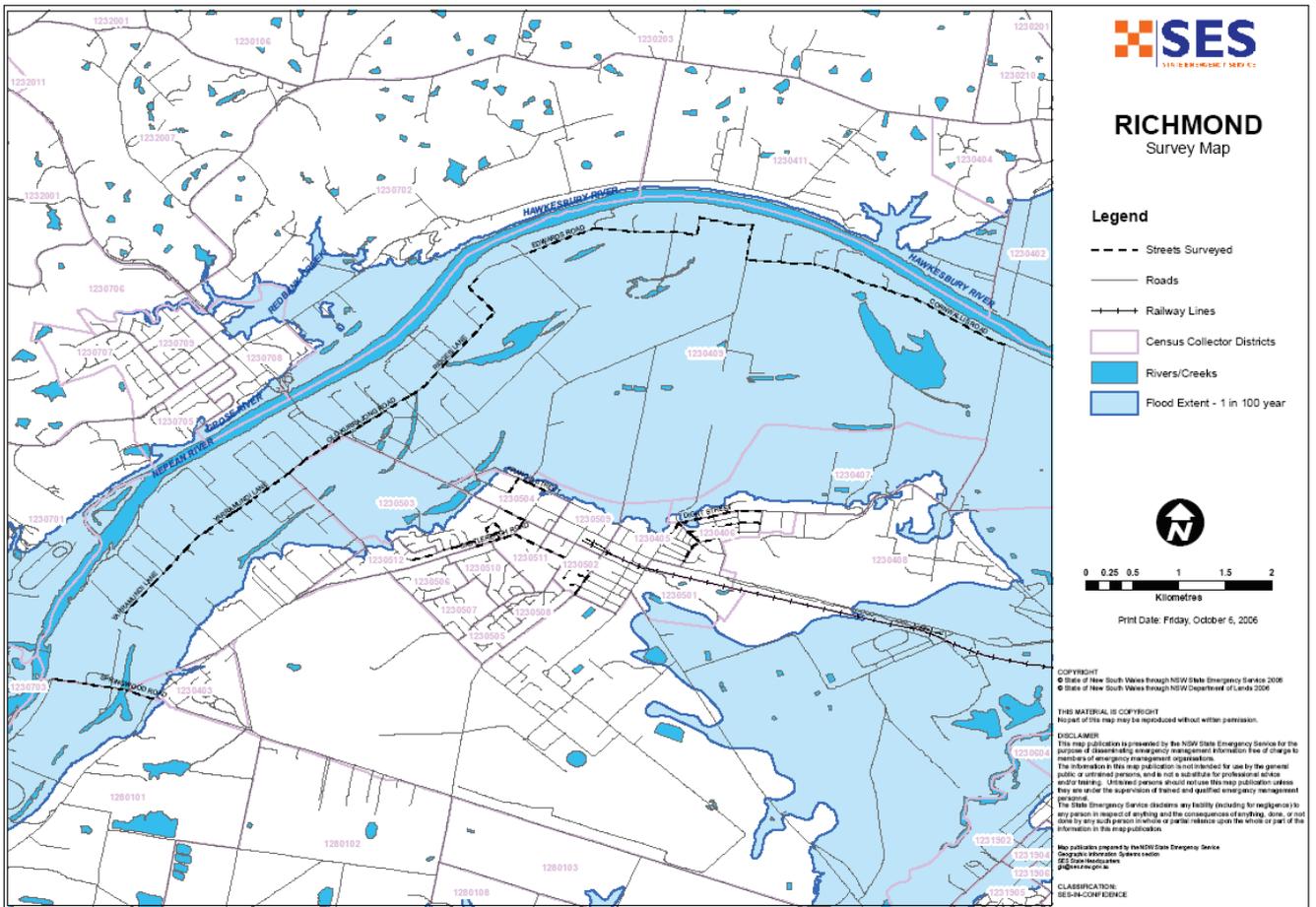


Figure 4 Survey delivery areas for Richmond with associated census data from relevant Collector Districts.

3.0 RESULTS

3.1 Return Rates

Overall, out of 1000 successfully delivered questionnaires, 216 (22%) surveys were returned. Penrith had the highest return rate (24%), followed by McGraths Hill (22%), Richmond (21%) and Windsor (20%).

Table 2 shows the approximate ratios of surveys returned from floodable areas (i.e. 1% flood probability) versus areas that are less likely or unlikely to flood. In McGraths Hill, because surveys were only delivered to floodable areas, all of the surveys completed and returned were from areas likely to flood. In contrast, in Richmond, the majority of surveys were delivered to areas less likely to flood, and this is reflected in the number of surveys returned from less-floodable areas. In Windsor and Penrith, surveys were evenly delivered to areas likely and less likely to flood, and for both towns more surveys were returned from the floodable areas.

Table 2 Is the area floodable or less likely/unlikely to flood?

	Location survey returned from									
	Penrith		McGraths Hill		Windsor		Richmond		All respondents	
	N	%	N	%	N	%	N	%	N	%
Likely to flood	41	69.5%	54	100.0%	29	59.2%	6	11.3%	130	60.5%
Less or unlikely to flood	18	30.5%	0	.0%	20	40.8%	47	88.7%	85	39.5%
Total	59	100.0%	54	100.0%	49	100.0%	53	100.0%	215	100.0%

4.0 REPRESENTATIVENESS OF SAMPLE

4.1 Home ownership

Nearly 90% of residents living in McGraths Hill own their own home, with the remainder renting (Table 3). Penrith and Richmond reported similar home ownership statistics at over 80%. The community that indicated the least amount of home ownership was Windsor at 69%, where a greater proportion of people living in rental properties answered the survey (30.6%).

In general, comparison with the Australian 2001 census data indicates that a greater proportion of home-owners answered the questionnaire, and lesser numbers of people renting filled it out. This trend is true of all of the four communities surveyed, except for Windsor where the proportions of home owners and renters answering the questionnaire were similar to the census figures.

Table 3 Reported home ownership and rental statistics

Do you/someone in your house own or rent the home you live in?	Location						
	Penrith		McGraths Hill		Richmond –Windsor Urban Area		
	Survey %	Census %	Survey %	Census %	Windsor Survey %	Richmond Survey %	Richmond – Windsor Census %
Own or buying, to live in it	88.1%	47.3	89.1%	71.9	69.4%	81.1%	61.3
Rent	8.5%	49.7	10.9%	25.6	30.6%	18.9%	36.9
Other	3.4%	3.0	.0%	2.6	.0%	.0%	1.9

4.2 Number of years living in the community

Penrith residents had spent the most number of years living within their community, at a mean of 25 years. McGraths Hill residents had spent the least number of years living in their community (mean of 13 years) with Windsor and Richmond somewhere in between the two (Table 4). In terms of the amount of time spent living in their current homes, Penrith residents had spent the greatest number of years in their houses (at a mean of 17 years), Windsor and Richmond around 11 years and McGraths Hill residents had lived in their homes the least amount of time at a mean of 9 years.

Despite some quite high means, the figures below (Figures 5 and 6) still show a fair proportion of respondents who have only lived a few years in their houses or communities. The means are driven up by fewer numbers of residents who have lived in the same place for over 30 years or more.

Table 4 How long have you lived in your community and your current home? (Years)

	Location														
	Penrith			McGraths Hill			Windsor			Richmond			Total		
	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N
Years in community	24.69	17.07	56	13.07	10.82	55	24.34	19.95	44	22.58	20.28	53	21.00	17.82	208
Years in current home	17.21	15.23	56	8.10	8.58	55	13.90	15.27	47	10.87	14.08	53	12.51	13.86	211

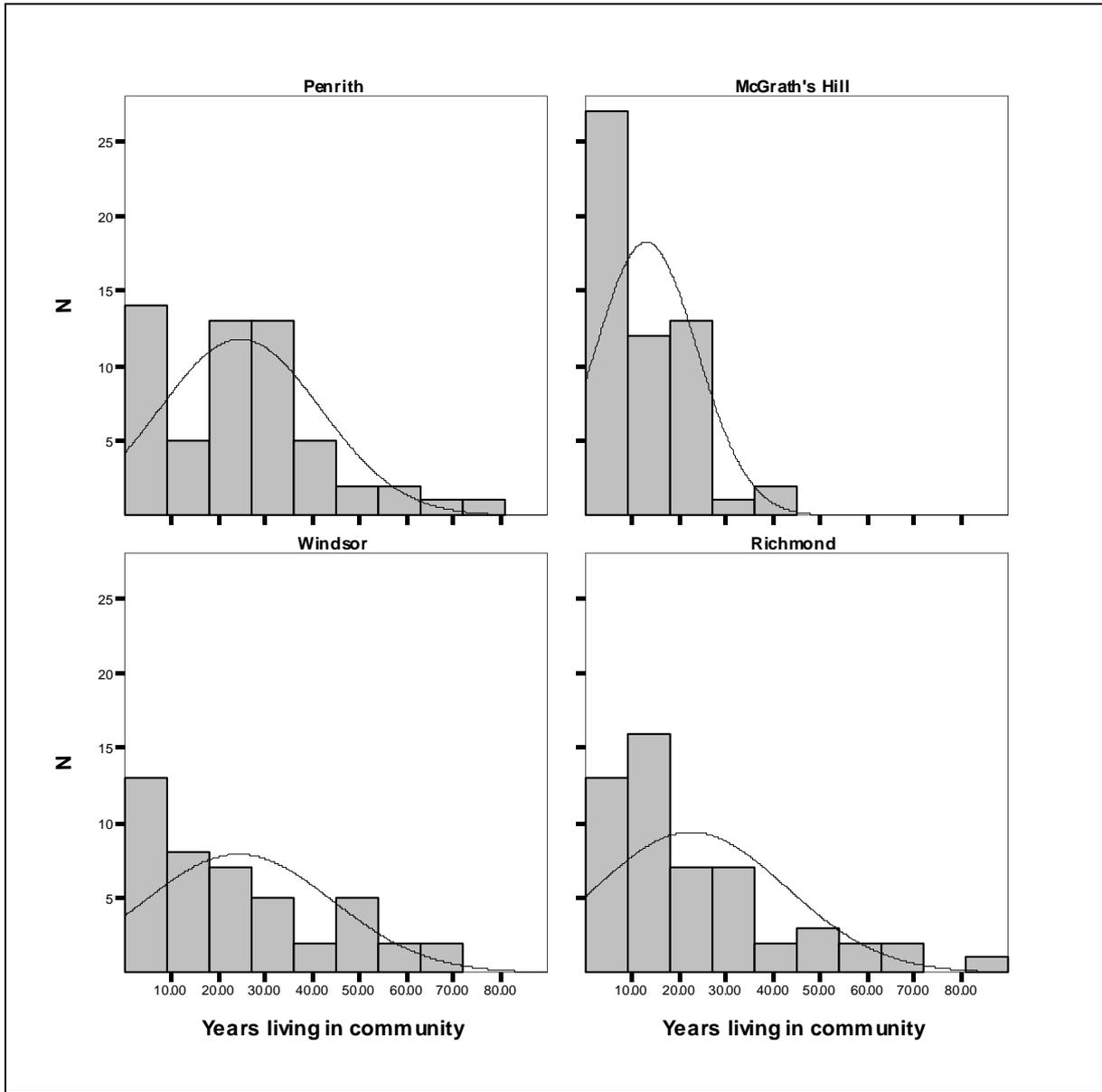


Figure 5 The number of years residents had lived in their community.

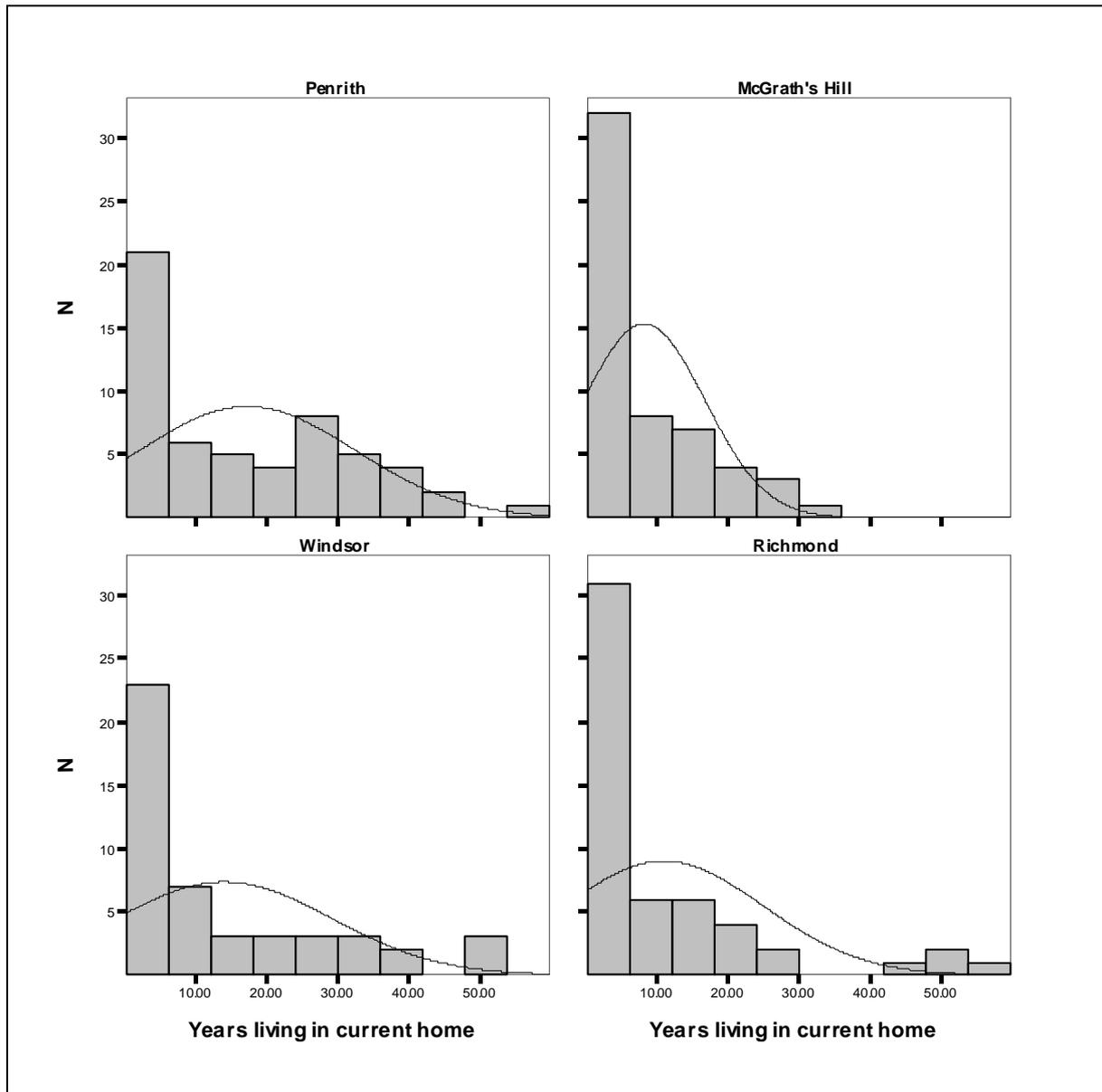


Figure 6 The number of years residents had lived in their current homes.

