

**Review of: Pinehaven Stream flood 8 December 2019 at Chatsworth road gauge site and its implications for flood frequency estimates in the catchment.**

**Prepared by Robert Hall, 22 July 2020.**

The report provides an estimate of the peak flow for this event at Chatsworth Road staff gauge. Extensions are made to the incomplete GWRC rating curve, which then enables a revision of the previous (MWH, SKM) flood frequency analysis for Pinehaven Stream.

Flood profile survey data was provided by SOH for this analysis which is in lieu of flood flow measurements not undertaken by GWRC.

**Section 1:**

Whilst not a hydraulics engineer, I can confirm the mean velocity derived are close to the previous independent work completed for the 23 July 2009 flood which was some 67 mm higher on the staff gauge. This independent work was based on mean velocity estimates passing through a measured area for the same location.

**Section 2:**

The extended rating curve will provide more reliable estimates.

**Section 3:**

This is a thorough reality check using 6 methods to derive flood frequency curves and is something that was missing from previous flood frequency studies for Pinehaven Stream which were limited, and over-estimated flows considerably. When compared MWH mean annual flood will have an average return interval of approximately 10 years. Furthermore MWH's 10 year flood is revised to be beyond the 100 year return interval.

**Conclusions**

The conclusions drawn from the analysis are sound, indicating clearly that previous flood frequency analysis prepared for GWRC be abandoned along with the proposed stream upgrade. I would add, future upgrades be delayed until at least 10 years of continuous flow measurements have been completed on Pinehaven Stream to enable a revision of the Pinehaven Stream flood frequency analysis. It is unfortunate the flow recorder site installed in 2008 was removed, as 12 years of flow data would have been available today.

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