

Mr. Brian PEARSON

Received by

Helen Hong

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RECURRENCE INTERVALS FROM ACTUAL FLOOD INFORMATION

Details of previous floods from 1799 to 1992 are from figures given in the 2018 Appendix 4 to Bill Bottomley website:

<http://www.billbottomley.com.au/wp-content/uploads/2015/11/appendices.pdf>

Also, there are no records of any floods submerging the bridge from 1992 to the present (2018).

Formula for recurrence intervals is: $n+1/m$ where n =number of years of record (219) and m =number of occurrences

| Hawkesbury River Flood Level at Windsor Bridge* | Number of Occurrences m | Recurrence Interval over 219 years, event per year |
|---|----------------------------|--|
| 7.0 m | 112 | 2.0 years |
| 8.0 m | 92 | 2.4 years |
| 9.0 m | 72 | 3.1 years |
| 10.0 m | 50 | 4.4 years |
| 11.0 m | 35 | 6.3 years |
| 12.0 m | 24 | 9.2 years |
| 13.0 m | 19 | 11.6 years |
| 14.0 m | 14 | 15.7 years |
| 15.0 m | 3 | 73 years |
| 16.0 m | 1 | 219 years |
| 17.0 m | 1 | 219 years |
| 18.0 m | 1 | 219 years |
| 19.0 m | 1 | 219 years |
| 20.0 m | 0 | - |

- the deck level of the Windsor Bridge over the Hawkesbury River is RL 7.0AHD (once in 2.0 years)
- the deck level for RMS Option 1 is about 9.8AHD (once in 4.1 years)
- the once in 5 year flood is approximately RL 10.7*AHD
- the once in 10 year flood is approximately RL 12.3*AHD

*See table below from Hawkesbury Floodplain Risk Management Study & Plan Volume 1 - Main Report Revised Draft for Public-Exhibition By Bewsher July 2012

Report of Hawkesbury City Council's Floodplain Risk Management Advisory Committee

| Flood event | North Richmond Bridge | *Windsor Bridge | Sackville Ferry | Lower Portland | Leets Vale | Webbs Creek Ferry |
|-------------|-----------------------|-----------------|-----------------|----------------|------------|-------------------|
| 5 year | 12.5 | 11.1 | 7.4 | 5.5 | 3.8 | 3.2 |
| 10 year | 14.0 | 12.3 | | | | |
| 20 year | 15.3 | 13.7 | 10.2 | 7.5 | 5.2 | 4.4 |
| 50 year | 16.4 | 15.7 | 11.7 | 9.1 | 6.5 | 5.6 |
| 100 year | 17.5 | 17.3 | 12.9 | 10.3 | 7.6 | 6.7 |
| 200 year | 18.9 | 18.7 | | | | |
| 500 year | 20.4 | 20.2 | | | | |
| 1000 year | 22.1 | 21.9 | | | | |
| PMF | 26.5 | 26.4 | 23.0 | 22.3 | 17.9 | 16.3 |

the once in 5 year flood is approximately RL 10.7*AHD
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Checking influence of Warragamba Dam construction on recurrence intervals
On basis of since Warragamba Dam completion (1949 to 2018 – 69 years):

| Hawkesbury River Flood Level at Windsor Bridge* | Number of Occurrences m | Recurrence Interval over 69 years, event per year |
|---|-------------------------|---|
| 7.0 m | 52 | 1.2 years |
| 8.0 m | 39 | 1.6 years |
| 9.0 m | 29 | 2.1 years |
| 10.0 m | 15 | 4.1 years |
| 11.0 m | 12 | 5.2 years |
| 12.0 m | 6 | 10.3 years |
| 13.0 m | 4 | 15.5 years |
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Website:

