

## Hydrologist Report –

## : Issues in report

- After the extreme weather event that occurred in Eugowra on the 14<sup>th</sup> of November, numerous properties required hydrologist reports to determine where the water came from.
- Eugowra was one of those properties and a hydrologist report was provided. However, there are errors within the report and additional information that challenges some of its key points.
- The errors and additional information are provided in this document:

### WMS Hydrologist Report Details

<b>Subject Property</b>	
<b>Inspector</b>	
<b>Inspecting Company</b>	Water Modelling Solutions (WMS) contracted by Allianz Australia Insurance Limited
<b>Inspection Date</b>	06/12/2022
<b>Report Date</b>	23/12/2022

### Comments and challenging evidence on report - \*Quotes are from the official WMS Report provided for the subject property\*

- A. “Eugowra experienced severe rainfall on Sunday, the 13<sup>th</sup> of November 2022; however, the water only resulted in water ponding on fields. The water was gone the following morning.” – page 1.
- i. It is agreed that on the 13<sup>th</sup> of November and the early hours of the 14<sup>th</sup> of November 2022, Eugowra did experience severe rainfall. At the subject property, 103 mm of rain was recorded in the 24 hours prior to the November event which began at 0900 hours.  
  
The statement that the water was ponding on the field is correct, however the water was not gone the following morning. There was still water on the ground and the lane, estimated to be ranging from 20- 40 cm in depth.  
  
Photo 1 in Appendix A shows the water level present on Hillview Lane at approximately 0135 hours on the 14<sup>th</sup> of November and Photo 2 in Appendix A shows the water the was still present on Hillview Lane at 0908 hours on the 14<sup>th</sup> of November.  
  
It is clear through photo 2, that a considerable amount of storm water run-off was still present on the ground before the “wave of water” hit.
- B. “Mandagery Creek had broken its banks several kilometres upstream of Eugowra in the November 2022 event” – page 4.
- i. The report mentions the rainfall recorded for the Toogong gauge and the Mandagery gauge as well as the Eugowra gauge focusing on the month of November.  
  
Figure 1 of this document shows the recorded monthly rainfall for Toogong, Mandagery and Eugowra for November and the three months prior. Across all three gauges and across all months shown, the 2022 recorded rainfall was significantly higher than the average rainfall, in some cases it is more than double.
  - ii. Consistent above average rainfall causes saturation of the landscape which leads to storm water -runoff. As shown in A(i) of this document, stormwater was present at Eugowra before the ‘wave’ hit. Toogong and Mandagery had rainfall that was significantly above the average also, therefore, it is plausible to conclude that a significant amount of stormwater run-off was present in the region between Toogong and Eugowra, which is 20.3 km, and from Mandagery to Eugowra, which is 17.3 km.

This document acknowledges, however, that obtaining accurate measurements of storm water across a large region is not possible.

- iii. Even though an accurate measurement of storm water present cannot be obtained, the amount of rain that occurred in the 24 hours and months prior along with already “flashy” Mandagery Creek levels and its physically small capacity, it is plausible to question whether much of the water that inundated the subject property was in the creek to begin with.
- iv. Geographically, any storm water present from Mandagery and Toogong to Eugowra would flow in the same direction as the Mandagery Creek. The hydrologist report fails to account for this accumulation of storm water as it moved down the landscape.
- v. Figure 2 shows the large amount of water travelling across Eulimore Rd, which is approximately 6.63 km north-east of the subject property. This figure clearly demonstrates the sheer scale of the water that was present. After observing this figure, it would be illogical to conclude that all of that water originated from Mandagery Creek, which was described as simply “a meandering stream” in the report, and no storm water had been collected across the region.

C. Storm water run-off from Nangar National Park

- i. As B.(v) of this document states, Figure 2 shows water over Eulimore Rd which is to the left of The Escort Way. To the right of The Escort Way is privately owned paddocks and then the hills of Nangar National Park.
- ii. Photo 3 in Appendix A shows a border fence of a privately owned paddock that faces the Escort Way and hence the Mandagery Creek. It is clear in this photo that the fence is flattened in the direction towards The Escort Way. This indicates that a significant amount of storm water run-off from the Nangar National Park hills has travelled down, flattened the fence, gone across The Escort Way and joined the large body of water moving towards Eugowra.
- iii. This adds further evidence that the large body of water moving towards Eugowra included a substantial amount of storm water.

