



Appendix I: SES Flood Intelligence Draft Updated

Table I1: Comments on Local Flood Plan (2006) (Reference 1)

LFP Section	Comment
1.5.25 SES Flood Wardens	It is not clear that each of the identified communities has a flood warden as required by the LFP.
3.10 Information	New ways of issuing information to communities such as through SMS need to be included.
Annex A – The Flood Threat: Flood Mitigation Systems	This section needs to be updated using the latest levee profiles and flood modelling. This shows that the North Wagga levee currently provides protection to a level of only about 9.7m (not 9.9m) on the Wagga gauge, equivalent to about a 10% AEP flood.
Annex A – The Flood Threat: Storage Dams	This section needs to be updated to account for dam safety upgrades especially at Blowering Dam in 2010.
Annex A – The Flood Threat: Weather Systems	This section needs to be updated to take account for the weather systems responsible for recent floods, especially to acknowledge the role of inland troughs such as that generating the March 2012 flood (Reference 2).
Annex A – The Flood Threat: Flood History	This section needs to be updated to include the floods of December 2010 and March 2012. These major floods weaken the argument that floods tend to occur in 'during late autumn, winter and early spring months'.
Annex B – Effects of Flooding on the Community	This section needs to be updated using the most recent Census data, building exposure data (from this study), levee crest levels and flood model outputs (from this study), for each of the identified communities. The section on road closures also needs to be updated to link to gauge heights where possible and to record durations. The section on the effects on utilities and infrastructure needs to be updated with respect to the latest information from Council, Riverina Water, Essential Energy etc.
Annex C – Gauges Monitored by Wagga Wagga SES Local HQ	The list of gauges needs to be checked. Gauges on all the tributaries downstream of Burrinjuck Dam should be monitored (remotely) including Lacmalac (Goobarragandra River), Brungle Bridge (Tumut River), Coolac (Muttama Creek), Batlow Road (Adelong Creek) and Mt Adrah (Hillas Creek).
Annex F – Evacuation Arrangements for Wagga Wagga City Council Area	The East Wagga/Gumly Gumly/Forest Hill/Alfredtown and Ladysmith sector appears to contain too many distinct communities for a single sector (Ladysmith especially is subject to flooding from Kyeamba Creek). Given their role in the March 2012 event, the Australian Defence Force should be considered for inclusion under the organisations with responsibilities.
Annex G – North Wagga Sector Evacuation	Modelling shows that the North Wagga levee commences overtopping at about the 9.7m height on the Wagga Wagga gauge, not 9.9m as is currently used as evacuation trigger. The status of the informal levee adjacent to Hampden Avenue also needs to be confirmed, since in March 2012, the evacuation route was not affected by floodwater until a height of about 9.5m (TBC).
Annex H – Oura Sector Evacuation	The evacuation trigger need to be confirmed using the latest flood modelling. The community has expressed a desire for a local gauge with a local trigger. The Oura Progress Association is seeking to purchase and develop the now disused Presbyterian church located at the corner of Adams and Alfred Streets for use as a community building including a place to store emergency equipment, to train, and in time of flood, to function as a local emergency operations centre and evacuation centre.

LFP Section	Comment
Annex K – East Wagga/ Gumly Gumly/ Forest Hill/ Alfredtown and Ladysmith Sector Evacuation	This sector contains too many distinct communities, which are likely to have particular issues that are not adequately addressed in a single annex. The evacuation triggers for Gumly Gumly and East Wagga need to be confirmed using the latest flood modelling. The list of vulnerable institutions includes Gumly Gumly Public School, which closed in 2007. Easts Vans Park is now known as Easts Riverview Holiday Park or Big 4 Wagga Wagga Holiday Park (and was flooded in March 2012).
Annex L – Flowerdale/ Edward Street West Sector Evacuation	The evacuation trigger and levels at which the evacuation route is cut need to be confirmed using the latest flood modelling.
Annex M – Central Wagga Wagga Sector Evacuation	It is anticipated that many lessons will have been learned through the evacuation of Central Wagga during the March 2012 flood, which should be used to review and update the Central Wagga Wagga evacuation plan. It is also likely that the list of vulnerable institutions requires updating given the 10 years that have elapsed since the LFP was last reviewed.
Maps	The maps showing the location of road low points in North Wagga and East Wagga are useful. The status of the informal levee adjacent to Hampden Avenue also needs to be confirmed, since in March 2012, the North Wagga evacuation route was not affected by floodwater until a height of about 9.5m (TBC). Maps showing road low points elsewhere in the LGA would be advantageous.