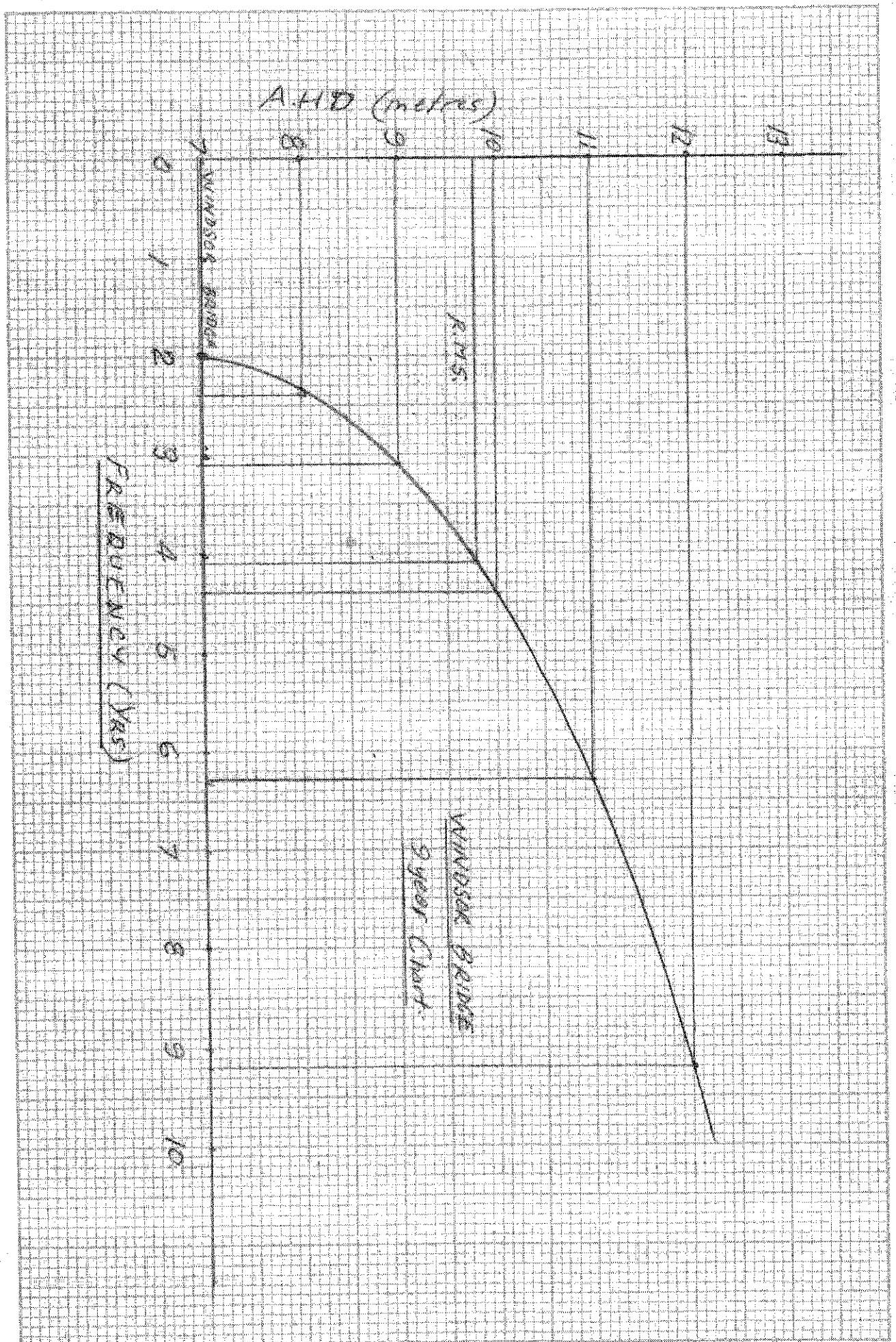
https://www.hawkesbury.nsw.gov.au/__data/assets/pdf_file/0017/52820/ORD_DEC_2012_Att1toltem224V1.pdf

