

Presented by:



Rory Nathan
University of
Melbourne

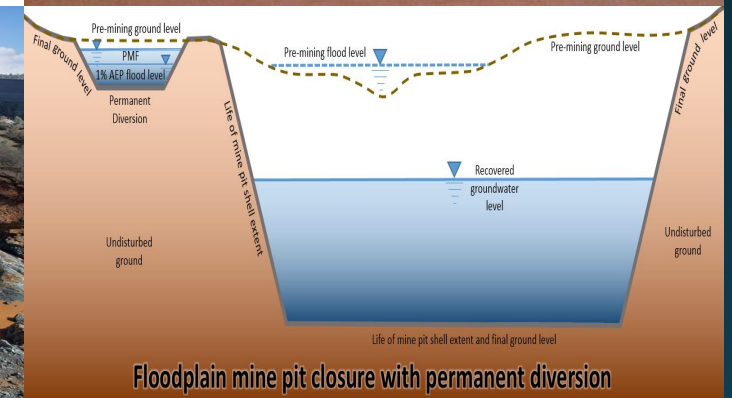
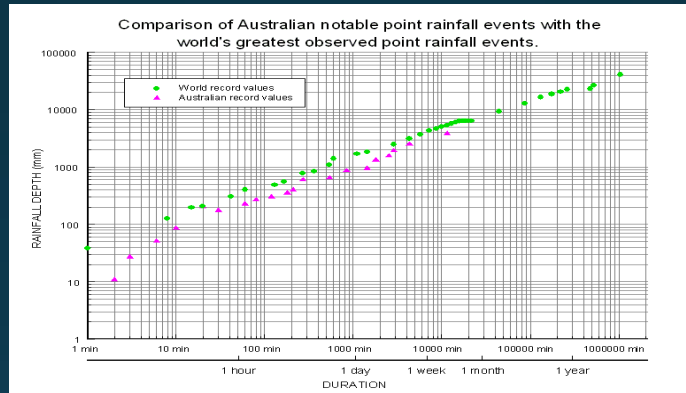
Daryl Lam
Water
Technology



Krey Price
Surface
Water
Solutions

What the PMF?

Event-based vs duration-based design criteria





Torrential rain has caused deadly floods in Henan province



Guardian graphic

72 hours

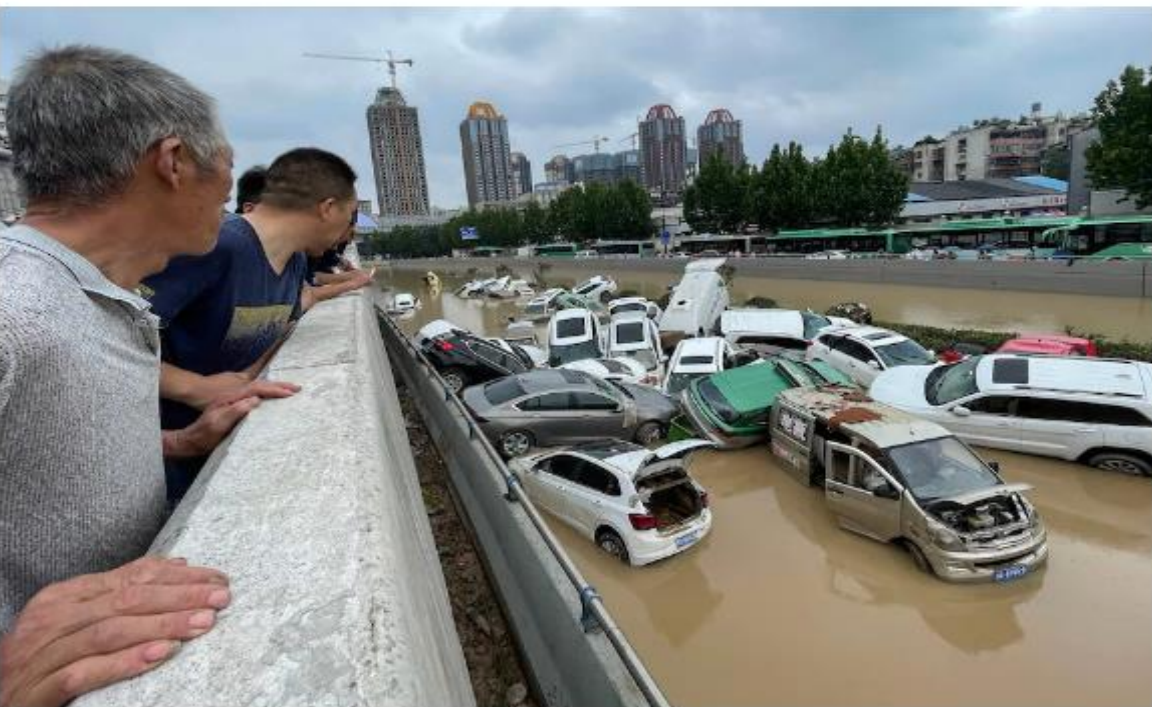
A year's worth of rain - **640mm** (25.2in) - fell in **three days**. It broke daily and hourly records and government officials said it was a one-in-1,000-year event. The city's weather bureau said more than **552mm** of rain had fallen between **7pm on Monday and 7pm on Tuesday**, including **202mm** between **4pm and 5pm** on Tuesday. **24 hours**

1 hour

The network's line 5 was inundated, trapping commuters on carriages and forcing the evacuation of at least 500 people, according to state media.

Eight inches in one hour: How a deadly downpour flooded Zhengzhou, China

At least 25 are dead after disastrous flooding that submerged trains and turned roads into rivers



The aftermath Wednesday of the heavy rain in Zhengzhou, a city in China's eastern Henan province. (AFP/Getty Images)

By Matthew Cappucci

July 21, 2021 at 4:42 p.m. EDT

Gift Share Print

At least 25 people were killed in subway cars amid devastating flooding in eastern China on Tuesday. Zhengzhou, the capital of Henan province and home to more than 10 million people, suffered an extreme downpour that proved the heaviest ever observed in China and among the most significant on record globally.