D. Implication that the water that inundated the subject property came from the “U-bend approximately 1 km north of the subject property.”

- i. The hydrologist report suggests that the water that inundated the subject property came from the Mandagery Creek U-bend approximately 1 kilometre north of the property, this is shown through the arrow in Figure 15 of the report, and quotes homeowner representative Rosemary Townsend stating that she saw a “white line from tree line to tree line”.
- ii. However, given the directionality of the water (including stormwater) flowing from Eulimore Rd and around Escort Rock, the water was moving in a south-westerly direction rather than southerly. Based off properties that are known to be impacted, such as ‘Karingah’ located 1.9 kilometres north-east of the subject property, directionality of fencing & property damage and a drone image showing water movement, the path of the water flow is shown in Figure 3. Images supporting this figure are included in Appendix A as photos 4-9. Photo 4 shows the two tree lines quoted from Rosemary. With the locality of tree line 2, water breaking solely from the Mandagery Creek U-bend north of the property would not have extended to meet the tree line.
- iii. Based on this directionality, the location of the subject property means it was impacted by water that came from Eulimore Rd and thus included stormwater.

E. mAHD recorded at subject property.

- i. At the subject property, the peak water depth was estimated to be 274.55 mAHD while the peak at the Eugowra town bridge was 272.43 mAHD.
- ii. Reasoning as to why the water peak depth was larger at the subject property than in town may include the properties proximity to the south westerly water, as shown in Figure 3, it is in the centre of the water path.

## **Terminology and technical errors in the report**

- F. Figure 5 in the report is irrelevant.
- i. On page 3 of the hydrologist report, Figure 3 and Figure 5 are mentioned as they demonstrate the recorded hourly rainfall from the Toogong and Mandagery gauges respectively across November.
  - ii. Figure 3 in the report is accurate, however, Figure 5 shows the Mandagery gauge recorded hourly rainfall levels across the month of October. As the event in question occurred in November and October rainfall had not been mentioned previously in the report, this graph is not relevant.
  - iii. The inclusion of an irrelevant graph undermines the accuracy of this report.
- G. No time stamp provided on Figure 4 and Figure 6
- i. Figure 4 and Figure 6 of the hydrologist report show the severity of rainfall across “the November event”. However, as the radar images provided in the report show, numerous different bands of rain developed and crossed over Eugowra, Toogong and Mandagery in the 24 hours prior to 0900 on the 14<sup>th</sup> of November and yet these figures show a negative near linear trend. Due to different bands of rainfall developing, moving across the region, and then dispersing, the rainfall severity should show a trend that fluctuates from positive to negative and vice versa. From examining these figures, they suggest that there was constant rainfall at both Toogong and Mandagery for 168 hours.
  - ii. Additionally, neither Figure 4 nor Figure 6 provide a time stamp from what time it measured the storm intensity.
  - iii. The figures show the intensity across duration (number of hours) however, does not state the time associated with the beginning and end of the graphed duration.
  - iv. Thus, there is no indication to when within “the November event” the measurements were taken. This generates uncertainty as to the validity of the measurements and adds to the confusion as to what the graphs are demonstrating.

## **Bureau of Meteorology – Influence of terminology**

Insurance policies have very specific and sensitive wording and therefore it is important to consider the terminology used by organisations who provided information for this hydrologist report:

- The Bureau of Meteorology provided and verified the data used in the hydrology report and thus, much of the Bureau’s terminology would have been used or would have influenced the wording of the hydrology report.  
For example, if the BOM refers to the water as flood water and issues ‘flood warnings’, the use of this terminology would highly influence hydrologist report writing.
- Therefore, clarification is required as to the Bureau’s definition of flood as it may not or not be required to provide a distinction between water leaving a creek or river and ground or stormwater run-off. Thus, the Bureau’s definition of flood may be an umbrella term used for convenience to describe all forms of water that are impacting or potentially going to impact a region regardless of where it came from.