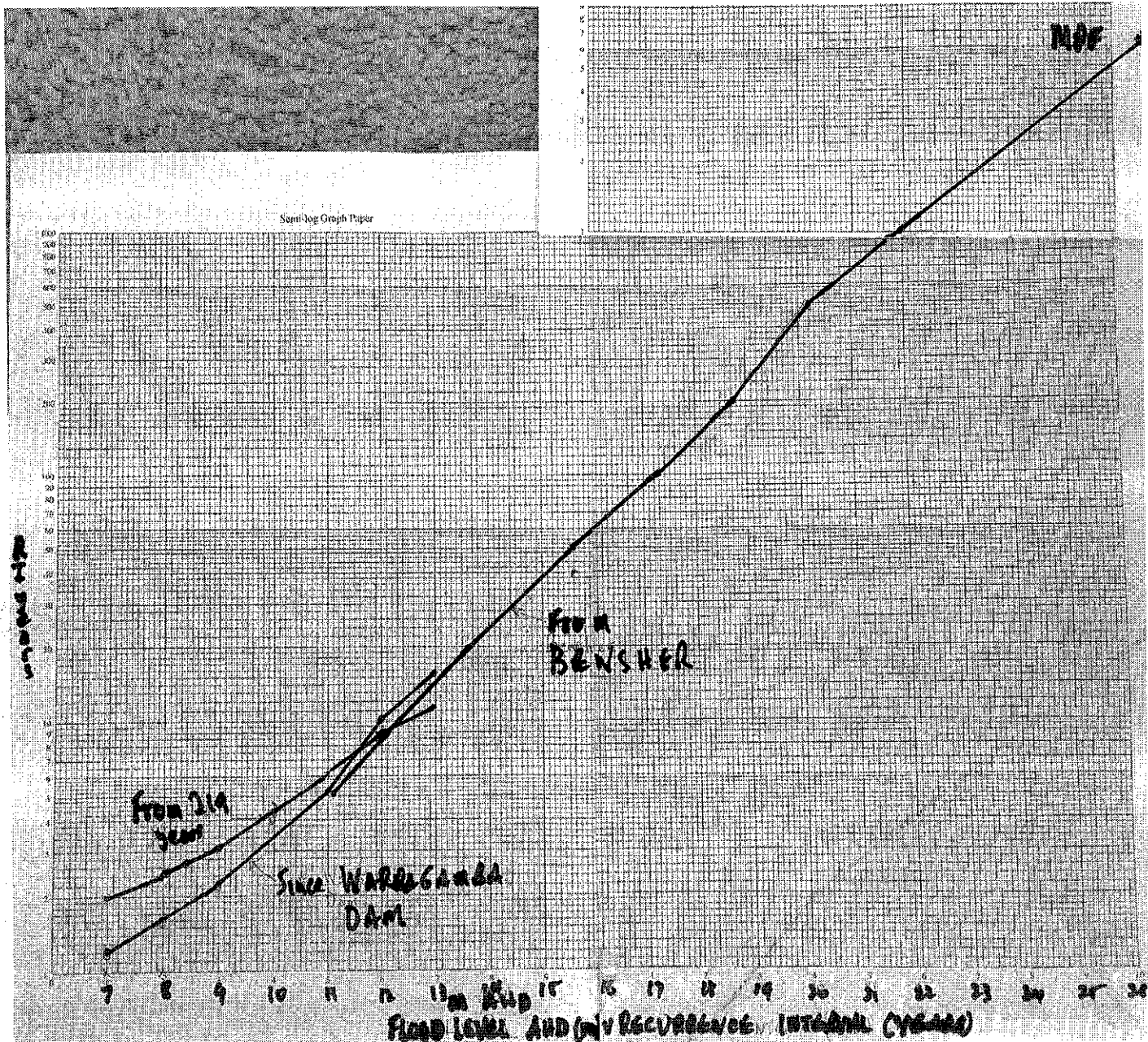
Hawkesbury City Council's Floodplain Risk Management Advisory Committee