The 2001 census data indicates that:-

- In Penrith 76% of residents had reported living in the same house for the last year, with 48% living in the same house for five years.
- In McGrath's Hill 83% of residents had reported living in the same house for the last year, with 56% living in the same house for five years.
- In the Richmond-Windsor urban area 79% of residents had reported living in the same house for the last year, with 50% living in the same house for five years.

This census data can be compared with figures calculated from responses given by the survey respondents (Table 5). The survey data shows that higher proportions of long term residents answered the questionnaire compared with the general demographic data for the area.

Table 5 Percentage of respondents who had lived 1 year and 5 years in their houses and wider community

	Penrith	McGraths Hill	Windsor	Richmond
Have lived for at least 1 year in this community	94.6%	97.7%	97.7%	90.6%
Have lived for 5 years in this community	87.6%	74.9%	89.7%	85.6%
Have lived for at least 1 year in the same house	91.1%	74.5%	89.4%	81.1%
Have lived for at least 5 years in the same house	78.1%	58.5%	71.4%	63.1%

4.3 General demographics

Tables 6 and 7 show the general demographic statistics (compared with census data) for each town surveyed. The main points from the general demographic statistics are as follows:

- In Penrith, Windsor and Richmond approximately half the respondents to the questionnaire reported to be male and half were female. In McGraths Hill there was some demographic bias however with more females (72%) than males answering the questionnaire.
- McGraths Hill had the greatest percentage of couples with children answer the survey (nearly 50%) followed by the other communities on around 25-30%. All towns had less than 14% of single parent families. More people living alone answered the questionnaire in Windsor and Richmond (approximately 35%). On comparison with the census data, it appears that a greater proportion of people living alone, and couples without children, answered the questionnaire.
- Most respondents who answered the questionnaire regarded themselves as Australian (around 80% or over). No-one of Aboriginal or Torres Strait Islander origin answered the survey. Penrith had the greatest number of respondents who chose "Other" with respect to ethnic background (20.8%), followed by Richmond and Windsor (approximately 15%) and McGraths Hill (6%). When comparing with the census figures it is evident that the "other" category is under-represented in the survey, especially with respect to McGraths Hill.
- In terms of age, the majority of respondents from Penrith, Windsor and Richmond were aged 45-64 years, and respondents from McGraths Hill were 25-44 years. When comparing with the census results, it is evident that there is some bias, with lower proportions of people aged 18-44 answering the survey, and slightly greater proportions of those aged over 45.
- Employment statistics from the survey generally reflected data from the 2001 census. The only biases might be in Penrith where a slightly greater proportion of people not in paid employment answered the survey, and in McGraths Hill where a smaller proportion of people not in paid employment answered the survey compared with census figures.
- Gross household income for 2004 was evenly spread across all the towns from very low levels of income (under \$10,000) to over \$60,000. While the 2001 census figures are not directly comparable (as the census collects weekly income rather than yearly income), it appears there may be a slight bias toward people in the middle to upper income brackets from Penrith and McGraths Hill (from \$30,000 per annum upwards).
- In terms of educational qualifications, survey respondents appear to be biased toward having qualifications, including either a professional/trade certificate, university undergraduate or university post-graduate degree. Lesser proportions of respondents had school, or no qualifications, when compared with the census data.

Table 6 General demographic statistics

		Location						
		Penrith		McGraths Hill		Richmond –Windsor Urban Area		
		Survey %	Census %	Survey %	Census %	Windsor Survey %	Richmond Survey %	Census %
Gender	Male	53.8	48.0	28.3	50.0	44.9	44.9	49.0
	Female	46.2	52.0	71.7	50.0	55.1	55.1	51.0
Which best describes your living situation?	Couple family with children	27.7	38.0	49.1	62.0	30.5	30.5	57.0
	Couple family without children	37.0	20.0	24.5	15.0	26.9	26.9	16.0
	One parent family	7.4	17.0	13.2	13.0	13.5	13.5	15.0
	Other family	5.6	1.8	0.0	0.5	0.0	0.0	0.7
	Alone	14.8	16.0	9.4	5.3	32.7	32.7	7.6
	With other people, not family	5.6	6.6	0.0	3.8	3.8	3.8	3.4
	Other (specify)	1.9	-	3.8	-	1.9	1.9	-
Ethnic background	Australian	79.2	62.7	94.1	58.2	84.6	84.6	59.9
	Aboriginal or Torres Strait Islander origin	0.0	2.8	0.0	1.9	0.0	0.0	2.5
	Other (specify)	20.8	34.5	5.9	39.8	15.4	15.4	37.7
Were you born in Australia?	Yes	73.6	78.0	84.9	87.0	80.8	80.8	86
	No	26.4	22.0	15.1	13.0	19.2	19.2	14
Age	18-24 years	0.0	15.5	3.8	13.0	6.0	6.0	14.8
	25-44 years	27.8	37.5	47.2	49.0	34.0	34.0	48.3
	45-64 years	53.7	25.4	45.3	28.2	38.3	38.0	25.0
	65 years and over	18.5	21.5	3.7	9.8	25.5	22.0	12.6

Table 7 Demographic statistics for employment status, income and highest educational qualification

		Location						
		Penrith		McGraths Hill		Richmond-Windsor Urban Area		
		Survey %	Census %	Survey %	Census %	Windsor Survey %	Richmond Survey %	Windsor-Richmond Census %
Employment status	Employed full-time	50.9	36.8	50.9	46.5	45.7	52.9	45.1
	Employed part-time	11.4	15.3	30.2	20.8	15.2	11.8	18.6
	Not in paid employment	37.7	48.0	18.9	32.7	39.1	35.3	36.3
Household 2004 gross income	Under \$10,000	2.0	0.9	9.8	0.6	7.3	5.9	0.4
	\$10,001 to \$15,000	6.1	20.2	4.8	8.6	14.6	13.7	11.5
	\$15,001 to \$20,000	6.1	10.7	4.8	6.6	2.4	3.9	7.9
	\$20,001 to \$30,000	10.2	8.8	4.8	6.6	7.4	11.8	7.2
	\$30,001 to \$40,000	8.2	20.0	2.4	16.9	9.8	21.6	17.9
	\$40,001 to \$50,000	6.1	10.2	14.3	12.8	19.5	7.7	12.7
	\$50,001 to \$60,000	8.2	8.6	14.3	10.3	14.6	5.9	10.6
	\$60,001 +	53.1	20.5	45.2	37.6	24.4	29.5	31.9
Highest educational qualification	School qualifications or less	33.9	68.5	46.2	61.4	26.1	48.0	62.5
	Trade certificate or professional certificate	41.1	23.2	30.7	30.7	41.3	30.0	29.0
	University undergraduate degree	16.1	6.4	23.1	6.2	23.9	20.0	6.4
	University postgraduate degree	8.9	1.9	0.0	1.7	8.7	2.0	2.0

5.0 PERCEPTIONS OF FLOOD RISK

5.1 The most likely natural disaster that could affect your community

The most likely natural disaster anticipated by respondents to affect their community was flooding (Table 8) with 86% of total respondents thinking that this was likely. This was closely followed by a thunderstorm with high winds and/or hail (70% of total respondents). Bushfire (30%), earthquake (2%), windstorms (1%), and tsunami (0%) were all thought to be disasters that were less likely to impact on communities. (Note: The communities are located inland, where tsunami will not be at risk at all).

When breaking down the statistics for different communities, Windsor was the community with the highest percentage of respondents who thought that a flood was likely to impact upon them (88%). Richmond and Penrith also had high percentages of respondents who thought that a flood was likely to affect their community (85-78%). McGraths Hill respondents were least likely to think that flooding could affect their community (54%).

Penrith respondents were more likely to choose “Bushfire” (41%) than respondents from the other communities (22-33%).

Table 8 The most likely natural disaster that could affect your community

Two most likely natural disasters		Location									
		Penrith		McGraths Hill		Windsor		Richmond		Total	
		Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Flood	Yes	46	78.0%	50	54.0%	45	88.2%	45	84.9%	186	85.7%
Thunderstorm with high winds and/or hail	Yes	42	71.2%	41	75.9%	29	56.9%	39	81.3%	151	69.6%
Windstorm	Yes	4	6.8%	6	11.1%	3	5.9%	5	7.5%	18	0.5%
Bushfire	Yes	24	40.7%	12	22.2%	17	33.3%	12	22.6%	65	30.0%
Earthquake	Yes	1	1.7%	1	1.9%	0	0.0%	2	3.8%	4	1.8%
Tsunami	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	.0%
Other	Yes	1	1.7%	0	1.9%	1	2.0%	1	1.9%	3	1.5%
Other please specify											
	Drought	1	1.7%	0	.0%	0	0.0%	0	0.0%	1	.5%
	Terror attack	0	0.0%	0	.0%	1	2.0%	0	0.0%	1	.5%
	Windstorm	0	0.0%	0	.0%	0	0.0%	1	1.9%	1	.5%

5.2 Had the respondent been affected by any previous events

When considering all the respondents to the questionnaire across the four communities surveyed, 59% had experienced a thunderstorm with high winds/hail, 43% had been affected by a flood, 21% had been affected by a windstorm and 20% had been affected by bushfire

(Table 9). All other event types were experienced by less than 5% of respondents. Almost 20% said that no events had affected them.

In terms of flooding, residents' from Richmond had most been affected by flooding in the past with 53% acknowledging that this was the case. This was closely followed by Windsor on 51%. Penrith and McGraths Hill respondents had had less experience of flooding with only 41% of those from McGraths Hill indicating they had experienced flooding, and 31% from Penrith.

The other previous type of event to have affected large numbers of respondents was thunderstorms with high winds/hail. Nearly 74% of respondents in Richmond noted that they had been affected by this type of event and 50-58% of respondents in Penrith, McGraths Hill and Windsor.

Table 9 Whether respondents had been affected by any previous events.

Have you ever been affected by...		Penrith		McGraths Hill		Windsor		Richmond		Total	
		Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Flood	Yes	18	30.5%	22	40.7%	26	51.0%	28	52.8%	94	43.3%
Thunderstorm with high winds and/or hail	Yes	34	57.6%	27	50.0%	29	56.9%	39	73.6%	129	59.4%
Windstorm	Yes	10	16.9%	10	18.5%	8	15.7%	18	34.0%	46	21.2%
Bushfire	Yes	14	23.7%	7	13.0%	12	23.5%	12	22.6%	45	20.7%
Earthquake	Yes	1	1.7%	1	1.9%	3	5.9%	4	7.5%	9	4.1%
Tsunami	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other	Yes	1	1.7%	1	1.9%	1	2.0%	0	0.0%	3	1.4%
No events have affected me	Yes	14	23.7%	18	33.3%	5	9.8%	5	9.4%	42	19.4%
Other please specify											
Winds		0	0.0%	0	0.0%	1	2.0%	0	0.0%	1	0.5%
Falling trees		0	0.0%	1	1.8%	0	0.0%	0	0.0%	1	0.5%
Drought		1	1.7%	0	0.0%	0	0.0%	0	0.0%	1	0.5%
Vibration from aircraft		0	0.0%	1	1.8%	0	0.0%	0	0.0%	1	0.5%

5.3 The extent to which respondents were affected by various events

Overall, respondents reported to be to be most affected by flooding, thunderstorms and windstorms, choosing rankings of between 1 and 3 to represent the impacts of past events (Table 10). A ranking in this range still represents only a 'slight impact' however rather than a 'severe impact' as the rankings fall very low in terms of the overall spectrum. When compared with a previous survey of Grafton, Maitland, Narrabri and Albury (which showed moderate ratings of between 4 and 5), Western Sydney respondents appear to have been far less affected by events (Becker et al., 2007).

A low standard deviation (i.e. closer to '0') suggests that respondents tend to agree on the effect that past events have had on them. In terms of flooding Penrith has the lowest

standard deviation (1.87) showing that residents there agree most about the level of impact of flooding. Richmond residents (with a standard deviation of 3.32) show the least agreement about the extent that flooding has had on them.

Table 10 The extent that respondents were affected by different events, considering property damage, injuries and financial impact (1=Little impact, 10=Severe impact)

	Location														
	Penrith			McGraths Hill			Windsor			Richmond			All respondents		
	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N
Extent affected by Flood	1.03	1.87	58	1.75	2.50	55	2.54	3.16	48	2.42	3.32	53	1.90	2.79	214
Extent affected by Thunderstorm with high winds and/or hail	1.83	2.19	59	2.18	2.60	55	2.63	2.94	48	3.94	3.40	53	2.62	2.89	215
Extent affected by Windstorm	.78	1.52	59	.89	2.02	55	.94	2.06	48	2.11	3.26	53	1.17	2.33	215
Extent affected by Bushfire	.83	1.86	59	.56	1.62	55	.77	1.92	48	1.40	2.61	53	.89	2.04	215
Extent affected by Earthquake	.03	.18	59	.00	.00	55	.35	1.38	48	.42	1.54	53	.19	1.02	215
Extent affected by Tsunami	.02	.13	59	.00	.00	55	.02	.14	48	.11	.32	53	.04	.19	215
Extent affected by Other	.29	1.58	59	.29	1.56	55	.02	.14	48	.02	.14	53	.16	1.15	215

5.4 When respondents thought certain disasters were next likely to affect their community

The combined respondents from all four communities felt that within the next year a thunderstorm with high winds/hail (60%) or a windstorm (39%) would be most likely to affect their town (Table 11). When looking at a five year time scale, respondents indicated that the flooding (42%) or bushfire (40%) would be most likely to occur within that time frame. A substantial percentage of respondents thought that they would never experience an earthquake (54%) or a tsunami (91%).