A staggering 7.95 inches (201.9 millimeters) of rain came down between 4 and 5 p.m. Tuesday, one of many reports of significant to prolific rainfall that resulted in deaths and damage across eastern China. It contributed to a daily rain total that exceeded 24 inches in Zhengzhou.

Torrential rain has caused deadly floods in Henan province



Guardian graphic

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The network's line 5 was inundated, trapping commuters on carriages and forcing the evacuation of at least 500 people, according to state media.



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Australia's Record Rainfall

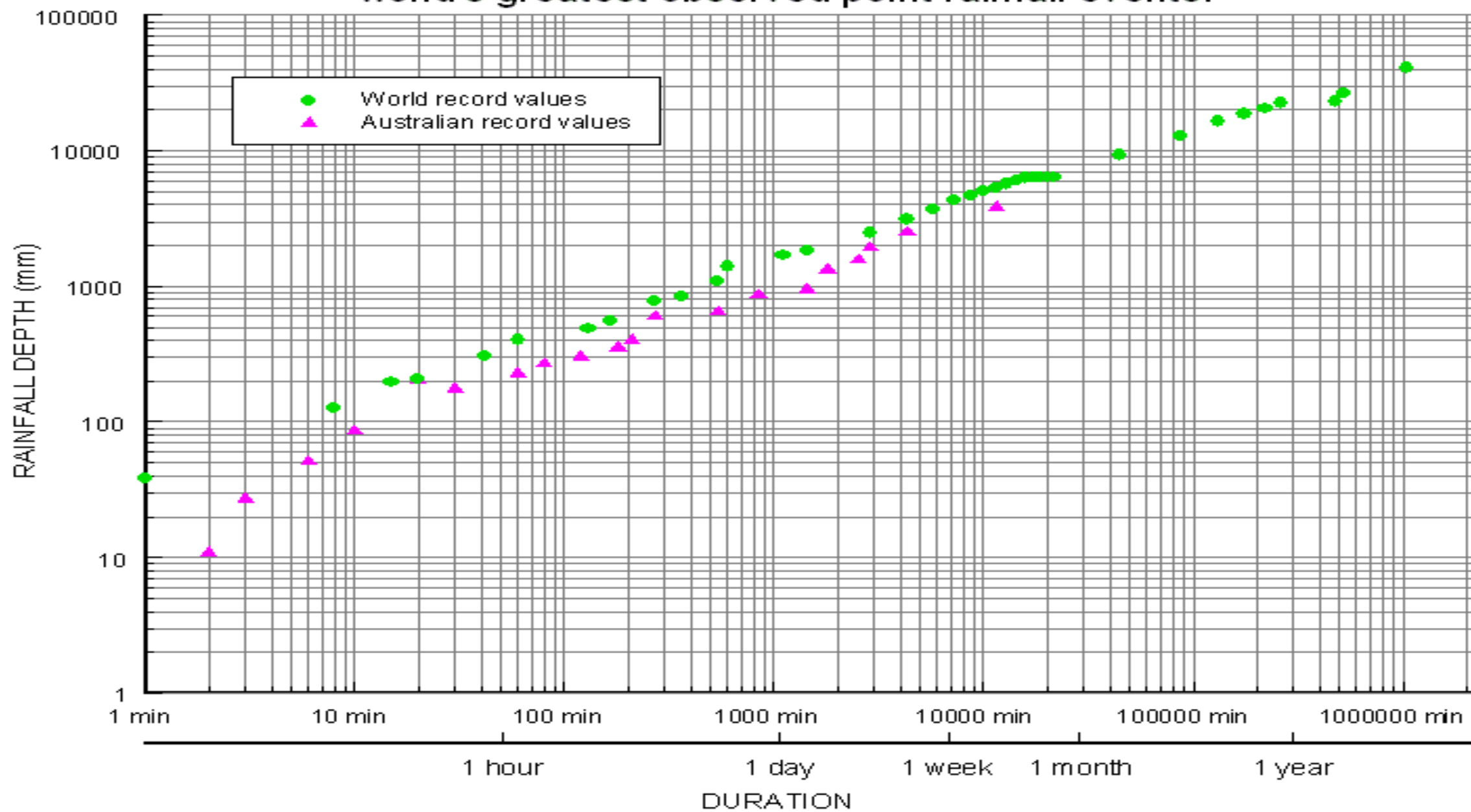
Australia

- [Australian Capital Territory](#)
- [New South Wales](#)
- [Northern Territory](#)
- [Queensland](#)
- [South Australia](#)
- [Tasmania](#)
- [Victoria](#)
- [Western Australia](#)

