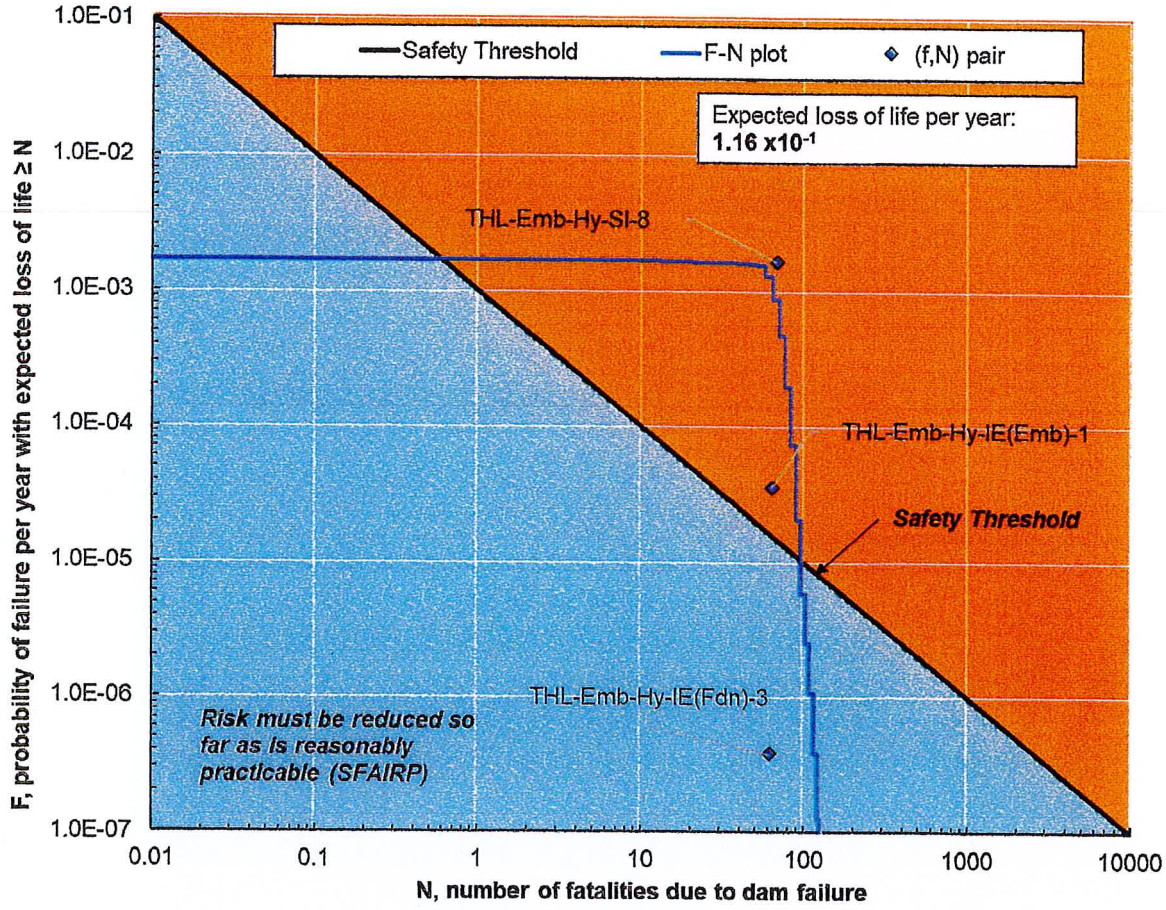

Figure E-1 ***Estimated bound of the likely F-N plot (Government Gazette of the State of New South Wales Number 113, 2022)***

Where:

THL-Emb-Hy-IE(Emb)-1 represents failure due to internal erosion through the embankment under hydrostatic loading.

THL-Emb-Hy-IE(Fdn)-3 represents failure due to internal erosion through the foundation under hydrostatic loading.

THL-Emb-Hy-IE(EmF)-5 represents failure due to internal erosion through the embankment into the foundation under hydrostatic loading.

THL-Emb-Hy-SI-8 represent failure due to slope instability under normal/hydrostatic loading.

Based on the results of the societal risk calculations, the F-N plot representing the estimated level of societal risk plots above the safety threshold outlined in the NSW Government Gazette No. 113 (2022). The individual risk for Thornleigh Reservoir is 8.4E-04 per annum which is also above the limit of 1.0E-4 set out in the Dams Safety Regulation (2019). The total annual risk to life posed by Thornleigh Reservoir, expressed as the Expected Total Annual Loss of Life is estimated to be 1.16E-01 per annum. Based on the results, the slope instability failure mode (THL-Emb-Hy-SI-8) is the key contributor to the total risk: This is due to the high annual probability of the failure mode as well as the high incremental potential loss of life (PLL) resulting from the failure of the embankment slope, particularly the southern embankment, where residential houses are located directly downstream of the embankment toe and evidence of slope displacement is observed, which is a possible indication of slope instability. As such, it is emphasised that failure of the southern embankment is of serious concern and actions should be prioritised to reduce the risks of failure for this key failure mode. Furthermore, even if the key failure mode (slope instability) driving the societal risk is removed, the F-N plot will still plot above the safety threshold. This is due to the second contributing failure mode (THL-Emb-Hy-IE(Emb)-1) internal erosion through the embankment, which has an expected risk to life of 2.32E-03 per annum, that will result in the F-N plot for this failure mode plotting above the safety threshold.