When looking at flooding specifically, the majority of Windsor and Richmond residents (over 50%) felt that flooding was most likely to occur within the time period of the next five years. McGraths Hill was more likely to believe that flooding would occur in the next 20 years (54%) and Penrith was split between the two (just over 30% each way).

These survey results are consistent with questionnaires undertaken in other communities where the greatest proportion of respondents believe that a flood will not occur immediately, but will occur in the near future, possibly sometime in the next ten to twenty years (e.g. Johnston et al., 2002; Becker et al., 2007).

Table 11 When respondents thought they were next likely to be affected by certain events

Next likely to be affected by...		Location									
		Penrith		McGraths Hill		Windsor		Richmond		Total	
		Column Valid N %	N								
Flood	Within the next year	5.4%	3	1.9%	1	11.4%	5	3.8%	2	5.3%	11
	Within the next 5 years	30.4%	17	37.0%	20	52.2%	23	50.0%	26	41.7%	86
	Within the next 20 years	32.1%	18	53.6%	29	25.0%	11	38.6%	20	37.9%	78
	Within the next 50 years	14.2%	8	3.7%	2	6.8%	3	1.9%	1	6.8%	14
	In over 50 years	10.7%	6	1.9%	1	2.3%	1	3.8%	2	4.9%	10
	Never	7.2%	4	1.9%	1	2.3%	1	1.9%	1	3.4%	7
	Total	100.0%	56	100.0%	54	100.0%	44	100.0%	52	100.0%	206
Thunder - storm with high winds and/or hail	Within the next year	54.7%	29	51.9%	27	68.3%	28	68.0%	34	60.2%	118
	Within the next 5 years	35.8%	19	36.6%	19	29.3%	12	28.0%	14	32.7%	64
	Within the next 20 years	5.7%	3	11.5%	6	2.4%	1	2.0%	1	5.6%	11
	Within the next 50 years	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
	In over 50 years	1.9%	1	0.0%	0	0.0%	0	2.0%	1	1.0%	2
	Never	1.9%	1	0.0%	0	0.0%	0	0.0%	0	0.5%	1
	Total	100.0%	53	100.0%	52	100.0%	41	100.0%	50	100.0%	196
Wind-storm	Within the next year	28.6%	14	43.5%	20	41.2%	14	44.9%	22	39.3%	70
	Within the next 5 years	40.8%	20	26.1%	12	41.2%	14	30.7%	15	34.3%	61
	Within the next 20 years	10.2%	5	15.2%	7	5.9%	2	18.4%	9	12.9%	23
	Within the next 50 years	4.1%	2	2.2%	1	5.9%	2	2.0%	1	3.4%	6
	In over 50 years	2.0%	1	2.2%	1	0.0%	0	2.0%	1	1.7%	3
	Never	14.3%	7	10.8%	5	5.8%	2	2.0%	1	8.4%	15
	Total	100.0%	49	100.0%	46	100.0%	34	100.0%	49	100.0%	178
Bushfire	Within the next year	5.9%	3	10.9%	5	22.2%	8	33.3%	15	17.4%	31
	Within the next 5 years	52.9%	27	28.3%	13	33.3%	12	44.5%	20	40.4%	72
	Within the next 20 years	11.8%	6	19.6%	9	11.1%	4	4.4%	2	11.8%	21
	Within the next 50 years	3.9%	2	2.1%	1	5.6%	2	0.0%	0	2.8%	5
	In over 50 years	3.9%	2	2.1%	1	0.0%	0	4.4%	2	2.8%	5
	Never	21.6%	11	37.0%	17	27.8%	10	13.4%	6	24.8%	44
	Total	100.0%	51	100.0%	46	100.0%	36	100.0%	45	100.0%	178
Earth-quake	Within the next year	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
	Within the next 5 years	2.2%	1	2.2%	1	2.9%	1	8.7%	4	4.1%	7
	Within the next 20 years	17.8%	8	11.1%	5	5.9%	2	10.9%	5	11.8%	20
	Within the next 50 years	13.3%	6	8.9%	4	11.8%	4	17.4%	8	12.9%	22
	In over 50 years	15.6%	7	8.9%	4	17.6%	6	26.1%	12	17.1%	29
	Never	51.1%	23	68.9%	31	61.8%	21	36.9%	17	54.1%	92
	Total	100.0%	45	100.0%	45	100.0%	34	100.0%	46	100.0%	170
Tsunami	Within the next year	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
	Within the next 5 years	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
	Within the next 20 years	0.0%	0	0.0%	0	3.0%	1	2.2%	1	1.2%	2
	Within the next 50 years	6.8%	3	0.0%	0	3.0%	1	6.7%	3	4.2%	7
	In over 50 years	0.0%	0	6.8%	3	6.1%	2	2.2%	1	3.6%	6
	Never	93.2%	41	93.2%	41	87.9%	29	88.9%	40	91.0%	151
	Total	100.0%	44	100.0%	44	100.0%	33	100.0%	45	100.0%	166

5.5 The last time a respondent's community was flooded

The majority of respondents from Penrith (37%) indicated that their community was flooded in the last 50 years (Table 12). McGraths Hill respondents were more divided but the largest number of people who answered this question felt that flooding had occurred in the last 20 years (44%). The greatest percentage of Windsor residents said that their community had been flooded in the last year 20 years also (48%) and the same for Richmond (45%).

Richmond residents were more likely to not know when their community had last been flooded (21%) followed by Penrith (19%). Over 10% of respondents from Penrith said their community had never been flooded.

From the figures, it appears that respondents from the communities surveyed have an accurate knowledge of past flood events. Records indicate that while minor flooding has occurred in the past 20 years, the last major floods in the Hawkesbury-Nepean Valley were in 1990, nearly 20 years ago (Gillespie et al., 2002; NSW State Disaster Plan, 2005). Penrith residents were more likely to indicate that their community was flooded in the last 50 years (rather than 20), despite the last major floods occurring at South Creek in 1988 (Penrith City Council, Interim Policy for Development of Flood Liable Land, date unknown). Major floods also occurred at Rope Creek in 1967 and South Creek in 1956, and might be the floods that respondents are recalling instead; or the choices that respondents made in the questionnaire might be influenced by their interpretation of 'your community'.

Table 12 The last time residents thought their communities were flooded

Last time community was flooded	Location									
	Penrith		McGraths Hill		Windsor		Richmond		Total	
	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Never	6	10.2%	1	1.9%	0	0.0%	0	0.0%	7	3.3%
In the last year	8	13.6%	0	0.0%	1	2.2%	0	0.0%	9	4.2%
In the last 2 years	3	5.1%	0	0.0%	0	0.0%	1	1.9%	4	1.9%
In the last 20 years	14	23.7%	24	44.4%	22	47.8%	24	45.3%	84	39.6%
In the last 50 years	15	37.3%	22	40.7%	15	32.6%	16	30.2%	68	32.1%
More than 50 years ago	2	1.7%	1	1.9%	3	6.5%	1	1.9%	7	3.3%
Don't know	11	18.6%	6	11.1%	5	10.9%	11	20.7%	33	15.6%

5.6 The last time a respondent's house was flooded

The majority of respondents located in Penrith (78%), McGraths Hill (47%), Windsor (63%) and Richmond (59%) indicated that they thought that the house where they lived had never been flooded (Table 13). Most of those that did think the house had been flooded thought it had happened at least 20 years ago or longer, except for some Penrith residents who thought there had been flooding through their house in the last 1-2 years. Between 12 and 36% of respondents from all towns did not know if their house had been flooded or not. McGraths Hill residents were the most likely respondents to indicate that they did not know (36%).

The high percentage of McGraths Hill respondents that thought their house hadn't been flooded or didn't know, could be because while McGraths Hill is part of an old settlement much of the area has been developed quite recently with new subdivisions and housing. Thus the residents may be relatively new and unaware of the flood history. This is reflected in the statistics for length of time spent living in the community and home (Section 4.2).

Table 13 The last time that residents thought their house where they live was flooded

Last time house where you live was flooded	Location									
	Penrith		McGraths Hill		Windsor		Richmond		Total	
	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Never	46	78.0%	26	47.3%	30	62.5%	31	58.5%	133	61.9%
In the last year	3	5.1%	0	.0%	0	.0%	0	0.0%	3	1.4%
In the last 2 years	0	.0%	0	.0%	0	.0%	0	0.0%	0	0.0%
In the last 20 years	1	1.7%	4	7.3%	3	6.3%	2	3.8%	10	4.7%
In the last 50 years	1	1.7%	4	7.3%	6	12.5%	7	13.2%	18	8.4%
More than 50 years ago	1	1.7%	1	1.8%	0	.0%	1	1.9%	3	1.4%
Don't know	7	11.9%	20	36.4%	9	18.8%	12	22.6%	48	22.3%

6.0 PREPAREDNESS FOR FLOODING

6.1 Current Preparations

Respondents were asked about which items they had already collected, or what actions they had already undertaken to prepare for flooding (Table 14). Items that were identified as already collected by residents across the four communities included spare batteries (68%), rubber gloves (50%), Waterproof bag (46%), first aid kit (45%) and torch (36%). The actions least likely to be carried out included talking to family members about what to do, preparing an emergency kit, and preparing a home flood plan (all less than 9%).

In general Windsor residents were more likely to have collected items for preparedness (e.g. torch, batteries, etc) than residents from the other towns surveyed.

Such figures are consistent with finding from other surveys about preparedness, where respondents will often have collected regular house household items, but are less likely to have undertaken more complex tasks (e.g. Johnston et al., 2002, Leonard et al., 2004).

Compared with a previous survey of the preparedness of four 'provincial' towns in Australia (Becker et al., 2007), residents from the more urban Hawkesbury-Nepean Valley were less likely to talk with their family members about what to do with regard to preparing for floods. Only 2% of respondents from the Hawkesbury-Nepean Valley said they had done this compared with 17% of people from provincial towns. In fact overall, residents from the provincial towns appear to have stockpiled more items and made more plans in general than their urban counterparts (Becker et al., 2007).

Interviews of residents in Windsor and Richmond completed by Colmar Brunton Social Research (1999) suggest much higher figures of preparedness. In their research, up to 83% of interviewees stated that they had an emergency plan/disaster plan for their household; up to 94% of respondents said that they had an emergency disaster kit; and up to 67% indicated that they had already organised how to meet/communicate with other family members in an emergency. Our more recent results do not appear to concur with the results found in the 1999 study.

Table 14 Which of the following have you or your family done to prepare for an emergency?

	Location				
	Penrith	McGraths Hill	Windsor	Richmond	Total
	Column Valid N %				
Made sure I/we have a portable radio	42.1%	33.3%	29.8%	25.5%	33.0%
Picked an emergency contact person outside of the district	12.3%	16.7%	31.9%	21.6%	20.1%
Arranged for someone in family to learn first aid	5.3%	24.1%	12.8%	15.7%	14.4%
Found out if we are in a vulnerable area	12.3%	22.2%	23.4%	21.6%	19.6%
Had home inspected for preparedness	22.8%	35.2%	38.3%	43.1%	34.4%
Talked to family members about what to do	.0%	1.9%	2.1%	3.9%	1.9%
Thought about how to lift precious items off the ground	3.5%	16.7%	17.0%	13.7%	12.4%
Considered how to access the roof	12.3%	31.5%	29.8%	19.6%	23.0%
Considered access to essential items	10.5%	18.5%	23.4%	21.6%	18.2%
Prepared a home flood plan	1.8%	13.0%	8.5%	11.8%	8.6%
Prepared an emergency kit	.0%	5.6%	6.4%	3.9%	3.8%
Made sure I/we have a torch	15.8%	35.2%	53.2%	45.1%	36.4%
Other (specify)	.0%	7.4%	10.6%	11.8%	7.2%
I/we have done nothing	.0%	1.9%	.0%	.0%	.5%
Made sure I/we have spare batteries	56.1%	63.0%	85.1%	68.6%	67.5%
Made sure I/we have a first aid kit	35.1%	46.3%	57.4%	41.2%	44.5%
Made sure I/we have rubber gloves	33.3%	53.7%	55.3%	60.8%	50.2%
Made sure I/we have candles and waterproof matches	21.1%	29.6%	38.3%	29.4%	29.2%
Made sure I/we have a waterproof bag for valuables	33.3%	48.1%	55.3%	51.0%	46.4%
Made a list of emergency contact numbers	5.3%	16.7%	25.5%	25.5%	17.7%
Stockpiled water and food for three days	14.0%	25.9%	34.0%	25.5%	24.4%

6.2 Respondents' beliefs about preparing for flooding

Between 55-65% of respondents from all the Hawkesbury-Nepean Valley communities thought that it was necessary to make preparations for floods (Table 15). This is about 10% less than in the previous survey of respondents from Grafton, Narrabri and Maitland. Albury fell below this figure at 48% (Becker et al., 2007).

Table 15 Respondents' beliefs about preparing for flooding

Do you believe it is necessary to make preparations for floods?	Location									
	Penrith		McGraths Hill		Windsor		Richmond		Total	
	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Yes	32	55.2%	35	63.6%	31	64.6%	32	61.5%	130	61.0%
Not sure	20	34.5%	16	29.1%	10	20.8%	9	17.3%	55	25.8%
No	6	10.3%	4	7.3%	7	14.6%	11	21.2%	28	13.2%
Total	58	100.0%	55	100.0%	48	100.0%	52	100.0%	213	100.0%

Respondents were asked to give a reason as to why they did not think preparation was necessary. Respondents stated that they did not think it was necessary to prepare because they did not believe they were in a flood risk area, or they hadn't been affected by a flood in the past so would not be in the future.