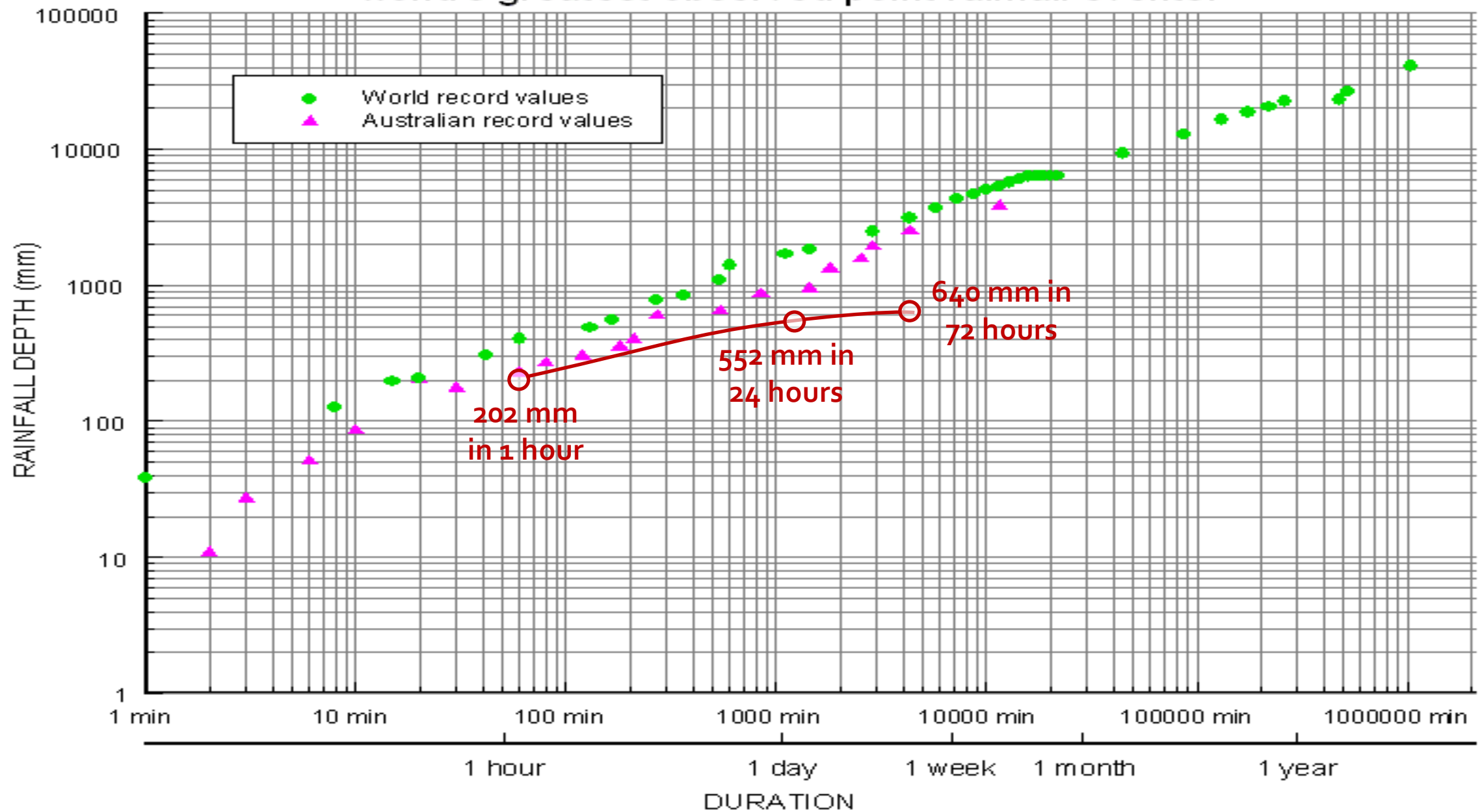
Rainfall Events

- [World's Record Rainfall](#)
- [Australia's Record Rainfall](#)
- [Why do 100 year events happen so often?](#)

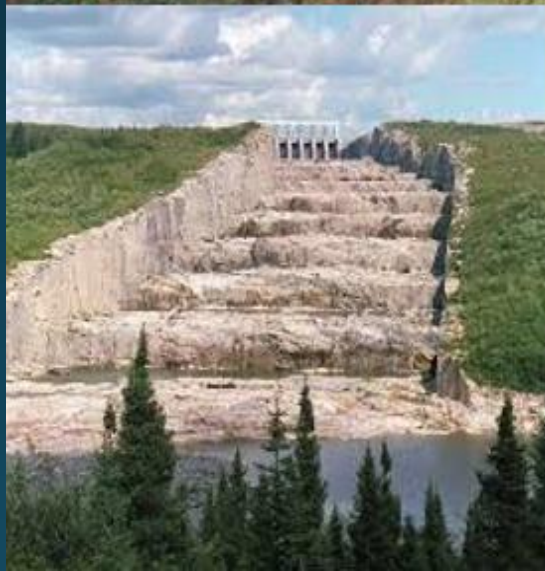
Comparison of Australian notable point rainfall events with the world's greatest observed point rainfall events.



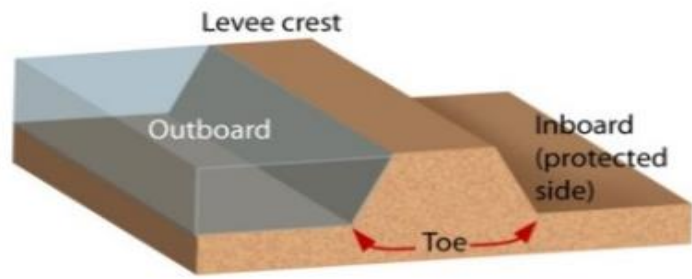
Comparison of Australian notable point rainfall events with the world's greatest observed point rainfall events.