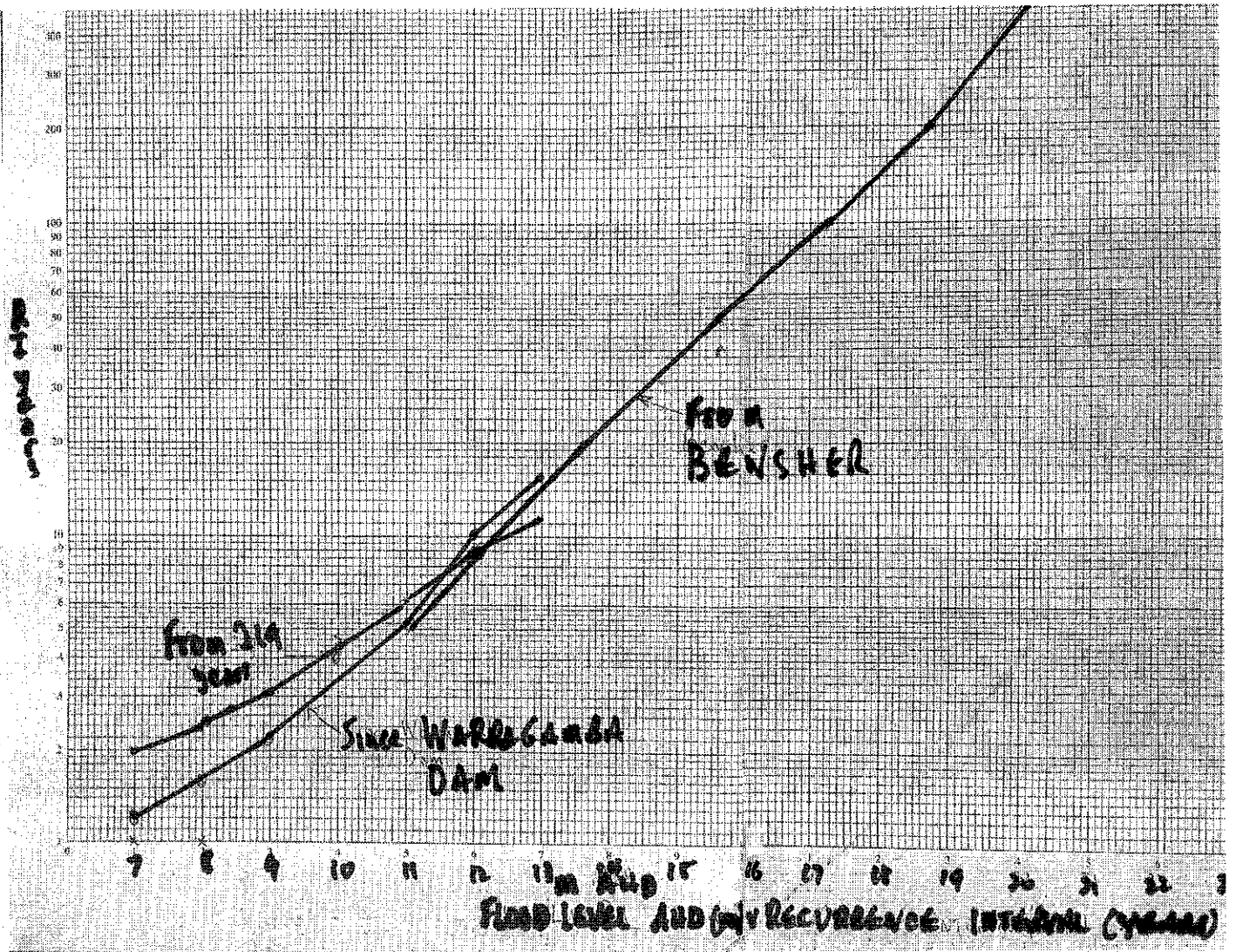
July 2012

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Also, there are no records of any floods submerging the bridge from 1992 to the present (2018).

Formula for recurrence intervals is: $n+1/m$ where n =number of years of record (200) and m =number of occurrences

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Website:

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