Of those that thought that you should prepare for floods (i.e. answered 'Yes'), around 60% from Penrith and Windsor and Richmond lived in areas considered more likely to flood, while only 19% of Richmond people lived in highly floodable areas. All (100%) residents from McGraths Hill that answered "Yes" lived in 'floodable' areas (Table 16).

In Penrith and McGraths Hill all of those that did not think preparing for flooding was necessary, live in areas which were likely to flood. In Windsor and Richmond there was a split, with some people who didn't think preparation was important living in areas likely to flood, and some not.

Table 16 Respondents' belief about whether it is necessary to make preparations for floods versus whether they are living in a floodable area

			Is the area floodable or less likely/unlikely to flood?					
			Likely to flood		Less or unlikely to flood		Total	
			Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %
Penrith	Do you believe it is necessary to make preparations for floods?	Yes	19	59.4%	13	40.6%	32	100.0%
		No	6	100.0%	0	.0%	6	100.0%
McGraths Hill	Do you believe it is necessary to make preparations for floods?	Yes	34	100.0%	0	.0%	34	100.0%
		No	4	100.0%	0	.0%	4	100.0%
Windsor	Do you believe it is necessary to make preparations for floods?	Yes	19	61.3%	12	38.7%	31	100.0%
		No	4	57.1%	3	42.9%	7	100.0%
Richmond	Do you believe it is necessary to make preparations for floods?	Yes	6	18.8%	26	81.3%	32	100.0%
		No	0	.0%	11	100.0%	11	100.0%
Total	Do you believe it is necessary to make preparations for floods?	Yes	78	60.5%	51	39.5%	129	100.0%
		No	14	50.0%	14	50.0%	28	100.0%

6.3 Respondents' concern about floods

Thinking and talking about flooding is part of what is known as 'critical awareness' and plays an important part of forming an individual's intention to prepare for hazards. All of the communities surveyed here fall somewhere in the middle of the scale with respect to thinking and talking about hazards (Table 17).

All of the communities also fall just under the centre of the scale with respect to finding information on flooding.

All of the communities are low on the scale with respect to thinking floods pose a threat to personal safety - lower than the four communities previously surveyed in NSW (Becker et al., 2006). They are more concerned about floods posing a threat to property, but even so only moderately.

In a Colmar Brunton Social Research study in 1999 interviewees from Richmond and Windsor were asked to rate their concern of risk to life from a serious flood from 1 to 10 (where 1 was extremely unconcerned and 10 was extremely concerned). In response to this, residents from Windsor gave an average rating of 6.9 and residents from Richmond a rating of 5.7.

While the 1999 study and this survey are not directly comparable some attempt can be made to see how the Colmar Brunton ratings correlate with the survey category "I think a flood could pose a threat to my personal safety". If the Colmar Brunton figures are divided by two (to match the 5 point scale), it is evident that respondents from Richmond and Windsor in the prior study tended to be more concerned about risk to life from a serious flood. No real conclusions can be drawn from this information however (i.e. we cannot definitely say residents have become less concerned over the years), because as mentioned previously, the two studies cannot be directly compared.

Table 17 How concerned respondents are about floods (1=Not at all, 5=A great deal)

	Location									
	Penrith		McGraths Hill		Windsor		Richmond		Total	
	Mean	Valid N	Mean	Valid N	Mean	Valid N	Mean	Valid N	Mean	Valid N
I think about floods	2.25	59	2.86	55	2.38	48	2.51	53	2.40	215
I talk about floods	1.80	59	2.27	55	2.15	48	2.28	53	2.12	215
I get information on floods	1.42	59	1.85	55	1.71	48	1.53	53	1.62	215
I think a flood could pose a threat to my personal safety	2.14	59	2.05	55	1.69	48	1.94	53	1.97	215
I think a flood could pose a threat to my property	2.86	59	2.78	55	2.17	48	2.30	53	2.60	215

6.4 Intention to seek information and become involved with a local group

Only very low percentage of respondents from Richmond and Penrith (less than 8%) suggested that they were definitely going to seek information on flood risk, seek information on preparing for floods or become involved with a local flooding-focussed group in the next month or so (Table 18).

The majority of respondents did not have any intentions to undertake any of the activities asked about. Between 60 and 73% of respondents from all towns indicated that they were not going to seek information on flood risk or seek information on preparing for floods in the next month or so. Over 79% of respondents from all towns also said that they were not going to become involved with a local group to discuss flood risk.

McGraths Hill residents seemed slightly more likely to intend to seek information than the other communities surveyed.

Table 18 In the next month or so do you intend to: (a) seek information about flood risk (b) seek information on things to do to prepare for a possible flood (c) become involved with a local group to discuss how to reduce flood risk to your community?

		Location									
		Penrith		McGraths Hill		Windsor		Richmond		Total	
		Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Seek information on flood risk to your community	No	38	67.9%	36	65.5%	32	72.7%	34	66.7%	140	68.0%
	Possibly	17	30.4%	11	20.0%	8	18.2%	16	31.4%	52	25.2%
	Definitely	1	1.7%	8	14.5%	4	9.1%	1	1.9%	14	6.8%
	Total	56	100.0%	55	100.0%	44	100.0%	41	100.0%	206	100.0%
Seek information on things to do to prepare for a possible flood	No	38	70.4%	33	60.0%	29	69.0%	32	62.7%	132	65.3%
	Possibly	12	22.2%	15	27.3%	10	23.8%	15	29.4%	52	25.7%
	Definitely	4	7.4%	7	12.7%	3	7.2%	4	7.9%	18	9.0%
	Total	54	100.0%	55	100.0%	42	100.0%	51	100.0%	202	100.0%
Become involved with a local group to discuss how to reduce flood risk	No	48	90.6%	45	83.3%	34	79.1%	40	80.0%	167	83.5%
	Possibly	5	9.4%	7	13.0%	9	20.9%	9	18.0%	30	15.0%
	Definitely	0	0.0%	2	3.7%	0	0.0%	1	2.0%	3	1.5%
	Total	53	100.0%	54	100.0%	43	100.0%	50	100.0%	200	100.0%

6.5 Flood protection provided by a levee

Very few residents from all of the communities surveyed indicated that they thought that their communities were protected by a levee (Table 19). Between 52% and 65% of respondents from Penrith, Windsor and Richmond stated that they thought their community did not have protection from a levee, and 38% from McGraths Hill stated the same. While pockets of mitigation works have been undertaken, no extensive levee system exists for the communities we surveyed along the Hawkesbury-Nepean river system.

McGraths Hill respondents were predominantly unsure (55%) of whether they had a levee for flood protection. Around a third of respondents from the other communities were also unsure whether levees existed.

Of those that thought they had levees, when asked whether the levees provided protection from small or big floods, respondents from all locations were most likely to not know what the level of protection was (65%).

Table 19 Does your community have flood protection provided by a levee, and if “Yes”, what level of protection do you think is provided?

		Location									
		Penrith		McGraths Hill		Windsor		Richmond		Total	
		Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Does your community have flood protection provided by a levee?	Yes	1	1.8%	4	7.3%	5	10.4%	3	5.8%	13	6.1%
	Not sure	19	33.3%	30	54.5%	18	37.5%	16	30.8%	83	39.2%
	No	37	64.9%	21	38.2%	25	52.1%	33	63.5%	116	54.7%
	Total	57	100.0%	55	100.0%	48	100.0%	52	100.0%	212	100.0%
If "Yes", what level of protection do you think is provided?	Protection against small floods	1	14.3%	1	9.1%	0	.0%	1	10.0%	3	8.1%
	Protection against big floods	1	14.3%	2	18.2%	2	22.2%	0	.0%	5	13.5%
	Protection against all floods	0	.0%	1	9.1%	1	11.1%	3	30.0%	5	13.5%
	Don't know	5	71.4%	7	63.6%	6	66.7%	6	60.0%	24	64.9%
	Total	7	100.0%	11	100.0%	9	100.0%	10	100.0%	37	100.0%

6.6 Flood insurance

Respondents were asked whether they were insured against flood damage. Around a third of residents from all the towns combined thought, incorrectly, that they were insured (flood insurance is not available in Australia), with a further 33% unsure as to whether they were insured or not (Table 20). These figures are similar to those found in a previous survey of four provincial New South Wales towns by Becker et al., (2006). These statistics are a concern as if a third of residents think they are covered by insurance, they may be less likely to take preventative action for flooding.

Windsor was the town that had the most accurate perception about insurance with 42% of respondents reporting that they were not covered by flood insurance. In contrast, at the other end of the scale only 28% of residents from McGraths Hill indicated that they were not covered by flood insurance with 72% either unsure or claiming that they were covered.

Table 20 Are you insured against floods?

	Location									
	Penrith		McGraths Hill		Windsor		Richmond		Total	
	Column Valid N %	Count								
Yes	33.3%	18	37.7%	20	30.2%	13	24.0%	12	31.5%	63
Not sure	33.3%	18	34.0%	18	27.9%	12	36.0%	18	33.0%	66
No	33.3%	18	28.3%	15	41.9%	18	40.0%	20	35.5%	71

7.0 FLOOD WARNINGS

7.1 Elements making up the public flood warning system

Respondents were asked to indicate what they recalled about the public flood warning system for their community. People were allowed to tick more than one option (i.e. warning element) for this question, so the results are made up of multiple responses (Table 21).

Penrith residents were the most likely to indicate that they did not know what the warning system was for their community (53%). Approximately a half of McGraths Hill residents, 33% of Windsor residents and 32% of people from Richmond did not know what the warning system was in their communities.

By far the largest type of warning indicated by survey respondents as making up their community's warning system was radio and TV announcements. Between 46% and 64% of residents in McGraths Hill, Windsor and Richmond indicated that this form of warning was part of the community warning system. Lesser numbers of respondents from Penrith (25%) indicated that radio and TV formed part of the community warning system.

Door knocking was the second form of warning most often indicated by survey respondents. Around 37% of residents in McGraths Hill and 29% of residents in Windsor indicated that door-knocking formed part of their community's warning system. In Richmond and Penrith however, door-knocking was not considered by as many people (under 19%) to be a part of their warning system.

Other methods of warning were indicated only in low numbers as parts of a community's warning system – generally around 10% or under. Richmond showed a preference for using the internet as part of a flood warning system (17%).

A significant number of respondents from McGraths Hill indicated that they thought there was no warning system (56%). Other communities indicated this in much lesser percentages – Penrith (20%), Windsor (6%) and Richmond (9%). These percentages are much higher than the comparative survey undertaken in other NSW communities in November 2005 (Becker et al., 2007).

McGraths Hill residents may be less aware of any type of warning available, as this area has undergone much more recent development, and as a result residents have not lived in the area as long. In contrast places such as Windsor and Richmond are more established, and have had a longer history of dealing with flood issues.

For comparison, a Colmar Brunton survey (1999) asked whether residents were aware of the warning signal they would get if an evacuation was required. Just under a third (31%) of respondents from Windsor and only 22% of respondents from Richmond, said that they were aware of the signal.

Table 21 Respondents views of elements that make up the different community's public flood warning systems

	Location				
	Penrith	McGraths Hill	Windsor	Richmond	Total
	Column Valid N %				
Don't know	52.5%	48.1%	33.3%	32.1%	41.9%
Sirens	1.7%	1.9%	5.9%	1.9%	2.8%
Mobile public address systems	1.7%	0.0%	9.8%	5.7%	4.1%
Flashing lights	5.1%	3.7%	5.9%	5.7%	5.1%
Radio and TV announcements	25.4%	46.3%	56.9%	64.2%	47.5%
Information on the internet	3.4%	9.3%	2.0%	17.0%	7.8%
Door-knocking	16.9%	37.0%	29.4%	18.9%	25.3%
There is no warning system	20.3%	55.6%	5.9%	9.4%	10.6%
Other	0.0%	1.9%	7.8%	0.0%	2.3%

7.2 What respondents would do on hearing a flood warning

Respondents were asked to tick more than one option to indicate what they actions they would follow on hearing a flood warning (Table 22). The largest percentage of respondents from all towns suggested that if they heard a flood warning they would contact the local council (66-80%) or contact SES (51-62%).

Survey respondents from Richmond were most likely to contact State Emergency Service (SES) (62%). About a third of residents in all communities said they would contact their neighbours. About a third would also listen to the radio, with McGraths Hill residents being most likely to do this (41%).

In general, residents from the Hawkesbury-Nepean Valley seemed more "SES aware" than those surveyed in the provincial towns of Grafton, Albury, Narrabri and Maitland (Becker et al., 2006), with a high proportion of residents claiming that they would make contact with SES if they heard a flood warning. The provincial towns, however, were more likely to show self-reliance with a tendency to rely on their own community networks or local radio/TV to get warning information.

Respondents for the Hawkesbury-Nepean survey indicated a higher overall level of evacuation compliance than those asked the same question in the provincial towns (Becker et al., 2006). McGraths Hill respondents indicated they would be most likely to evacuate at once (54%).

Table 22 On hearing a flood warning what would respondents do?

	Location				
	Penrith	McGraths Hill	Windsor	Richmond	Total
	Column Valid N %				
Don't know	10.2%	5.6%	2.0%	1.9%	5.1%
Contact your neighbours	27.1%	33.3%	23.5%	28.3%	28.1%
Contact the local council	66.1%	79.6%	80.4%	75.5%	75.1%
Contact SES	50.8%	55.6%	56.9%	62.3%	56.2%
Contact another emergency service	20.3%	5.6%	5.9%	1.9%	8.8%
Check the internet	11.9%	24.1%	21.6%	20.8%	19.4%
Other (specify)	13.6%	14.8%	13.7%	15.1%	14.3%
Meet at a designated evacuation centre or assembly point	13.6%	14.8%	21.6%	15.1%	16.1%
Stay inside and wait to be told what to do	20.33%	20.4%	31.4%	32.1%	25.8%
Listen to the radio	30.5%	40.7%	29.4%	28.3%	32.3%
Listen to the TV	3.4%	13.0%	17.6%	20.8%	13.4%
Evacuate at once	35.6%	53.7%	43.1%	39.6%	42.9%
Evacuate at a later stage	10.2%	9.3%	3.9%	3.8%	6.9%
Stay at home	10.2%	27.8%	15.7%	13.2%	16.6%
Go and check the river	6.8%	5.6%	3.9%	9.4%	6.5%

7.3 The number that respondents would call for help in a flood

Overall, the responses to the question “What number would you call for help in a flood?” were fairly evenly spread (Table 23). Respondents from all towns tended either to not know what number they would call (33%) or to prefer to call ‘000’ (37%). Respondents from Richmond had the highest proportion of ‘don’t know’ responses (37%).