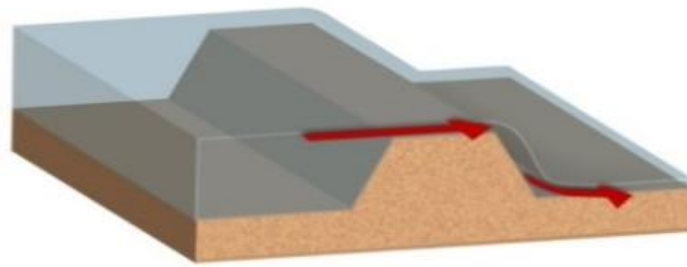
Spillway Design



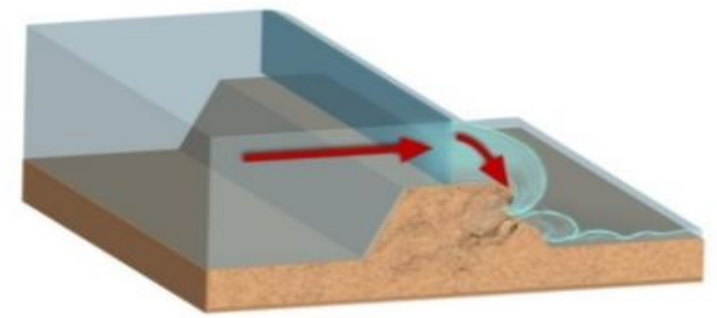




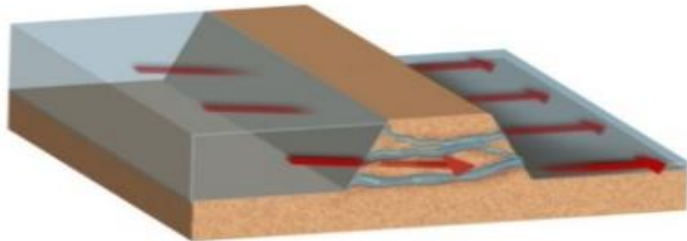
Anatomy of a levee



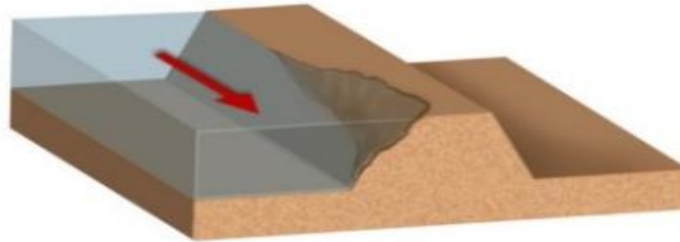
1a. Overtopping



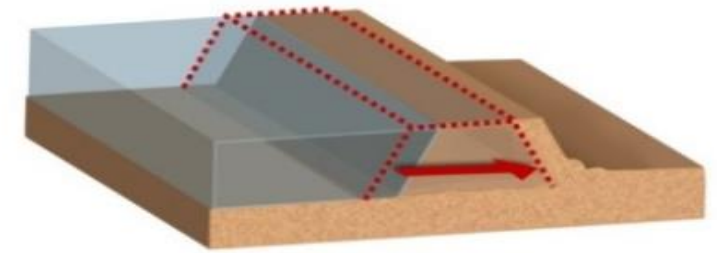
1b. Overtopping/Jetting



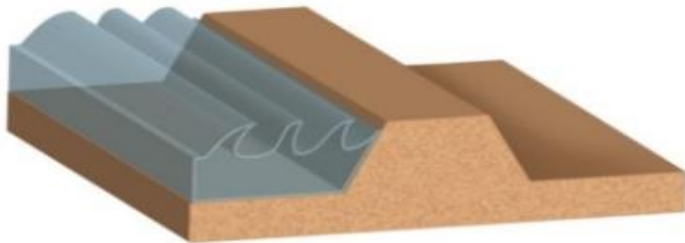
2. Internal Erosion/Piping