### **Inability to insure subject property.**

The subject property was insured by Allianz Australia Insurance Limited under a farm package that included all infrastructure and machinery on the property. The option of flood insurance was not provided at all to this property as it is over 5 acres and not the owner's primary source of income. Therefore, the owners of the subject property had no opportunity to protect themselves from flooding.

- Explanation from Allianz is required as to why flood insurance was not available under this farm package.
- Additionally, if flood insurance was refused based on the subject properties' location within the Eugowra region, a settlement strategy published in 2021 by Cabonne Council shows that the subject property would be outside the "flood fringe" of the Mandagery Creek. This design model is shown in Figure 4 on this document.

### **Conclusions**

- The hydrologist report concludes that "local stormwater run-off could not have inundated the subject property above ground level" yet with the evidence provided in this document it is clear that the accumulation of stormwater run-off from regions between both Toogong and Mandagery to Eugowra has not been accounted for.
- Furthermore, there is significant evidence, such as the water from Nangar National Park, to question as to whether much of the water that travelled in a south westerly direction and inundated the subject property and Eugowra was even in the Mandagery Creek to begin with. Even so, the water from the National Park meeting with the water across Eulimore Rd proves that stormwater run-off was a part of the water that inundated the subject property.
- Ultimately, Eugowra has flooded and had above average rainfall in many instances. What sets this event apart is the constant above average rainfall that was present in the months prior at Mandagery, Toogong and Eugowra that caused an entirely "saturated catchment" and significant stormwater run-off to be present. It is illogical to conclude that Eugowra reached above a 1 in 5000 AEP design flood event without the accumulation of existing stormwater run-off from recent rainfall.
- Therefore, the sheer scale, speed and strength of the water that inundated and severely damaged the subject property could not have resulted solely from water leaving the Mandagery Creek and thus its scale and strength was greatly bolstered through the collection of stormwater run-off as water moved downward from Mandagery and Toogong.
- As a result, stormwater run-off played a significant role in the damage caused to subject property. With the evidence provided in this document, it is thoroughly convincing that the scale of inundation would have been far less if stormwater had not be present across the Toogong, Mandagery and Eugowra regions.



**Figures:**

	Eugowra Post Office			Toogong			Mandagery		
	2022 Measurement (mm)	Average recorded rainfall (mm)	recorded (mm)	2022 Measurement (mm)	Average recorded rainfall (mm)	recorded (mm)	2022 Measurement (mm)	Average recorded rainfall (mm)	recorded (mm)
August	100.4	47.8		83.5	39.4		125.2	53.0	
September	84.8	45.5		107.5	43.0		115.8	55.7	
October	142.6	54.2		91.5	42.1		119.2	55.8	
November	-	-		145.0	64.3		217.8	72.3	
Annual (including all 12 months)	-	-		890.5	577.7		1295.0	712.1	

Figure 1: Table showing the recorded monthly rainfall and annual total for Eugowra, Toogong and Mandagery in 2022 alongside the average recorded rainfall for the areas. This table was generated independently with all data provided by the Bureau of Meteorology (source: Monthly rainfall - Bureau of Meteorology).