The SES number (132 500) was cited by only 8% of the total respondents as the number they would call for help in a flood. This figure is lower than for the other NSW communities surveyed in 2005 (Becker et al., 2007) where 15% of respondents knew the number to call. This may possibly be related to the fact that the number is pushed more heavily in provincial areas in the media (e.g. Prime TV).

The local council was also a place that Hawkesbury-Nepean Valley respondents thought they might call for help with flooding with between 8 and 23% of respondents indicating that they could call the council.

Table 23 What number would you call for help in a flood?

What number would you call for help in a flood?	Location									
	Penrith		McGraths Hill		Windsor		Richmond		Total	
	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Don't know	20	36.3%	15	30.6%	13	27.7%	17	37.0%	65	33.0%
000	22	40.0%	23	46.9%	15	31.9%	13	28.2%	73	37.1%
1800 201 000	0	0.0%	1	2.0%	1	2.1%	1	2.2%	3	1.5%
132 500	3	5.5%	4	8.2%	5	10.6%	4	8.7%	16	8.1%
131 700	0	0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Local council	6	10.9%	4	8.2%	11	23.4%	8	17.4%	29	14.7%
Other	4	7.3%	2	4.1%	2	4.3%	3	6.5%	11	5.6%
Total	55	100.0%	49	100.0%	47	100.0%	46	100.0%	197	100.0%

7.4 The organisation respondents would contact for road information in a flood

The SES, RTA and Police were all most popular organisations cited by respondents as places that they would contact for road information in a flood (Table 24). Around half of respondents from all the towns combined indicated they would contact these organisations for information. Windsor had the highest percentage of respondents who indicated that they would make contact with the SES (63%) followed by Richmond (55%) and Penrith (49%). Predicted contact with the SES was lowest in McGraths Hill (41%).

Table 24 Who would you contact for road information in a flood?

	Location									
	Penrith		McGraths Hill		Windsor		Richmond		Total	
	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Don't know	6	10.2%	6	11.1%	6	11.8%	8	15.1%	26	12.0%
Local council	12	20.3%	7	13.0%	13	25.5%	11	20.8%	43	19.8%
SES	29	49.2%	22	40.7%	32	62.7%	29	54.7%	112	51.6%
RTA	25	42.4%	23	42.6%	24	47.1%	24	45.3%	96	44.2%
Police	28	47.5%	24	44.4%	24	47.1%	28	52.8%	104	47.9%
Fire Authority	1	1.7%	1	1.9%	2	3.9%	1	1.9%	5	2.3%
Neighbour	3	5.1%	7	13.0%	5	8.2%	3	5.7%	18	8.3%
Other (specify)	3	5.1%	5	9.3%	2	3.9%	4	7.5%	14	6.5%

7.5 Evacuation during a flood

Respondents were asked what action they would take if they were told to evacuate their property during a flood (Table 25). For the option "Go immediately when told", compliance was indicated as being the highest in Penrith (82%), and slightly less in McGraths Hill, Windsor and Richmond (all just over 65%). However, even the lowest "Go immediately" evacuation figures for the Hawkesbury-Nepean survey are comparable or higher than the figures collected from the November 2005 NSW survey (Becker et al., 2007), meaning that

residents from the Hawkesbury-Nepean Valley are more likely to comply with evacuation requests.

Less than 2% of respondents from the Hawkesbury-Nepean Valley indicated that they would “Do nothing”.

Table 25 If you were told to evacuate your property during a flood, would you...?

	Location									
	Penrith		McGraths Hill		Windsor		Richmond		Total	
	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Do nothing - stay put	1	1.8%	1	1.8%	0	0.0%	0	0.0%	2	1.0%
Wait until the water reaches my house and then decide	1	1.8%	3	5.6%	2	4.3%	3	6.0%	9	4.4%
Evacuate everyone immediately when told	44	81.6%	36	66.7%	30	65.3%	34	68.0%	144	70.6%
Evacuate most of household immediately, but leave someone	3	5.6%	1	1.8%	5	10.9%	7	14.0%	16	7.8%
Wait for 'door-knock'	3	5.6%	9	16.7%	4	8.7%	3	6.0%	19	9.3%
Use the phone to call for help to evacuate	1	1.8%	0	0.0%	1	2.2%	2	4.0%	4	2.0%
Don't know	1	1.8%	1	1.8%	2	4.3%	0	0.0%	4	2.0%
Other	0	%	3	5.6%	2	4.3%	1	2.0%	6	2.9%

7.6 Flooded areas of road – what respondents would do when encountering this situation

Respondents were asked two questions about what they would do when encountering stretches of road which had been flooded. First, they were asked if they came across a flooded area of road without a ‘road closed’ sign what would they do? Between 48% and 58% of respondents from all the towns reported that they would turn back, with Windsor respondents indicating the highest level of undertaking this action at 58% (Table 26). In contrast to this figure, 20-26% reported that would continue on with care (Richmond having the highest percentage at 26% and Penrith the lowest at 20%) and 5% or less would wait for assistance.

A second question asked respondents that if they came across a flooded section of road with a ‘road closed’ sign what would they do? A very high percentage (over 90%) of residents from all communities in the Hawkesbury-Nepean Valley said that they would go back.

The figures reported for this survey with respect to entering floodwater, are very similar to the percentages found in the surveys of Maitland, Albury, Grafton and Narrabri (Becker et al., 2007). The Colmar Brunton (1999) interviews, however, found that slightly higher proportions of respondents thought it was safe to walk or drive through six inches of flood water (43% for Richmond and 50% for Windsor).

Of the nearly 50 respondents who said they would continue on, males were only slightly more likely to continue (25%) than females (20%) (Table 27). There appeared to be no real trend for driving through flooding with respect to age with around 25% of people aged 25-64 years old admitting that they might do this (Table 28).

Table 26 Flooded areas of road – what respondents would do when encountering this situation

		Location									
		Penrith		McGraths Hill		Windsor		Richmond		Total	
		Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Flooded area of road not marked with a 'road closed' sign - would you:	Continue on with care	11	20.0%	13	23.6%	12	25.5%	12	26.1%	48	23.6%
	Go back	31	56.3%	31	56.5%	27	57.5%	22	47.8%	111	54.8%
	Wait for assistance	3	5.5%	2	3.6%	2	4.3%	1	2.2%	8	3.9%
	Don't know	4	7.3%	1	1.8%	1	2.1%	1	2.2%	7	3.4%
	Other (specify)	6	10.9%	8	14.5%	5	10.6%	10	21.7%	29	14.3%
	Total	55	100.0%	55	100.0%	47	100.0%	46	100.0%	203	100.0%
If there was a 'road closed' sign, would you:	Continue on with care	0	0.0%	1	1.8%	1	2.1%	0	0.0%	2	1.0%
	Go back	54	94.7%	52	94.6%	44	93.6%	50	96.2%	200	94.8%
	Wait for assistance	3	5.3%	1	1.8%	0	0.0%	0	0.0%	4	1.9%
	Don't know	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Other	0	0.0%	1	1.8%	2	4.3%	2	3.8%	5	2.3%
	Total	57	100.0%	55	100.0%	47	100.0%	52	100.0%	211	100.0%

Table 27 Flooded areas of road – what respondents would do when encountering this situation (breakdown by gender)

		Gender					
		Male		Female		Total	
		Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Flooded area of road not marked with a 'road closed' sign - would you:	Continue on with care	22	25.6%	23	20.4%	45	22.6%
	Go back	34	39.5%	66	58.4%	100	50.3%
	Wait for assistance	4	4.7%	4	3.5%	8	4.0%
	Don't know	5	5.8%	2	1.8%	7	3.5%
	Other (specify)	21	24.4%	18	15.9%	39	19.6%
	Total	86	100.0%	113	100.0%	199	100.0%
If there was a 'road closed' sign, would you:	Continue on with care	1	1.2%	1	.9%	2	1.0%
	Go back	79	91.9%	107	95.5%	186	93.9%
	Wait for assistance	2	2.3%	2	1.8%	4	2.0%
	Don't know	0	.0%	0	.0%	0	.0%
	Other (specify)	4	4.7%	2	1.8%	6	3.0%
	Total	86	100.0%	112	100.0%	198	100.0%

Table 28 Flooded areas of road – what respondents would do when encountering this situation (breakdown by age)

		Age									
		18-24 years		25-44 years		45-64 years		65 years and over		Total	
		Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
Flooded area of road not marked with a 'road closed' sign - would you:	Continue on with care	0	.0%	19	26.4%	22	25.9%	6	18.8%	47	24.1%
	Go back	5	83.3%	34	47.2%	45	52.9%	20	62.5%	104	53.3%
	Wait for assistance	0	.0%	0	.0%	5	5.9%	2	6.3%	7	3.6%
	Don't know	0	.0%	3	4.2%	3	3.5%	1	3.1%	7	3.6%
	Other (specify)	1	16.7%	16	22.2%	10	11.8%	3	9.4%	30	15.4%
	Total	6	100.0%	72	100.0%	85	100.0%	32	100.0%	195	100.0%
If there was a 'road closed' sign, would you:	Continue on with care	0	.0%	1	1.4%	1	1.1%	0	.0%	2	1.0%
	Go back	6	100.0%	71	95.9%	84	94.4%	30	90.9%	191	94.6%
	Wait for assistance	0	.0%	0	.0%	2	2.2%	2	6.1%	4	2.0%
	Don't know	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
	Other (specify)	0	.0%	2	2.7%	2	2.2%	1	3.0%	5	2.5%
	Total	6	100.0%	74	100.0%	89	100.0%	33	100.0%	202	100.0%

8.0 PUBLIC EDUCATION

8.1 Had respondents seen any flood information for their local river

A similar percentage (around 50%) of respondents from McGraths Hill, Windsor and Richmond had seen some form of flood information for their local river (Table 29). Only 24% of Penrith residents stated that they had seen information on flooding for their local river.

The information seen came in a variety of formats including brochures, signage, flood heights/depth indicators, historical information, newspaper, radio, websites, and more.

Table 29 Had respondents seen any flood information for their local river

	Location									
	Penrith		McGraths Hill		Windsor		Richmond		Total	
	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %	Count	Column Valid N %
No	35	59.4%	21	38.9%	14	29.2%	19	36.5%	89	41.8%
Not sure	10	16.9%	6	11.1%	10	20.8%	8	15.4%	34	16.0%
Yes	14	23.7%	27	50.0%	24	50.0%	25	48.1%	90	42.2%
Total	59	100.0%	54	100.0%	48	100.0%	52	100.0%	213	100.0%

8.2 Places information was received from

A significant percentage of Penrith residents said they had not received any information about preparing for floods (63%) (Table 30). In addition, 47% of Richmond residents, 39% of respondents from McGraths Hill and 31% of Windsor residents had also not received any information about preparing for floods.

The information that was received came predominantly from SES (32%), Local Council (30%), and newspapers or magazines (16%). No other forms of media appeared particularly dominant. The local council featured strongest for Windsor (47%). The SES was more strongly cited by residents from McGraths Hill (44%) and Windsor (41%).

Table 30 Have you heard or received any information about preparing for floods from the following places?

	Location				
	Penrith	McGraths Hill	Windsor	Richmond	Total
	Column Valid N %				
I haven't heard or received any information about floods	62.7%	38.9%	31.4%	47.2%	45.6%
Newspapers or magazines	5.1%	5.6%	13.7%	17.0%	16.1%
Meetings, seminars or workshops	3.4%	3.7%	3.9%	1.9%	3.2%
Businesses	0.0%	0.0%	2.0%	1.9%	1.8%
School hand-outs	0.0%	1.9%	2.0%	0.0%	1.0%
Friends or relatives	3.4%	3.7%	3.9%	9.4%	6.9%
Service organisations	0.0%	0.0%	2.0%	0.0%	0.5%
Neighbourhood Watch groups	0.0%	0.0%	2.0%	0.0%	1.0%
Where you work	0.0%	0.0%	2.0%	1.9%	2.8%
Posters or postcards	0.0%	0.0%	0.0%	1.9%	1.4%
Telephone book/street directory	1.7%	1.9%	2.0%	1.9%	1.8%
Local council	16.9%	18.5%	47.1%	28.3%	30.4%
My insurance company/agent	0.0%	0.0%	0.0%	1.9%	1.0%
Flood warden	0.0%	0.0%	2.0%	0.0%	1.4%
Internet	1.7%	1.9%	0.0%	1.9%	1.4%
Email	0.0%	0.0%	0.0%	0.0%	0.0%
SMS (Text)	0.0%	0.0%	0.0%	0.0%	0.0%
Other (specify)	1.7%	1.9%	5.9%	5.7%	3.7%
SES	13.6%	44.4%	41.2%	30.2%	32.0%
Federal government	1.7%	3.7%	2.0%	1.9%	2.3%
Fire service	0.0%	1.9%	2.0%	1.9%	1.4%
Police	0.0%	0.0%	3.9%	7.5%	2.8%
Bureau of Meteorology	1.7%	5.6%	3.9%	5.7%	4.1%
Television	5.1%	9.3%	3.9%	15.1%	8.3%
Radio	5.1%	9.3%	5.9%	17.0%	9.2%

8.3 Whether respondents had asked any particular people, groups or organisations for information on how to get ready for floods

A large proportion (92%) of respondents in Penrith had not asked anyone about information on how to get ready for floods (Table 31). Of those that had asked, neighbours were indicated as the most likely source of information (3%).

The remaining three communities also had high percentages of people who reported not having asked anyone for information about preparing for floods (between 79% and 87%). In those communities, friends, neighbours, the local council and the SES were the people or organisations where the information was most likely to come from.