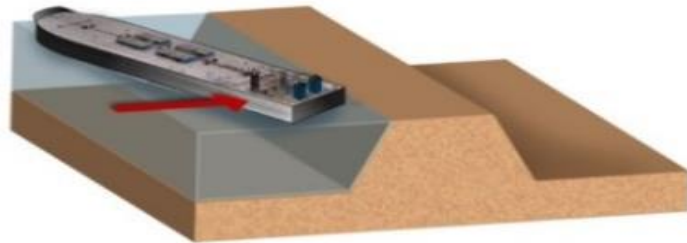
3. Surface Erosion



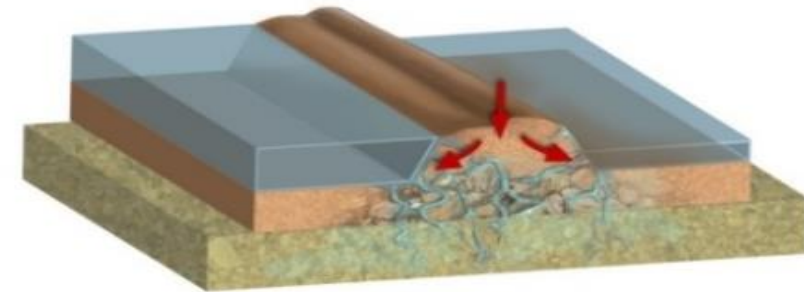
4. Sliding



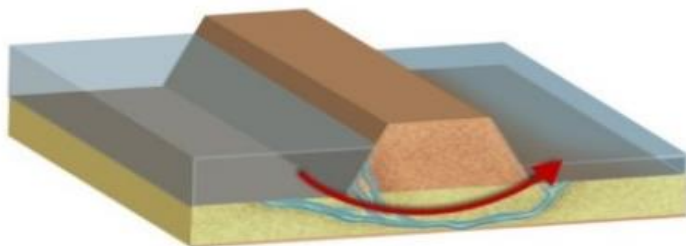
5. Wave Impacts



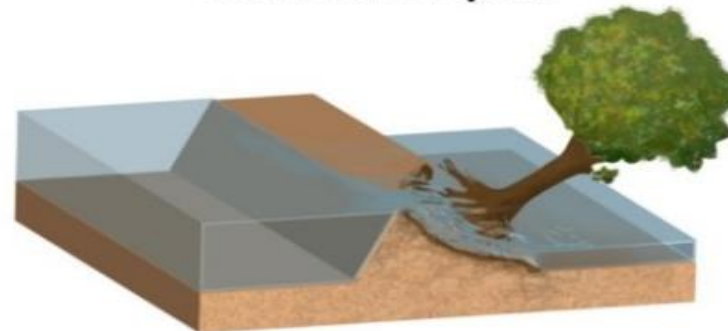
6. Structural Impacts



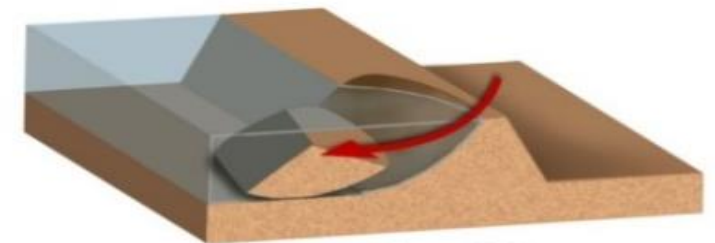
7. Liquefaction



8. Piping of substratum



9. Tree damage



10. Slope failure

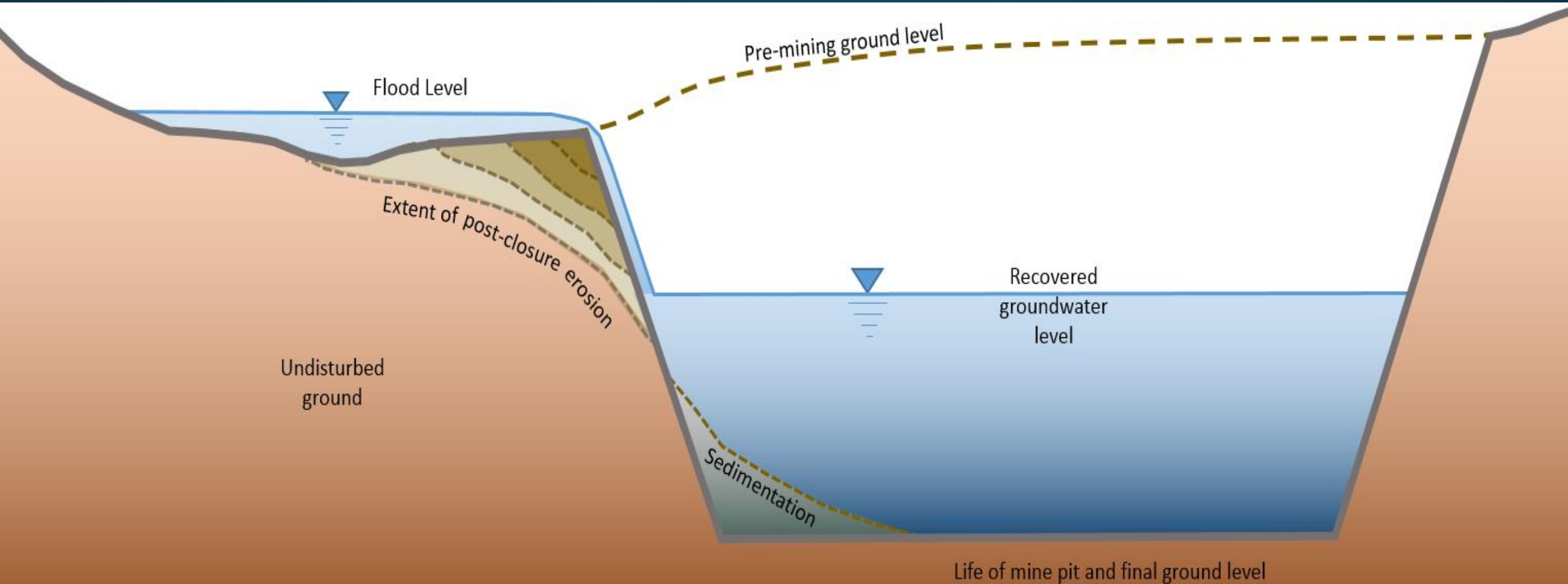