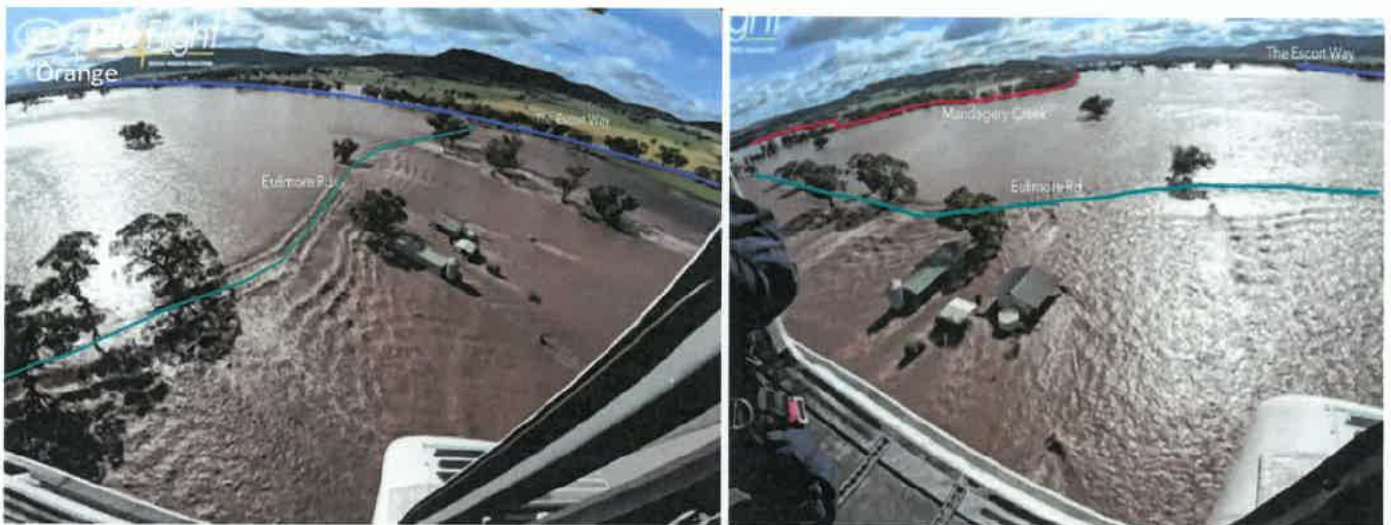


Figure 2: Screenshots of footage taken by the Life Flight rescue helicopter during "the November event". The Escort Way (dark blue), Eulimore Rd (turquoise) and the Mandagery Creek (red) are outlined in the images. The right-side image shows clearly the enormity of water moving towards Eugowra and adds evidence to question whether this amount of water was in the Mandagery Creek to begin with (source: the footage from the Life Flight helicopter was posted by Life Flight themselves on Facebook and reposted on the forum of the Eugowra Facebook page).