Table I2: Comments on Flood Intelligence Card (2015)

Gauge height (m)	Comment
Intro	Latest modelling (and observations in the March 2012 flood) shows the North Wagga levee is overtopped by 9.7m, not 9.9m, which therefore requires amendment of the stated levee operating level on the first page of the FIC.
0.00	The notes describing how the hydrology and rating tables have changed are very useful.
7.00	It is understood that the level of the low-point at the Graham Avenue culvert leading to Gumly Common was raised after the March 2012 flood. The new level needs to be checked.
7.50	The entry in relation to Wagga Beach Caravan Park could be updated to include procedures for evacuating mobile <i>cabins</i> , since in early September 2016 these were relocated from the park to the carpark near the Visitor Information Centre in Tarcutta Street.
7.62	The date of this flood is not described (Jul 1995?), and since no consequences are reported, there is negligible value in including such a minor flood in the FIC.
7.92	The date of this flood is not described (Oct 1992?), and since no consequences are reported, there is negligible value in including such a minor flood in the FIC.
8.65	The latest modelling and rating curve described in Figure 21 of Reference 3 places the 0.2EY flood at a height of about 9.05m, not 8.65m. Consequences could be sourced from this FRMS report.
8.69	The date of this flood is not described (Oct 2010?), and since no consequences are reported, there is negligible value in including such a minor flood in the FIC.
8.85	The historic flood date (7 Oct 1993?) to which the peak height refers needs to be added, together with any known consequences. For example, this flood is believed to have entered the laundry of a house in Gardiner Street North Wagga (outside the levee).
8.95	This flood peak on 4 October 2016 could be added to the FIC, together with observed consequences.

Gauge height (m)	Comment
9.00	It is likely that Council's informal levee works along the Hampden Avenue evacuation route from North Wagga increased the immunity of this route in the March 2012 event up to about 9.5m (TBC).
9.25	The latest modelling and rating curve described in Figure 21 of Reference 3 places the 10% AEP flood at a height of about 9.70m, not 9.25m. Consequences could be sourced from this FRMS report.
9.30	The statement about the time a decision needs to be made in relation to the possible emergency topping up of the North Wagga levee is somewhat ambiguous.
9.61	The historic flood date (15 Jul 1991) to which the peak height refers needs to be added, together with any known consequences. For example, this flood is believed to have reached knee-high in a house in Gardiner Street North Wagga (outside the levee).
9.70	The historic flood date (6 Dec 2010) to which the peak height refers needs to be added, together with known consequences.
9.90	Latest modelling (and observations in the March 2012 flood) shows the North Wagga levee is overtopped by 9.7m, not 9.9m.
9.95	Latest modelling places the 5% AEP flood at a height of 10.14m, not 9.95m. Consequences could be sourced from this FRMS report.
10.13	The historic flood date (24 Mar 1950?) to which the peak height refers needs to be added, together with any known consequences.
10.20	Latest modelling (and observations in the March 2012 flood) shows the North Wagga levee is overtopped by 9.7m, not 9.9m.
10.60	The historic flood date (6 Mar 2012) to which the peak height refers needs to be added. The latest estimate of the average frequency of this event based on flows is indeed about 3% AEP from Reference 3. Consequences should be reported including the number of houses or businesses flooded above floor in the various sectors (about 7 dwellings in Oura, about 7 dwellings in Gumly [4 badly], nearly all [about 190] dwellings in North Wagga within the levee, but few dwellings in North Wagga outside the levee).
10.70	The statement that the majority of houses in Gumly are inundated at this height needs to be confirmed.
10.74	The historic flood date (30 Aug 1974) to which the peak height refers needs to be added. The latest estimate of the average frequency of this event based on flows is about 1% AEP from Reference 3, not 60 or 70 year ARI as now superseded assessments estimated. Note that construction of levees and increased riparian vegetation mean that a given flow is likely to result in higher levels today than was the case in 1974.
10.75	Latest modelling places the 2% AEP flood at a height of 10.82m, not 10.75m. Consequences could be sourced from this FRMS report.
10.97	The historic flood date (2 Jan 1844) to which the peak height refers needs to be added. Note that construction of levees and increased riparian vegetation mean that a given flow is likely to result in higher levels today than was the case in the 19 th century.
11.31	Latest modelling places the 1% AEP flood at a height of 11.29m, not 11.31m. Consequences could be sourced from this FRMS report.
11.76	An entry could be added for the 0.5% AEP flood, which is at this height. Consequences could be sourced from this FRMS report.
12.32	An entry could be added for the 0.2% AEP flood, which is at this height. Consequences could be sourced from this FRMS report.
16.00	Latest modelling places the PMF at a height of 16.05m, not too dissimilar to the current listing of 16.00m. Consequences could be sourced from this FRMS report.

Appendix I References

- NSW State Emergency Service
1. **Wagga Wagga Local Flood Plan**
January 2006
- Bureau of Meteorology
2. **Special Climate Statement 39: Exceptional heavy rainfall across southeast Australia**
6 March 2012
- Wagga Wagga City Council
3. **Wagga Wagga Detailed Flood Model Revision**
WMAwater, August 2014