Diversions and Creek Capture



Diversions and Creek Capture

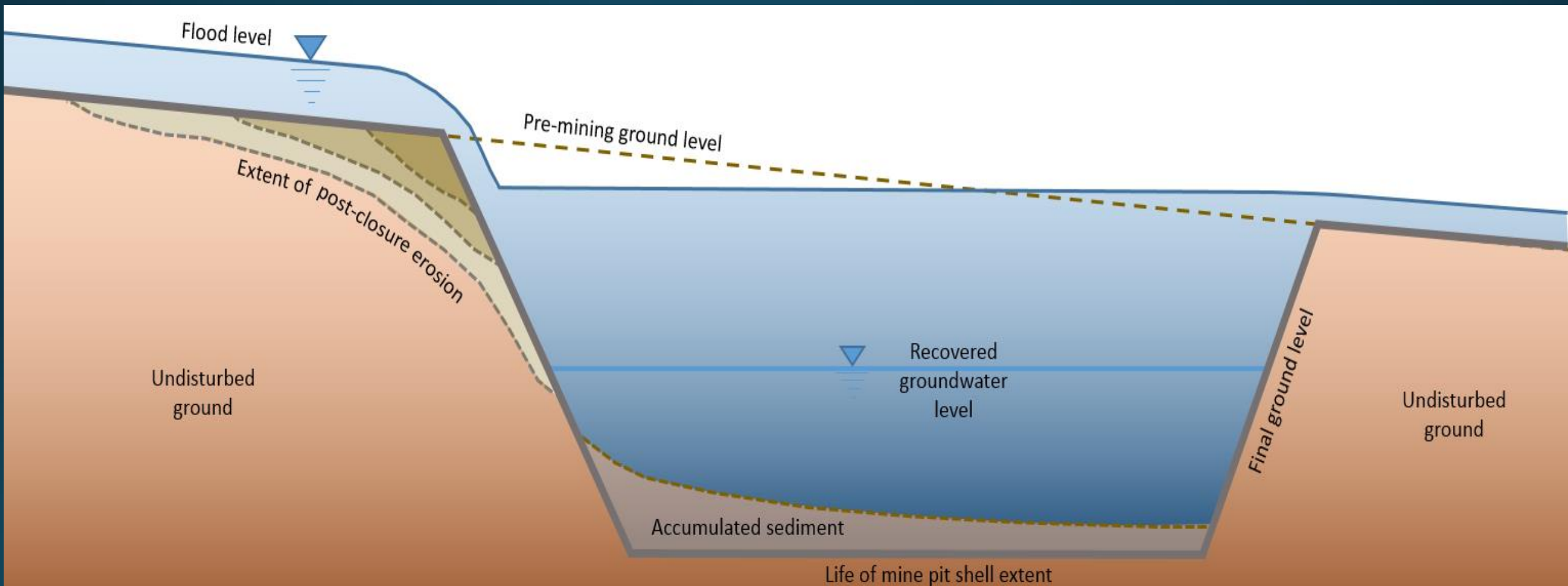


Diversions and Creek Capture



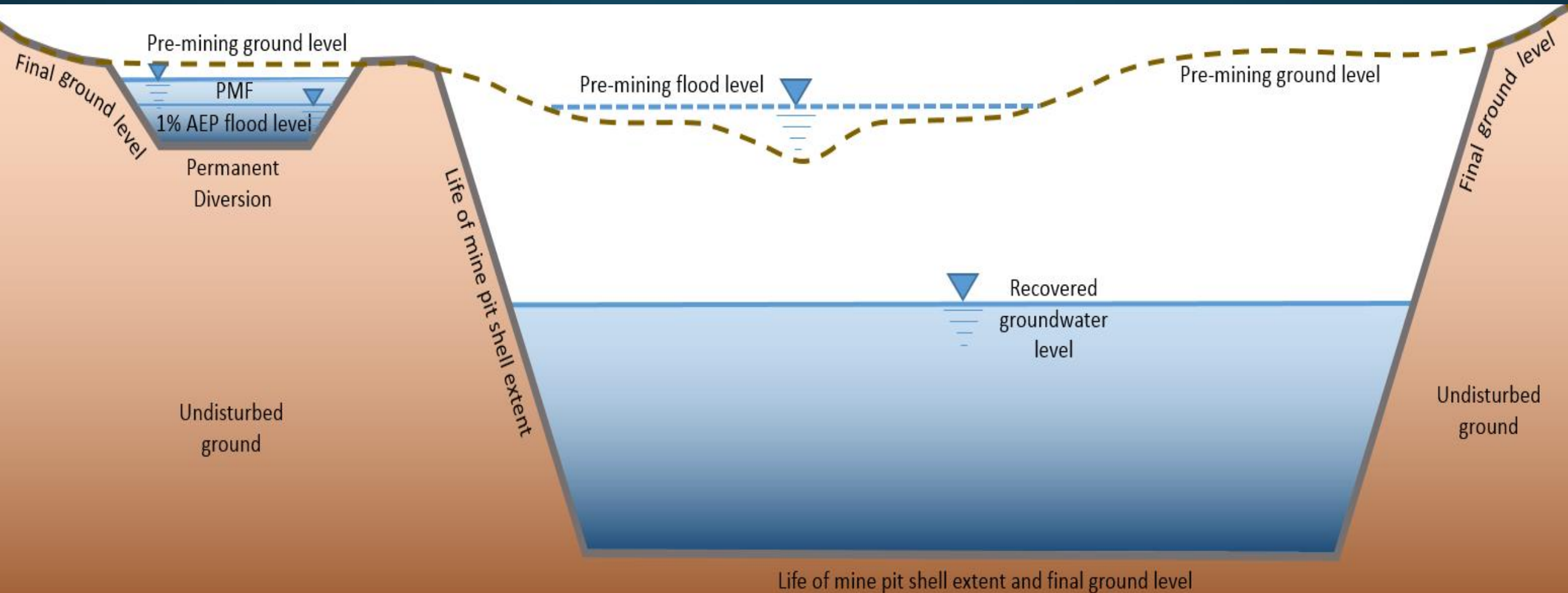
Typical cross section for creek capture scenario

Diversions and Creek Capture



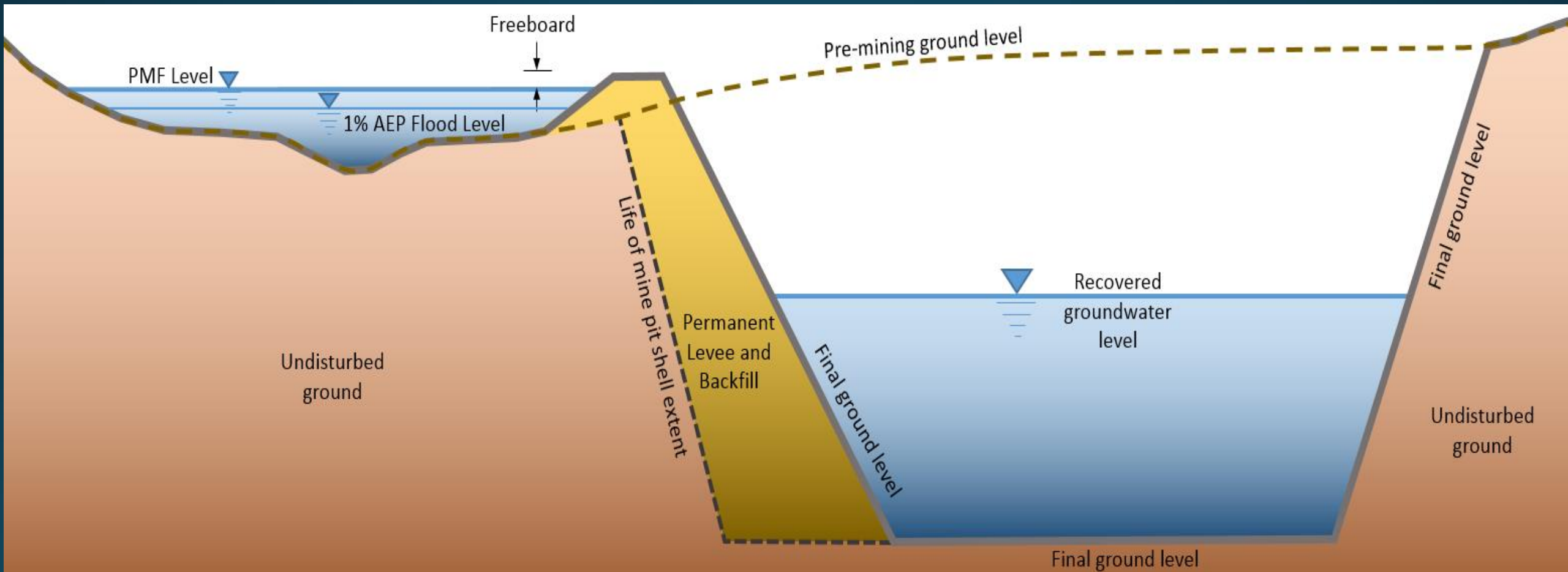
Typical longitudinal profile for creek capture scenario

Permanent Diversion?