Over all, the numbers of respondents in the Hawkesbury-Nepean Valley who had not sought information on how to get ready for floods, tended to be higher than for provincial areas (Becker et al., 2007).

Table 31 Have you asked any of the following people, groups or organisations for information on how to get ready for floods?

	Location				
	Penrith	McGraths Hill	Windsor	Richmond	Total
	Column Valid N %				
No, I haven't asked anyone how to get ready for floods	91.5%	87.0%	84.1%	79.2%	86.5%
Bureau of Meteorology	0.0%	0.0%	0.0%	3.8%	1.0%
Business establishments	0.0%	0.0%	0.0%	1.9%	.5%
My workplace	0.0%	0.0%	2.3%	3.8%	1.4%
My child's school	0.0%	0.0%	0.0%	1.9%	0.5%
Other	0.0%	3.7%	2.3%	1.9%	1.9%
Friends	0.0%	1.9%	9.1%	7.5%	4.3%
Neighbours	3.4%	5.6%	6.8%	9.4%	6.3%
Relatives	1.7%	0.0%	2.3%	3.8%	1.9%
Local council	1.7%	1.9%	6.8%	5.7%	3.8%
SES	0.0%	7.4%	4.5%	13.2%	6.3%
Federal government	0.0%	0.0%	0.0%	0.0%	0.0%
Police	0.0%	1.9%	0.0%	5.7%	1.9%
Fire Service	0.0%	0.0%	0.0%	1.9%	.5%

8.4 Preferences for getting information about preparing for floods

Respondents were asked about how they preferred to get information on how to prepare their household or business for floods. The preferred ways of receiving information were similar across all of the four communities in the Hawkesbury-Nepean Valley (Table 32). They included: brochures received in the mail (85%); TV advertisements (33%); radio advertisements (26%); and fridge magnets and newspaper/magazines (30-33%).

A Colmar Brunton study (1999) asked residents in Windsor and Richmond slightly different questions about flood information; however similar media were found to be popular with respondents including the TV, brochures, radio, newspapers/magazines, fridge magnets and letters in the mail.

When taking into account the recent flood surveys of Maitland, Albury, Narrabri and Grafton, we can see that many of the results regarding flood information are broadly comparable between the urban and provincial communities. However, the provincial communities had a slight tendency to prefer radio and TV while the Internet was more popular with Hawkesbury-Nepean Valley residents (15%) than for those asked in the provincial survey (9%) (Becker et al., 2007).

Table 32 How would you prefer to get information on how to prepare your household/business for floods?

	Location				
	Penrith	McGraths Hill	Windsor	Richmond	Total
	Column Valid N %				
Brochure received in the mail	91.5%	90.7%	76.5%	81.1%	85.3%
Public meeting	11.9%	5.6%	10.2%	9.4%	9.7%
Other	1.7%	0.0%	0.0%	0.0%	0.5%
Brochure picked up	3.4%	5.6%	7.8%	9.4%	6.5%
Radio advertisement	20.3%	24.1%	35.3%	24.5%	25.8%
TV advertisement	28.8%	37.0%	37.3%	28.3%	32.7%
Fridge magnet received in the mail	32.2%	37.0%	15.7%	28.3%	33.2%
Home visit by SES	18.6%	16.7%	2.0%	18.9%	17.1%
Newspaper or magazine advertisement	22.0%	24.1%	29.4%	45.3%	30.0%
Community display	8.5%	13.0%	23.5%	20.8%	16.1%
Internet	8.5%	20.4%	11.8%	18.9%	14.7%

8.5 Preferences for receiving information about current flooding

Respondents were asked about how they preferred to receive information about flooding that was occurring in their town (Table 33). Radio was indicated as the preferred option for respondents from all communities (83%). TV was the second preferred option (70%), followed by door-knocking (around 44% for all the towns surveyed). These results are also consistent with those from the November 2005 survey (Becker et al., 2007).

McGraths hill respondents were more likely to indicate than other communities that door-knocking was a preferred option for warning (65%).

Table 33 In a flood, how would you prefer to receive information about that flood?

	Location				
	Penrith	McGraths Hill	Windsor	Richmond	Total
	Column Valid N %				
Radio	84.7%	85.2%	80.4%	83.0%	83.4%
TV	66.1%	75.9%	60.8%	75.5%	69.6%
Door-knocking	47.5%	64.8%	29.4%	34.0%	44.2%
Mobile public address	35.6%	20.4%	23.5%	32.1%	28.1%
Internet	5.1%	22.2%	9.8%	20.8%	14.3%
Email	8.5%	13.0%	3.9%	7.5%	8.3%
Siren	15.3%	7.4%	11.8%	11.8%	11.5%
Flood Warden	27.1%	27.8%	25.5%	29.4%	27.2%
Telephone	33.9%	31.5%	25.5%	27.5%	29.5%
SMS (text)	11.9%	29.6%	15.7%	19.6%	18.9%
Don't know	0.0%	0.0%	0.0%	0.0%	0.0%
Other	0.0%	1.9%	2.0%	0.0%	1.0%

8.6 Responsibility for flooding

Local government (local council) and state government (SES) are considered by respondents from all of the towns surveyed to have the most responsibility for protecting people from floods. In general, figures for the local council are slightly higher indicating that all four communities think the local council has the most responsibility (Table 34). Individual responsibility comes third in terms of ranking, before federal government.

Table 34 Please indicate on the scale, whose responsibility you believe it is to protect us from floods (1=Not at all, 5=A great deal).

	Location														
	Penrith			McGraths Hill			Windsor			Richmond			Total		
	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N
Federal Government	2.78	1.86	59	2.93	1.89	55	2.10	1.86	48	2.89	1.88	53	2.69	1.89	215
State Government (SES)	3.83	1.67	59	3.60	1.59	55	3.50	1.86	48	4.08	1.47	53	3.76	1.65	215
Local Government (local council)	4.22	1.43	59	4.35	1.04	55	3.67	1.73	48	4.09	1.56	53	4.10	1.46	215
Individual households (mine)	2.69	1.92	59	3.16	1.82	55	2.67	2.07	48	3.17	1.89	53	2.93	1.92	215

8.7 Belief in preparing for flooding

Richmond and Penrith agree most with the statement, "There is no use preparing for floods as we can't do much anyway" (Table 35). Even so, they only agree to a small extent, and are not even sitting halfway along the scale (under 2).

Table 35 Please indicate on the scale, how much you agree with the following statement (There is no use preparing for floods as we can't do much anyway) 1=Not at all, 5=A great deal:

	Location														
	Penrith			McGraths Hill			Windsor			Richmond			Total		
	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N
There is no use preparing for floods as we can't do much anyway	1.97	1.34	59	1.85	1.18	55	1.85	1.29	48	2.02	1.37	53	1.93	1.29	215

9.0 HAZARD COGNITIONS – THE EXTENT TO WHICH PEOPLE THINK ABOUT AND DISCUSS HAZARDS

9.1 Barriers to floods preparation

In general, barriers to prevent preparing for floods were considered to be moderate. When the scores from all the communities were considered, a 'lack of knowledge or information' was considered to be the greatest barrier (Table 36).

Table 36 To what extent might each of the following prevent you from preparing for floods? (1=Not at all, 5=A great deal)

	Location														
	Penrith			McGraths Hill			Windsor			Richmond			Total		
	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N
Cost	1.73	1.31	59	2.18	1.39	55	1.81	1.44	48	2.28	1.56	53	2.00	1.43	215
Skill required to prepare	1.71	1.43	59	2.15	1.45	55	1.88	1.44	48	2.32	1.50	53	2.01	1.46	215
Time to prepare	2.03	1.60	59	2.49	1.40	55	2.29	1.57	48	2.19	1.39	53	2.25	1.49	215
Other things to think about	2.19	1.62	59	2.38	1.57	55	1.88	1.45	48	2.09	1.54	53	2.14	1.55	215
Need for co-operation with others	1.97	1.50	59	2.42	1.41	55	1.79	1.35	48	2.30	1.48	53	2.13	1.45	215
Lack of knowledge or information	3.27	1.62	59	3.27	1.52	55	2.75	1.67	48	3.00	1.53	53	3.09	1.59	215

9.2 Outcome Expectancy and Level of Concern

Respondents were asked a series of questions which investigated their outcome expectancies and concerns about flooding (Table 37). The low scores gained for the questions asked (around 2 or under) indicate that most respondents have a moderate outcome expectancy (i.e. they believe floods are moderately worth preparing for), and that floods are of moderate concern.

Table 37 To what extent do you believe the following statements (1=Not at all, 5=A great deal)

	Location														
	Penrith			McGraths Hill			Windsor			Richmond			Total		
	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N
Floods are too destructive to bother preparing for	1.51	1.18	59	1.69	1.14	55	1.42	.87	48	1.55	.99	53	1.54	1.06	215
A serious flood is unlikely to occur during lifetime	2.25	1.46	59	2.18	1.29	55	2.10	1.43	48	2.55	1.49	53	2.27	1.42	215
Unnecessary to prepare as assistance will be provided	1.81	1.12	59	1.82	.96	55	1.83	1.31	48	1.62	1.15	53	1.77	1.13	215
Floods are not of concern	1.95	1.44	59	1.89	1.18	55	2.00	1.49	48	2.04	1.37	53	1.97	1.37	215

9.3 Sense of community

The scores of the respondents indicate that residents moderately to highly: feel a part of their community, are interested in their community, and that they share values and beliefs with other community members (Table 38). No one community appears to show a greater sense of community in comparison to the others.

When compared to the provincial communities in the 2005 survey (Becker et al., 2007) sense of community seems fairly similar, with the provincial towns only having slightly higher scores on the scale for some of the indicators (e.g. “I feel a part of this community” or “I am satisfied living in this community, etc).

Table 38 Residents' sense of community: Please use the scale to indicate how much each statement applies/doesn't apply to you: (1=Doesn't Apply, 5=Applies strongly)

	Location														
	Penrith			McGraths Hill			Windsor			Richmond			Total		
	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N
I feel a part of this community	3.14	1.50	59	3.36	1.24	55	3.27	1.53	48	3.49	1.45	53	3.31	1.43	215
I am satisfied living in this community	3.78	1.34	59	3.87	1.00	55	3.38	1.50	48	3.85	1.45	53	3.73	1.33	215
I am a useful member of this community	2.85	1.56	59	2.96	1.28	55	3.10	1.57	48	2.92	1.64	53	2.95	1.51	215
I have the same values and beliefs as my neighbours	3.34	1.52	59	2.98	1.33	55	2.71	1.52	48	2.91	1.32	53	3.00	1.43	215
I feel I don't belong in this community	1.37	.96	59	1.52	.97	54	1.69	1.22	48	1.26	1.04	53	1.45	1.05	214
I am interested in knowing what goes on in this community	3.73	1.31	59	3.49	1.22	55	3.38	1.50	48	3.47	1.48	53	3.53	1.37	215
I would be happy to leave this community	1.66	1.18	59	1.98	1.19	55	1.75	1.25	48	1.60	1.26	53	1.75	1.22	215
I know my neighbours and/or other community members	3.56	1.47	59	3.64	1.11	55	3.23	1.49	48	3.25	1.65	53	3.43	1.44	215
I have no active involvement in this community	2.17	1.48	59	2.44	1.21	55	2.08	1.40	48	2.00	1.39	53	2.18	1.37	215

9.4 Self Efficacy

Self efficacy is the idea that one has control over future life events. It is often referred to as 'internal locus of control'. Respondents from the Hawkesbury-Nepean Valley survey appear to have moderate levels of self-efficacy (Table 39).

Table 39 Residents' self efficacy: Please use the scale to indicate how much each statement applies/doesn't apply to you: (1=Doesn't Apply, 5=Applies strongly)

	Location														
	Penrith			McGraths Hill			Windsor			Richmond			Total		
	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N	Mean	Std Dev	Valid N
I feel I have control over the things that happen in my life and in the community	3.03	1.38	59	2.98	1.13	55	2.90	1.29	48	2.75	1.11	53	2.92	1.23	215
There is no way I can solve some of the problems I have by myself	2.49	1.48	59	2.65	1.16	55	2.44	1.40	48	2.49	1.45	53	2.52	1.37	215
I can't do much to change what happens in my life or in the community	2.25	1.21	59	2.27	1.11	55	2.08	1.25	48	2.25	1.11	53	2.22	1.17	215
Somehow problems in my life usually solve themselves	2.36	1.34	59	2.75	1.22	55	2.54	1.38	48	2.19	1.21	53	2.46	1.30	215

10.0 STRUCTURAL INFORMATION ABOUT RESPONDENTS' PROPERTY

10.1 Details about building structure

For the questionnaire, several questions were asked about the structure of respondents' houses. In general it was found that:-

- The type of houses found in most of the communities tended to be one storey high, with fewer two storey houses.
- Windsor had the greatest percentage of houses raised above ground level with 70% of respondents reporting that their houses were raised (Table 40). This is more than in Richmond and Penrith (both around 60%) and McGraths Hill (37%).

Table 40 Is your house raised above ground level?