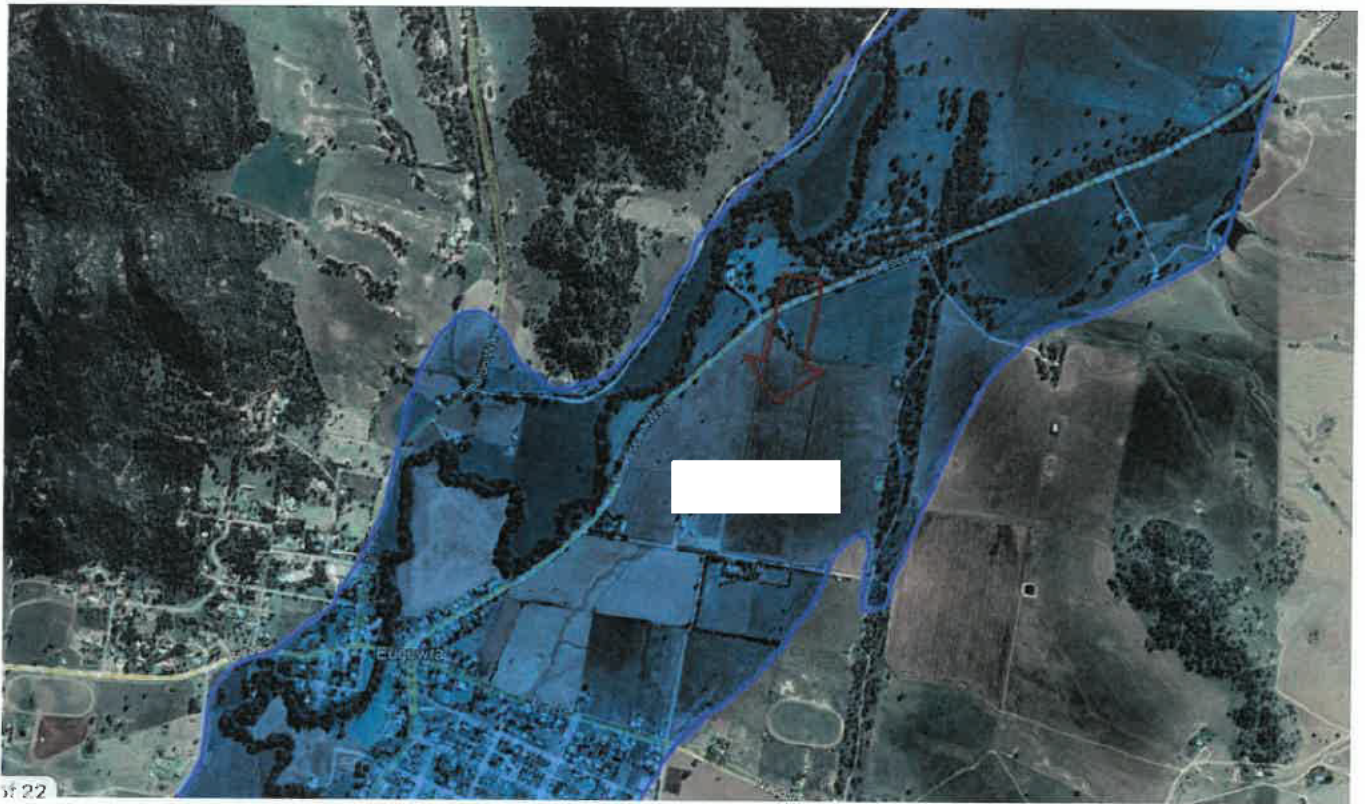


Figure 3: Map of Eugowra with the flow of water highlighted in blue. The physical satellite image was provided in the hydrologist report and shows the location of the subject property via a yellow pin and proposed directionality of the water by the hydrologist shown via the red arrow. The proposed water flow was drawn over the image independently using knowledge of properties impacted and photos 5-9 from Appendix A (source: personal images and knowledge).



Figure 4: map showing the Eugowra floodway published in the Cabonne Council Settlement Strategy 2021-2041. This report was published in May 2021 and shows the Mandagery Creek floodway along with the fringe floodway. The legend of the map covers where the subject property would be, therefore, an orange square with a black cross has been placed on the legend to provide the subject properties location. It is evident that the subject property sits outside of the Mandagery Creek floodway fringe (source: Cabonne Council: Cabonne Settlement Strategy 2021-2041).



## Appendix A



*Photo 1: Image of the water level present on Hillview Lane at approximately 0135 hours on the 14<sup>th</sup> of November 2022. The gateway to the subject property is shown on the left side of the image (source: personal image taken).*



*Photo 2: Shows the water that was still present on Hillview Lane at 0908 hours of the 14<sup>th</sup> of November 2022. The subject property is the main house and sheds shown in the image (source: personal image taken)*



*Photo 3: Image taken of a fence of a privately owned paddock that borders the Escort Way. Coming from Eugowra heading towards Orange on The Escort Way, this paddock fence is on the right-hand side of the road whereas the water shown in Figure is on the left-hand side (source: personal image taken with permission from paddock owner).*