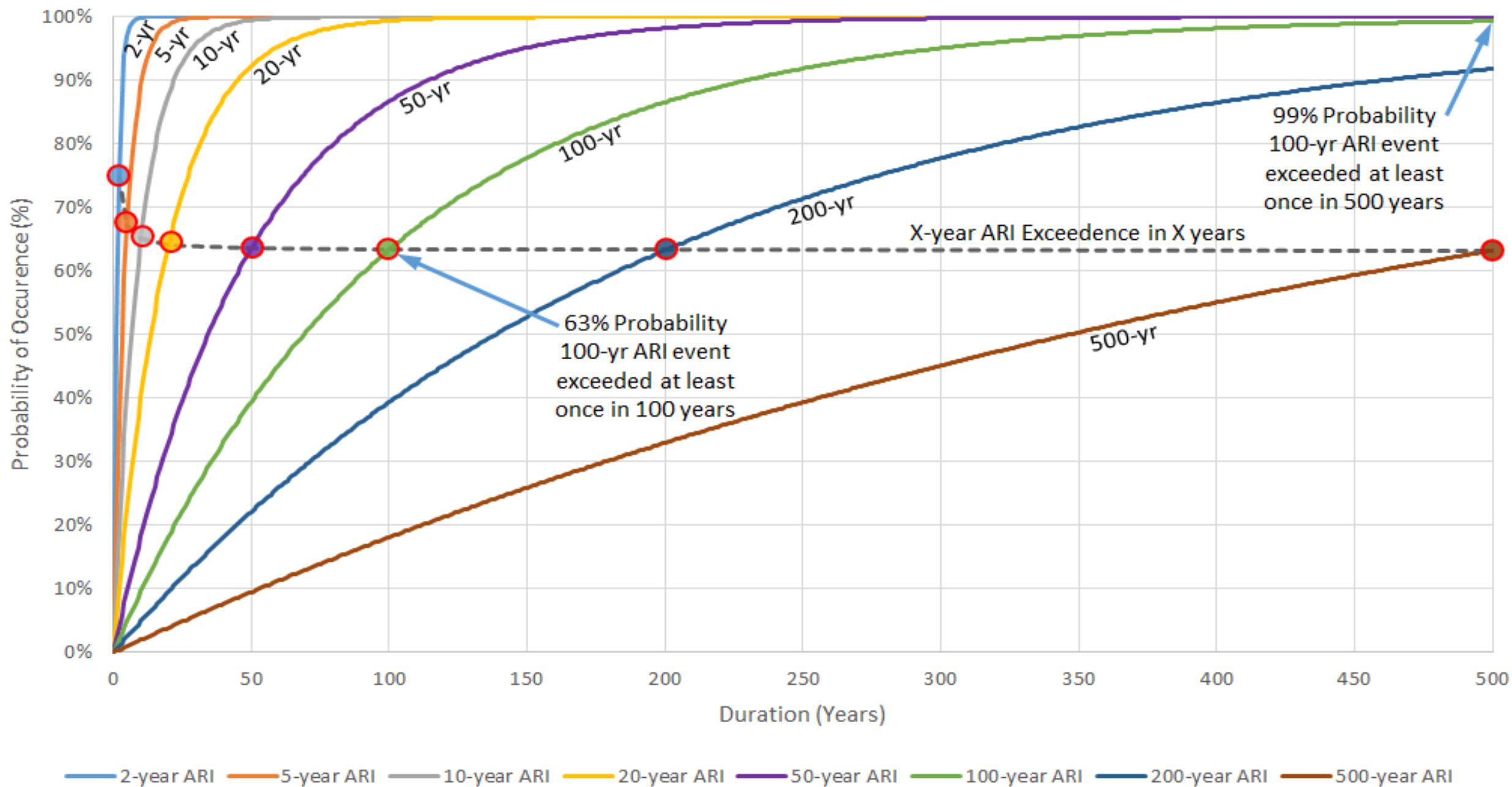
Floodplain mine pit closure with permanent diversion

Permanent Diversion?