		Location									
		Penrith		McGraths Hill		Windsor		Richmond		Total	
		Column Valid N %	Count								
Is your house raised above ground level?	Yes	63.6%	35	37.0%	20	70.2%	33	59.6%	31	57.2%	119
	Not sure	1.8%	1	11.1%	6	4.3%	2	3.8%	2	5.3%	11
	No	34.6%	19	51.9%	28	25.5%	12	36.6%	19	37.5%	78

11.0 CONCLUSIONS

A survey of residents' attitudes and understanding of flood warnings and management was conducted in four Hawkesbury-Nepean Valley communities (Penrith, McGraths Hill, Windsor and Richmond) in February 2006. A total of 1000 questionnaires were delivered directly to houses in all four areas, with an overall return rate of 22%. The questionnaire included questions on: awareness, risk perception, previous exposure to flooding, information received concerning preparedness activities, information sought for preparedness purposes and the extent to which people engaged or plan to engage in preparedness activities. Analysis of the results shows that:

- Flooding is perceived as the most likely future hazard by the vast majority of residents from all four communities with over 85% of respondents indicating that flooding was a natural disaster likely to affect their community at some point. Half of Windsor and Richmond residents expect a flood sometime within the next 5 years, and approximately a third of Penrith and McGraths Hill residents expect a flood within the same time period.
- In terms of previous experience, 43% of respondents had been affected by a flood in the past, with a greater percentage of Windsor and Richmond residents experiencing floods (approximately 50%), than people from McGraths Hill (41%) and Penrith (31%).
- Levels of household preparedness for flooding are varied. A reasonable number of respondents reported having already collected some common household items such as spare batteries (68%), rubber gloves (50%), a waterproof bag (46%), a first aid kit (45%) and a torch (36%). However other items or actions were collected or carried out in much smaller percentages. The actions least likely to be carried out included talking to family members about what to do, preparing an emergency kit, and preparing a home flood plan (all less than 9%).
- Despite significant experience of past flooding, and a moderate understanding of the flood risk, there are still moderate levels of concern amongst community members.
- Just over 60% of residents believe it is necessary to prepare for floods, but have only moderate to low personal concern of the flood risk (i.e. 'flooding won't happen to me'). With lower levels of personal concern, people are less likely to take personal action and to make actual preparations for themselves or their families. This highlights the need for individuals to personalise the risk, as even if they think there is a need for community as a whole to prepare, they are less likely to become prepared themselves if the risk isn't personalised.
- Lower levels of personal concern also restrict people from seeking information about risk, and getting involved in community groups, both of which may ultimately help address risk and enhance personal preparedness.
- In general, the barriers which may prevent people preparing for floods were considered to be only low to moderate. When the scores from all the Hawkesbury-Nepean

communities were considered, a 'lack of knowledge or information' was considered to be the greatest barrier, however this barrier was still only present at moderate levels.

- There is a moderate to high lack of knowledge of any flood warning systems in Hawkesbury-Nepean communities. Around half of residents in Penrith and McGraths Hill did not know what elements made up the warning system, and one third of respondents in Windsor and Richmond also did not know. However, self-reported warning compliance levels (i.e. where people indicated they would 'evacuate at once' if they heard a flood warning) were much higher (43%) than those reported in the 2005 survey of provincial communities (Becker et al., 2007).
- Overall, the responses to the question "What number would you call for help in a flood?" were fairly evenly spread. Respondents from all towns tended either to not know what number they would call (33%) or to prefer to call '000' (37%). Respondents from Richmond had the highest proportion of 'don't know' responses (37%). The SES number (132 500) was cited by only 8% of the total respondents as the number they would call for help in a flood. The local council was also a place that Hawkesbury-Nepean Valley respondents thought they might call for help with flooding with between 8% and 23% of respondents indicating that they could call the council.
- Very few residents from all of the communities surveyed indicated that they thought that their communities were protected by a levee (Table 19). Between 52% and 65% of respondents from Penrith, Windsor and Richmond stated that they thought their community did not have protection from a levee, and 38% from McGraths Hill stated the same. While pockets of mitigation works have been undertaken, no extensive levee system exists for the communities we surveyed along the Hawkesbury-Nepean river system. McGraths Hill respondents were predominantly unsure (55%) of whether they had a levee for had flood protection, and around a third of respondents from the other communities were also unsure whether levees existed.

The survey shows current low levels of community participation in reducing flood risk. To create a well-prepared and resilient community that understands its hazards and is prepared to deal with them, a number of stages of intervention have been identified (Paton and Johnston, 2001; Paton et al. 2005). Paton et al. (2005) outlines a three stage process, starting with (1) motivating people to prepare; then (2) facilitating the formation of intentions, and then (3) promoting the conversion of intentions to preparedness. It has been found that no one strategy will bring about change at all stages. There is a need to look at different strategies to encourage more community buy-in and participation in the process of preparing for flood hazards. Simple hazard education (i.e. telling the public about flood risk) is not going to increase levels of preparedness, as levels of knowledge about the hazard are already high. Alternative strategies are required that seek to engage and involve individuals in the process (and help personalise the risk), rather than simply disseminate information. To ensure that education and community engagement initiatives are effective, there is a need for the continual monitoring and evaluation of future programs. It is only through this that gaps can be identified and the successful elements of a program can be replicated.

12.0 REFERENCES

- Ballantyne, M., Paton, D., Johnston, D., Kozuch, M., and Daly, M., 2000. Information on volcanic and earthquake hazards: the impact on awareness and preparation. *Institute of Geological & Nuclear Sciences Limited science report 2000/2*. 45 p.
- Bartley, A., 1999. Survey research: mail surveys. In *Social science research in New Zealand: many paths to understanding*. Edited by Davidson, C. and Tolich, M. Pearson Education, Prentice Hall, New Zealand. pp 188-204.
- Becker, J., Johnston, D., Coomer, M., Ronan, K. 2007. Flood risk perceptions, education and warning in four communities in New South Wales, Australia – results of a questionnaire survey, November 2005, *GNS Science Report 2007/30*.
- Colmar Brunton Social Research, 1999. Baseline Survey of Richmond, Windsor, Lismore and Woronora. Colmar Brunton Research for the Hawkesbury-Nepean Floodplain Management Strategy. 105p.
- Gillespie, C., Grech, P., Bewsher, S., Bewsher, D., 2002. Reconciling development with flood risks: the Hawkesbury-Nepean dilemma. *Australian Journal of Emergency Management*. Autumn 2002, pp 27-32.
- Handmer, J., 2002a. Flood warning reviews in North America and Europe: statements and silence. *The Australian Journal of Emergency Management*, 17(3): 17-24.
- Handmer, J., 2002b. Are Flood Warnings Futile? Risk communication in emergencies. *The Australasian Journal of Disaster and Trauma Studies*, 2002/2: online journal.
- Hartcher, C., Knowles, C., Rozzoli, K., 1995. Legislative Assembly Hansard (Extract): Flood Mitigation: Matter of Public Importance. <http://www.parliament.nsw.gov.au/prod/PARLMENT/hansArt.nsf/V3Key/LA19951115029>.
- Hawkesbury Nepean Catchment Management Authority, 2006. *Western Sydney*. <http://www.hn.cma.nsw.gov.au/topics/2043.html>
- Hawkesbury/Neapean Flood Emergency Sub Plan, 2005. Hawkesbury/Neapean Flood Emergency Sub Plan, 2005. *NSW State Disaster Plan (State DISPLAN)*. 68 p.
- Johnston, D., Paton, D., Kerr, J., Becker, J., Gray, W., 2002. Waikanae River flood risk Perceptions - results of a community survey, August 2001, *Institute of Geological & Nuclear Sciences science report 2002/06*. 52 p.
- Keys, C., 2005. pers. comm..

Leonard, G.S., Johnston, D.M., & Paton, D., 2004. Analysis of Te Anau residents' impacts, awareness and preparedness following the 2003 Fiordland earthquake, *Institute of Geological & Nuclear Sciences science report 2004/37* 57 p.

State Emergency Service, 2001. *New South Wales State Flood Plan: April 2001* (A Sub-plan of the State Disaster Plan).

Pfister, N., 2002. Community response to flood warnings: the case of an evacuation from Grafton, March 2001. *Australian Journal of Emergency Management*, 17(2): 19-29.

Paton, D., Johnston, D., 2001. Disaster and communities: vulnerability, resilience and preparedness. *Disaster Prevention and Management*, 10(270-277).

Paton, D., Smith, L.M., Johnston, D., 2005. When good intentions turn bad: Promoting natural hazard preparedness. *Australian Journal of Emergency Management*, 20, 25-30.

Penrith City Council, *Interim Policy for Development of Flood Liable Land*, date unknown. <http://www.penrithcity.nsw.gov.au/uploadedFiles/InterimFloodPolicy.pdf>

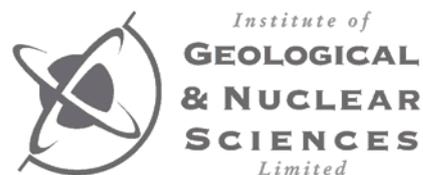
13.0 ACKNOWLEDGEMENTS

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**APPENDIX 1 – COPY OF THE QUESTIONNAIRE SENT TO ALL TOWNS
(PENRITH VERSION)**

Penrith Flood Survey:

Involving the community in
emergency response preparedness



FLOOD SURVEY RESEARCH INFORMATION SHEET

This research is intended to assess factors that influence how and why people make decisions about preparing or not preparing for natural disaster consequences such as floods. Preparing is seen as an important factor in assisting communities to safeguard their well-being and to minimise disruption (e.g., damage to homes, loss of work) should a flood occur. This research is being undertaken to assess levels of preparedness and the household and community factors that influence levels of preparedness. The survey includes questions that have been identified as influencing the effectiveness of public information campaigns designed to enhance preparedness for natural hazards.

The outcomes of this research will be used by New South Wales State Emergency Service (SES) to enhance the effectiveness of public information programmes, enhance household preparedness for floods, and help ensure that the needs of the community are met with respect to emergency management for flooding.

To collect information on understanding and preparedness for flooding, surveys are being distributed to a random sample of 500 households in your community. Your participation in this survey will help ensure that future public information campaigns can be targeted to meet the needs of your community.

A report summarising the findings of this survey will be available through the local State Emergency Service office, provided to the local newspaper for publication and will additionally be made available on the Institute of Geological and Nuclear Sciences (<http://www.gns.cri.nz>) and Central Queensland University (<http://www.cqu.edu.au>) web pages. To meet our institutional and professional ethical obligations, the data will be stored for five years in a locked storage area, and all raw data will then be destroyed at the end of that period.

Your participation in this study is entirely voluntary, and you may elect to refuse to answer any question on the survey or choose to withdraw from the study at any time (i.e., not fill out and/or choose not to return the survey). The survey does not ask for any identifying information; the researchers will not know your identity. As a result, there is no way in which your responses will be identifiable in any research output including conference presentations and published research reports in academic and professional journals.

Should you wish to find out any additional information regarding this study, please do not hesitate to contact any of the research team:-

Julia Becker, Institute of Geological and Nuclear Sciences (j.becker@gns.cri.nz) or
Phil Campbell, State Emergency Service (philip.campbell@ses.nsw.gov.au); 02-4224-2261) or
Prof Kevin Ronan, Central Queensland University (k.ronan@cqu.edu.au; 07-4930-6746).

Additionally, please contact Central Queensland University's Office of Research (Tel 07 4923 2607) should there be any concerns about the nature and/or conduct of this research project.

Your return of the enclosed survey will be taken as indicative of your having read the information sheet and of your agreement to participate in this study.

The first section of this questionnaire asks about which natural disasters you think are important.

1. Which do you believe are the two most likely natural disasters that could affect your community? (Tick only two)

- ₁ Flood
- ₂ Thunderstorm with high winds and/or hail
- ₃ Windstorm
- ₄ Bushfire
- ₅ Earthquake
- ₆ Tsunami
- ₇ Other (please specify _____)

2. Have you ever been affected by any of the following events? (Tick all that apply)

- ₁ Flood
- ₂ Thunderstorm with high winds and/or hail
- ₃ Windstorm
- ₄ Bushfire
- ₅ Earthquake
- ₆ Tsunami
- ₇ Other (please specify _____)
- ₈ No events have affected me (If “No events”, go to Question 3)

If you have been affected, to what extent were you affected? (considering property damage, injuries and financial impact). Please tick the one number you feel best represents this damage in each row, on the scale from 1 to 10.

	Little impact			←—————→				Severe impact		
	1	2	3	4	5	6	7	8	9	10
Flood	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆	<input type="checkbox"/> ₇	<input type="checkbox"/> ₈	<input type="checkbox"/> ₉	<input type="checkbox"/> ₁₀
Thunderstorm with high winds and/or hail	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆	<input type="checkbox"/> ₇	<input type="checkbox"/> ₈	<input type="checkbox"/> ₉	<input type="checkbox"/> ₁₀
Windstorm	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆	<input type="checkbox"/> ₇	<input type="checkbox"/> ₈	<input type="checkbox"/> ₉	<input type="checkbox"/> ₁₀
Bushfire	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆	<input type="checkbox"/> ₇	<input type="checkbox"/> ₈	<input type="checkbox"/> ₉	<input type="checkbox"/> ₁₀
Earthquake	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆	<input type="checkbox"/> ₇	<input type="checkbox"/> ₈	<input type="checkbox"/> ₉	<input type="checkbox"/> ₁₀
Tsunami	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆	<input type="checkbox"/> ₇	<input type="checkbox"/> ₈	<input type="checkbox"/> ₉	<input type="checkbox"/> ₁₀
Other (specify _____)	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆	<input type="checkbox"/> ₇	<input type="checkbox"/> ₈	<input type="checkbox"/> ₉	<input type="checkbox"/> ₁₀

3. When do you think that each of these disasters is next likely to affect your community? (Tick one for each disaster)

Flood

- ₁ Within the next year
- ₂ Within the next 5 years
- ₃ Within the next 20 years
- ₄ Within the next 50 years
- ₅ In over 50 years
- ₆ Never

Thunderstorm with high winds and/or hail

- ₁ Within the next year
- ₂ Within the next 5 years
- ₃ Within the next 20 years
- ₄ Within the next 50 years
- ₅ In over 50 years
- ₆ Never

Windstorm

- ₁ Within the next year
- ₂ Within the next 5 years
- ₃ Within the next 20 years
- ₄ Within the next 50 years
- ₅ In over 50 years
- ₆ Never

Bushfire

- ₁ Within the next year
- ₂ Within the next 5 years
- ₃ Within the next 20 years
- ₄ Within the next 50 years
- ₅ In over 50 years
- ₆ Never

Earthquakes

- ₁ Within the next year
- ₂ Within the next 5 years
- ₃ Within the next 20 years
- ₄ Within the next 50 years
- ₅ In over 50 years
- ₆ Never

Tsunami

- ₁ Within the next year
- ₂ Within the next 5 years
- ₃ Within the next 20 years
- ₄ Within the next 50 years
- ₅ In over 50 years
- ₆ Never

The following questions are included to help us find out what you think about floods.