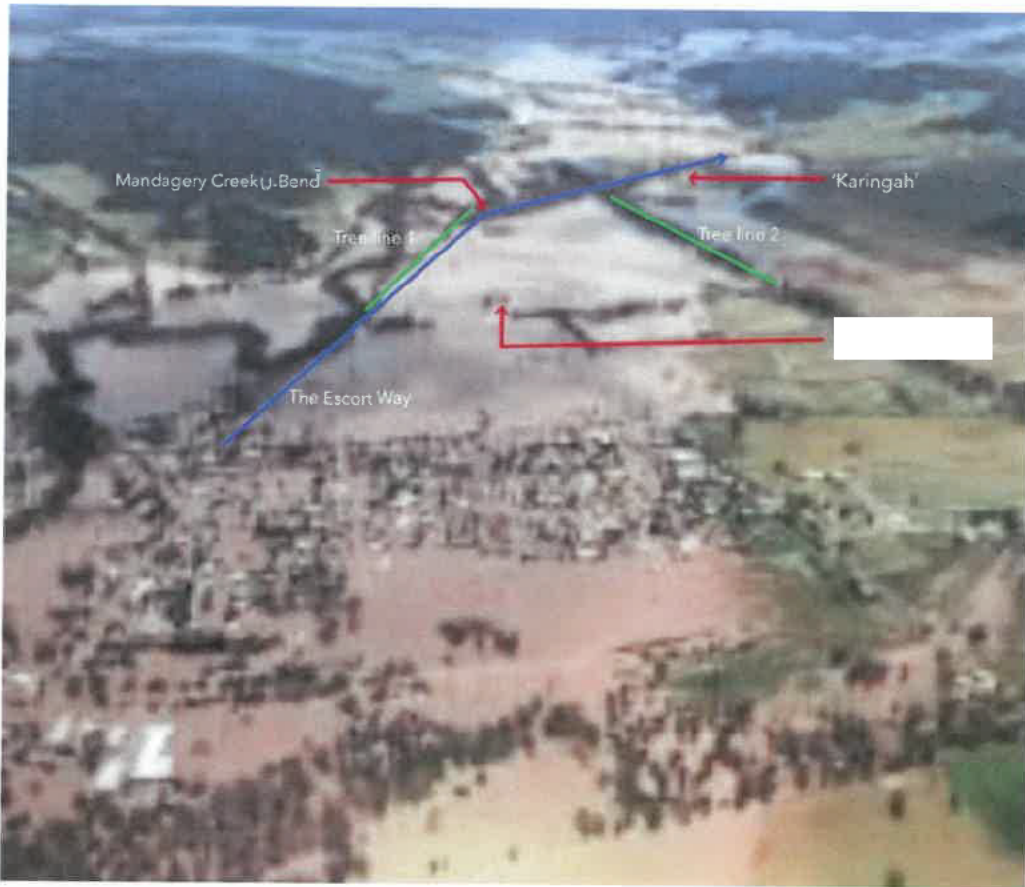


Photo 4: drone image taken of Eugowra during "the November event". On this image, the locality of the subject property is shown along with the location of 'Karingah', a property used as evidence in this document, the path of The Escort Way out of Eugowra and the two tree lines mentioned by homeowner representative Rosemary Townsend (source: posted on public forum Eugowra Supermarket Facebook page).



Photo 5: image taken amongst tree line 2 (from photo 4) showing flood debris on the north-eastern side of the trees, indicating water movement in a south westerly direction (Source: personal image taken on public land).



Photo 6: image taken of a fence line on a privately owned paddock that borders with Hillview Ln. It shows flood debris gathered on the north-eastern side of the trees, indicating water movement in the south westerly direction (Source: personal image taken with permission from land owner).





*Photo 7: image taken of a fence line of a privately owned paddock that borders both tree line 2 from Photo 4 and Hillview Ln. This image is taken on tree line 2 facing towards Eugowra with the subject property to the west of the photographer (source: personal image taken on public land).*



*Photo 8: Image of a machinery shed on the subject property. The photo shows the eastern facing side of the shed and a set of double doors that have been pushed inwards. Had the water only originated from the north, those double doors would not have been pushed inwards, rather outwards due to excessive water entry into the shed from the north (source: personal image taken of subject property from Hillview Ln).*



*Photo 9: image of another shed on the subject property. This photo shows the western side of the shed blown out and a boat that was originally parked pointing to the south, now pointing to the south west. Had that impact this property only originated from the north, it would have flowed in parallel with the sheds and pushed all that was inside out the southern end. Furthermore, the right-hand side of this image shows a shipping container that was originally placed east to west, it is now clearly on an angle (source: personal image taken on subject property).*

*\*All photos of private paddock fence lines used in this document have appropriate permissions from the owners to be included\**