4. When was the last time your community was flooded (i.e. some houses or businesses in your community were flooded)? (Tick only one)

- ₁ Never
- ₂ In the last year
- ₃ In the last 2 years
- ₄ In the last 10 years
- ₅ In the last 50 years
- ₆ More than 50 years ago
- ₇ Don't know

5. When was the last time that the house where you live was flooded? (Tick only one)

- ₁ Never
- ₂ In the last year
- ₃ In the last 2 years
- ₄ In the last 10 years
- ₅ In the last 50 years
- ₆ More than 50 years ago
- ₇ Don't know

6. How concerned are you about floods? (Tick one in each row)

	Not at all	(Scale)			A great deal
	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
I think about floods	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
I talk about floods	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
I get information on floods	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
I think a flood could pose a threat to my personal safety	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
I think a flood could pose a threat to my property	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

7. Do you believe it is necessary to make preparations for floods that may affect you and your household in the future? (Tick only one)

- ₁ Yes
 - ₂ Not sure
 - ₃ No
- If "No", why not? _____

8. Have you seen any flood information for your local river(s)? (Tick only one)

- ₁ No
 - ₂ Not sure
 - ₃ Yes
- If "Yes", what was this information? _____

9. In the next month or so, do you intend to: (Tick one in each row)

	No	Possibly	Definitely
Seek information on flood risk to your community	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
Seek information on things to do to prepare for a possible flood	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
Become involved with a local group to discuss how to reduce flood risk to your community	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃

The following set of questions asks about flood protection and flood warnings.

10. Does your community have flood protection provided by a levee? (Tick only one)

- ₁ Yes
- ₂ Not sure
- ₃ No (If 'No', go to Question 11)

If "Yes", what level of protection do you think is provided by this levee? (Tick only one)

- ₁ Protection against small floods
- ₂ Protection against big floods
- ₃ Protection against all floods
- ₄ Don't know

11. Which of the following elements make up your community's public flood warning system? (Tick all that apply)

- ₁ Don't know
- ₂ Sirens
- ₃ Mobile public address systems
- ₄ Flashing lights
- ₅ Radio and TV announcements
- ₆ Information on the internet
- ₇ Door-knocking by the local emergency services or local flood wardens
- ₈ There is no warning system
- ₁₉ Other (please specify _____)

12. If you heard a flood warning for your community what would you do? (Tick all that apply)

- ₁ Don't know
- ₂ Stay inside and wait to be told what to do
- ₃ Listen to the radio
- ₄ Listen to the TV
- ₅ Evacuate at once
- ₆ Evacuate at a later stage
- ₇ Meet at a designated evacuation centre or assembly point
- ₈ Stay at home
- ₉ Go and check the river
- ₁₀ Contact your neighbours
- ₁₁ Contact the local council
- ₁₂ Contact State Emergency Service (SES)
- ₁₃ Contact another emergency service
- ₁₄ Check the internet
- ₁₅ Other (please specify _____)

13. What number would you call for help in a flood? (Tick only one)

- ₁ Don't know
- ₂ 000
- ₃ 1800 201 000
- ₄ 132 500
- ₅ 131 700
- ₆ Local council
- ₇ Other (please specify _____)

14. Who would you contact for road information in a flood? (Tick all that apply)

- ₁ Don't know
- ₂ Local council
- ₃ State Emergency Service (SES)
- ₄ RTA (Roads and Traffic Authority)
- ₅ Police
- ₆ Fire Authority
- ₇ Neighbour
- ₈ Other (please specify _____)

**15. If you were told to evacuate your property during a flood, would you:
(Tick only one)**

- ₁ Do nothing – stay put / at home
- ₂ Wait until the water reaches my house and then decide
- ₃ Evacuate everyone immediately when told
- ₄ Evacuate most of the household immediately, but leave someone at home
- ₅ Wait for the council / emergency services to 'door-knock' my house
- ₆ Use the phone to call for help to evacuate
- ₇ Don't know
- ₈ Other (please specify _____)

Think about the answer you chose for number 15 above. Why did you choose this answer? Please briefly write the reasons below.

16. If you decided to evacuate, where would you go? (Tick one)

- ₁ To a designated evacuation centre
- ₂ To family or a friend's house
- ₃ To another location (please specify _____)
- ₄ Don't know
- ₅ I would not evacuate

Think about the answer you chose for Number 16 above. Why did you choose this answer? Please briefly write the reasons below.

17. Are you aware of the evacuation procedures for you area?

- ₁ Yes
- ₂ No

If **yes**, please briefly describe below what these procedures are.

18. Do you know where your local evacuation routes are?

- ₁ Yes
- ₂ No

If yes, how did you find out about these routes?

19. In the event of a major flood, evacuation centres will be created for people to evacuate to. These centres will be decided when a major flood event occurs. What would be the best ways of informing you of the location of evacuation centres in you area? (Tick all that apply)

- ₁ Radio
- ₂ TV
- ₃ Door-knocking
- ₄ Mobile public address
- ₅ Internet
- ₆ Email
- ₇ Siren
- ₈ Flood Warden
- ₉ Telephone
- ₁₀ SMS (Text)
- ₁₁ Don't know
- ₁₂ Other (please specify _____)

20. If you are driving and come across a flooded area of road which is not marked with a 'road closed' sign – would you: (Tick only one)

- ₁ Continue on with care
- ₂ Go back
- ₃ Wait for assistance
- ₄ Don't know
- ₅ Other (please specify _____)

21. If there was a 'road closed' sign on a flooded area of road, would you: (Tick only one)

- ₁ Continue on with care
- ₂ Go back
- ₃ Wait for assistance
- ₄ Don't know
- ₅ Other (please specify _____)

22. In a flood, how would you prefer to receive general information about that flood? (Tick all that apply)

- ₁ Radio
- ₂ TV
- ₃ Door-knocking
- ₄ Mobile public address
- ₅ Internet
- ₆ Email
- ₇ Siren
- ₈ Flood Warden
- ₉ Telephone
- ₁₀ SMS (Text)
- ₁₁ Don't know
- ₁₂ Other (please specify _____)

The following set of questions asks about floods and what to do to get ready for them.

23. Have you heard or received any information about preparing for floods from any of the following places? (Tick all that apply)

- ₁ I haven't heard or received any information about floods
- ₂ Local council
- ₃ SES (State Emergency Service)
- ₄ Federal government (national level)
- ₅ Fire service
- ₆ Police
- ₇ Bureau of Meteorology
- ₈ Television
- ₉ Radio
- ₁₀ Newspapers or magazines
- ₁₁ Meetings, seminars or workshops
- ₁₂ Businesses (e.g., pamphlets in power or phone accounts)
- ₁₃ School hand-outs (e.g., brochures, homework)
- ₁₄ Friends or relatives
- ₁₅ Service organisations (e.g., the Red Cross)
- ₁₆ Neighbourhood Watch groups
- ₁₇ Where you work
- ₁₈ Posters or postcards
- ₁₉ Telephone book / street directory
- ₂₀ My insurance company/agent
- ₂₁ Flood warden
- ₂₂ Internet
- ₂₃ Email
- ₂₄ SMS (Text)
- ₂₅ Other, specify _____

24. Have you asked any of the following people, groups or organisations for information on how to get ready for floods? (Tick all that apply)

- ₁ No, I haven't asked anyone
- ₂ Friends
- ₃ Neighbours
- ₄ Relatives
- ₅ Local council
- ₆ SES (State Emergency Service)
- ₇ Federal government (national level)
- ₈ Police
- ₉ Fire Service
- ₁₀ Bureau of Meteorology
- ₁₁ Business establishments
- ₁₂ My workplace
- ₁₃ My child's school
- ₁₄ Other, (please specify _____)

25. How would you prefer to get information on how to prepare your household / business for floods? (Tick all that apply)

- ₁ Brochure received in the mail
- ₂ Brochure picked up from an organisation
- ₃ Radio advertisement
- ₄ TV advertisement
- ₅ Fridge magnet received in the mail
- ₆ Home visit by State Emergency Service (SES)
- ₇ Newspaper or magazine advertisement
- ₈ Community display
- ₉ Internet
- ₁₀ Public meeting
- ₁₁ Other (please specify _____)

26. Please indicate on the scale whose responsibility you believe it is to protect us from floods. (Tick one in each row)

	Not at all (Scale)			A great deal	
Federal Government	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
State Government (State Emergency Service)	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Local Government (local council)	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Individual households (mine)	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

27. Please indicate on the scale how much you agree with the following statement: (Tick only one)

	Not at all (Scale)			A great deal	
There is no use preparing for floods as we can't do much anyway	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

28. Which of the following have you or your family done to prepare for an emergency? (Tick all that apply)

- ₁ I/we have done nothing to prepare for an emergency
- ₂ Made sure I/we have a portable radio
- ₃ Made sure I/we have a torch
- ₄ Made sure I/we have spare batteries
- ₅ Made sure I/we have a first aid kit
- ₆ Made sure I/we have rubber gloves
- ₇ Made sure I/we have candles and waterproof matches
- ₈ Made sure I/we have a waterproof bag for valuables
- ₉ Made a list of emergency contact numbers
- ₁₀ Stockpiled water and food for three days
- ₁₁ Picked an emergency contact person outside of the district
- ₁₂ Arranged for someone in family to learn first aid
- ₁₃ Found out if we are in an area particularly vulnerable to flooding
- ₁₄ Had home inspected for preparedness
- ₁₅ Talked to family members about what to do if a flood warning is heard
- ₁₆ Thought about how to lift precious items off the ground in a flood
- ₁₇ Considered how to access the roof in a flood
- ₁₈ Considered access to essential items needed in a flood (e.g. rope for securing items so they do not float away)
- ₁₉ Prepared a home flood plan
- ₂₀ Prepared an emergency kit
- ₂₁ Other (Please specify _____)

29. To what extent might each of the following prevent you from preparing for floods: (Tick one in each row)

	Not at all (Scale) A great deal				
	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Cost	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Skill required to prepare	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Time to prepare	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Other things to think about	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Need for co-operation with others	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Lack of knowledge or information	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

30. To what extent do you believe that: (Tick one in each row)

	Not at all (Scale) A great deal				
	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Floods are too destructive to bother preparing for	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
A serious flood is unlikely to occur during your lifetime	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
It is unnecessary to prepare for floods as assistance will be provided by the local authority and/or the emergency services	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
Floods are not of concern	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

People respond in different ways to natural disasters. The next few questions are designed to help us better understand how your community may respond to a future event. Remember all information given will remain confidential.

31. Below is a list of statements on how you feel about living in your community. Please use the scale below to show how much each statement applies to you, or doesn't apply to you. (Tick one in each row)

	Doesn't apply (Scale) Applies strongly				
I feel a part of this community	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I am satisfied living in this community	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I am a useful member of this community	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I have the same values and beliefs as my neighbours	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I feel I don't belong in this community	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I am interested in knowing what goes on in this community	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I would be happy to leave this community	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I know my neighbours and/or other community members	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I have no active involvement in this community	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

32. Please think about your life in your community at present. Choose a number from the scale below that shows how much you agree or disagree with each of the following statements. (Tick one in each row)

	Disagree Strongly ← (Scale) → Agree Strongly				
I feel I have control over the things that happen in my life and in the community	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
There is no way I can solve some of the problems I have by myself	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I can't do much to change what happens in my life or in the community	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Somehow problems in my life usually solve themselves	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

The next set of questions concerns information about you and your household. We will only use this information to improve emergency preparedness in your community. Please remember that the information is anonymous.

33. Do you, or someone in your house, own or rent the home you live in? (Tick only one)

- ₁ Own or buying, to live in it
- ₂ Own or buying, but only for use as a holiday home
- ₃ Rent, to live in it
- ₄ Rent as a holiday home
- ₅ Other (please specify _____)

34. How long have you lived in your community?

_____ years _____ months

35. How long have you lived in your current home?

_____ years _____ months

36. How many storeys does your house have?

Number of storeys excluding basement and loft/attic: _____

37. Is your house raised above ground level? (Tick only one)

- ₁ Yes
- ₂ Not sure
- ₃ No

If “Yes”, please estimate in centimetres how high it is raised up _____

38. Are you insured against floods? (Tick only one)

- ₁ Yes
- ₂ Not sure
- ₃ No

33. What is your gender? e.g. male, female (please specify)_____

39. Which best describes the situation you are living in now? (Tick only one)

- ₁ Couple family with children
- ₂ Couple family without children
- ₃ One parent family
- ₄ Other family
- ₅ Alone
- ₆ With other people, not family
- ₇ Other, specify _____

40. What is your ethnic background? (Tick only one)

- ₁ Australian
- ₂ Aboriginal or Torres Strait Islander origin
- ₃ Other, specify _____

41. Were you born in Australia? (Tick only one)

- ₁ Yes
- ₂ Not sure
- ₃ No

If 'No', how long have you lived here?" (Please specify) _____ years

42. How old are you? (Tick only one)

- ₁ 18-24 years
- ₂ 25-44 years
- ₃ 45-64 years
- ₄ 65 years and over

43. Are you? (Tick only one)

- ₁ Employed full-time
- ₂ Employed part-time
- ₃ Not in paid employment

44. What was your household's total 2004 income (before tax)? (Tick only one)

- ₁ Under \$10 000
- ₂ \$10001 to \$15 000
- ₃ \$15 001 to \$20 000
- ₄ \$20 001 to \$30 000
- ₅ \$30 001 to \$40 000
- ₆ \$40 001 to \$50 000
- ₇ \$50 001 to \$60 000
- ₈ \$60 001 to \$70 000
- ₉ \$70 001 to \$80 000
- ₁₀ \$80 001 to \$90 000
- ₁₁ Over \$90 000

45. What is your highest educational qualification? (Tick only one)

- ₁ No school qualifications
- ₂ School qualifications
- ₃ Trade certificate or professional certificate (TAFE) or diploma
- ₄ University undergraduate degree (e.g., diploma or bachelor's degree)
- ₅ University postgraduate degree (e.g., Master's, Ph.D.)

**Thank you for filling in this questionnaire.
The information will help us make
your community more prepared for floods.**

**PLEASE RETURN THIS QUESTIONNAIRE
IN THE SUPPLIED POSTAGE PAID ENVELOPE.**



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