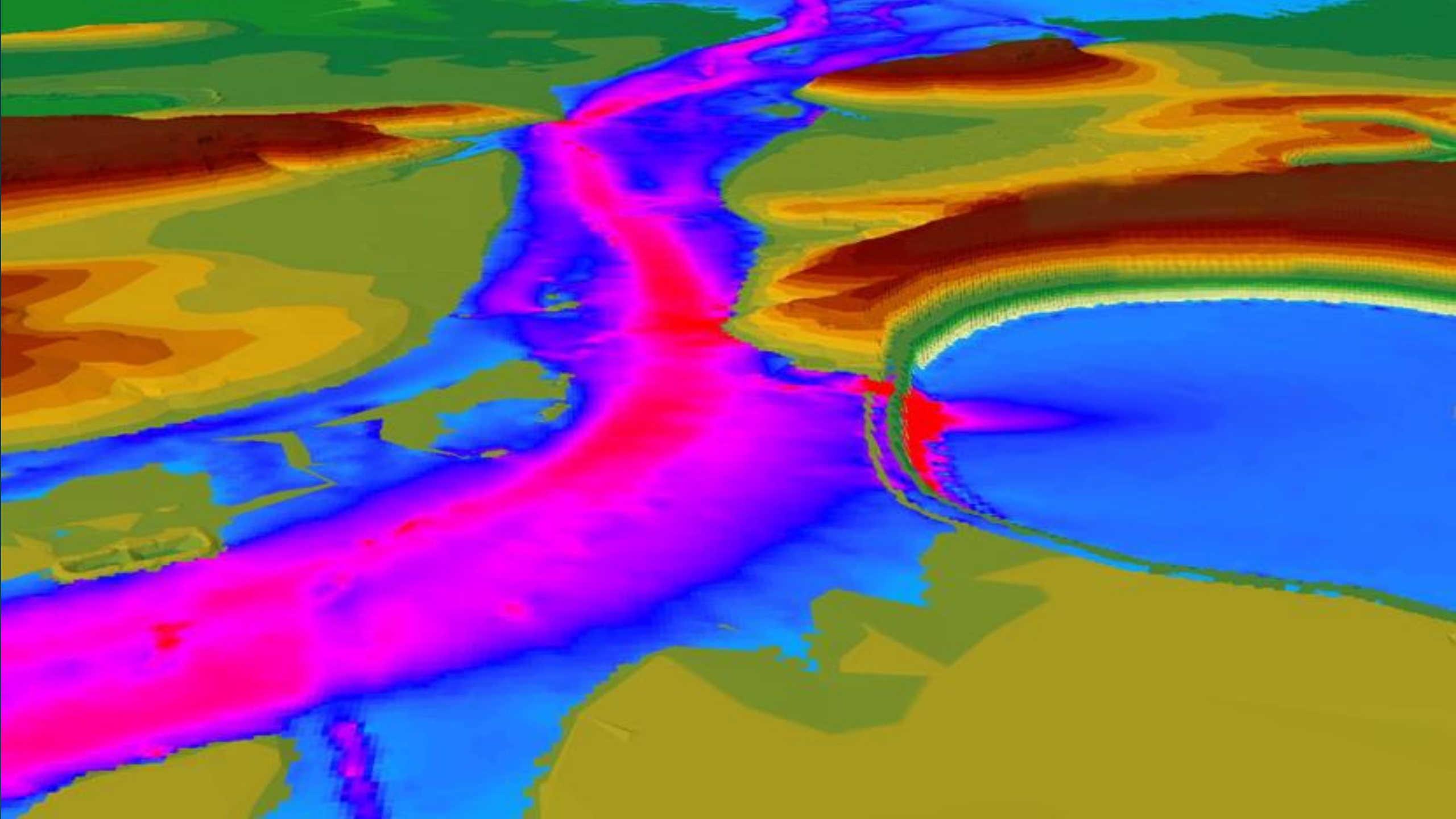
Floodplain mine pit closure with permanent levee

Probability of Event-based Exceedance over Duration of Assessment



Analysis Options

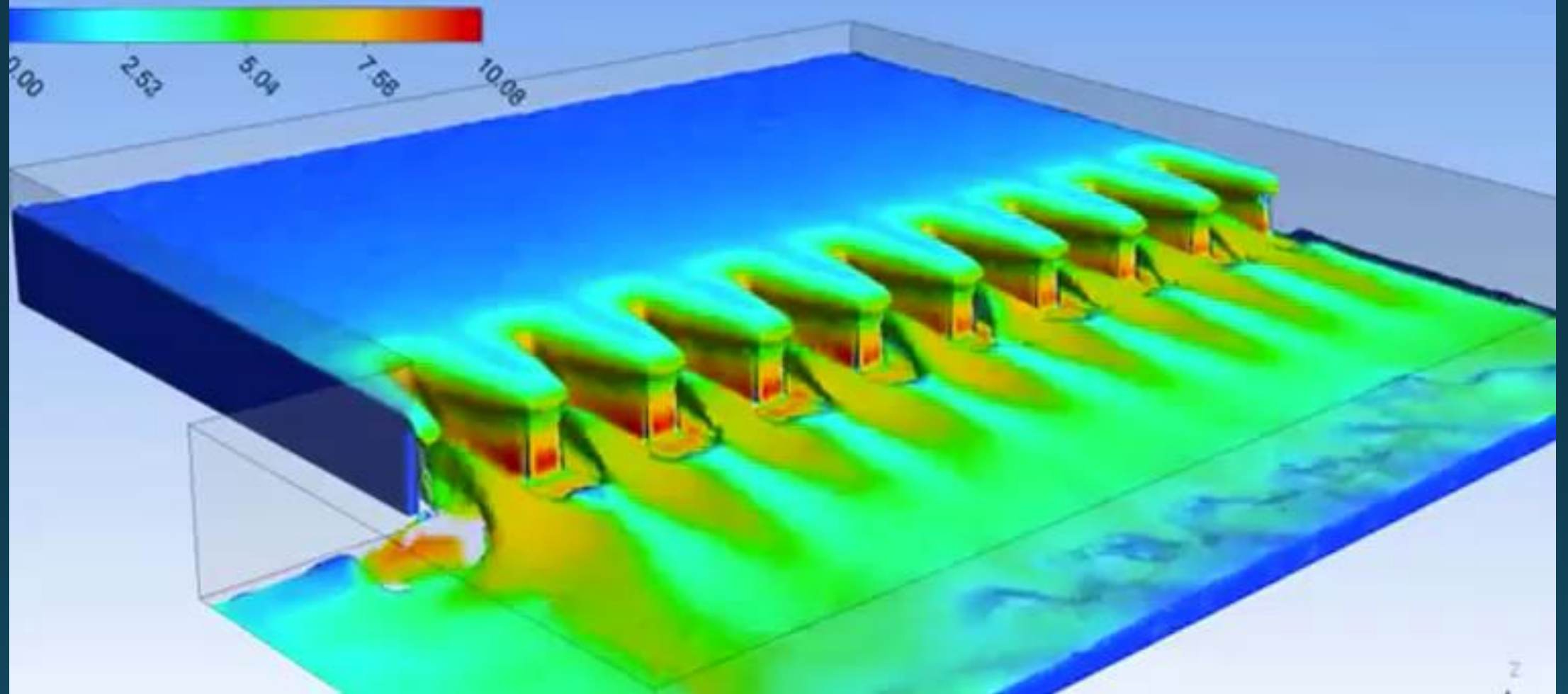
- 1D Hydraulics
- 2D Hydraulics
- 3D/CFD
- Landform Erosion
- Sediment Transport
- Geotechnical Modelling
- Stochastic Hydrology
- Flood Frequency Analysis
- Spreadsheet?



Agua velocity
isosurface 1

[m s⁻¹]

ANSYS
R13



Spillway Failure



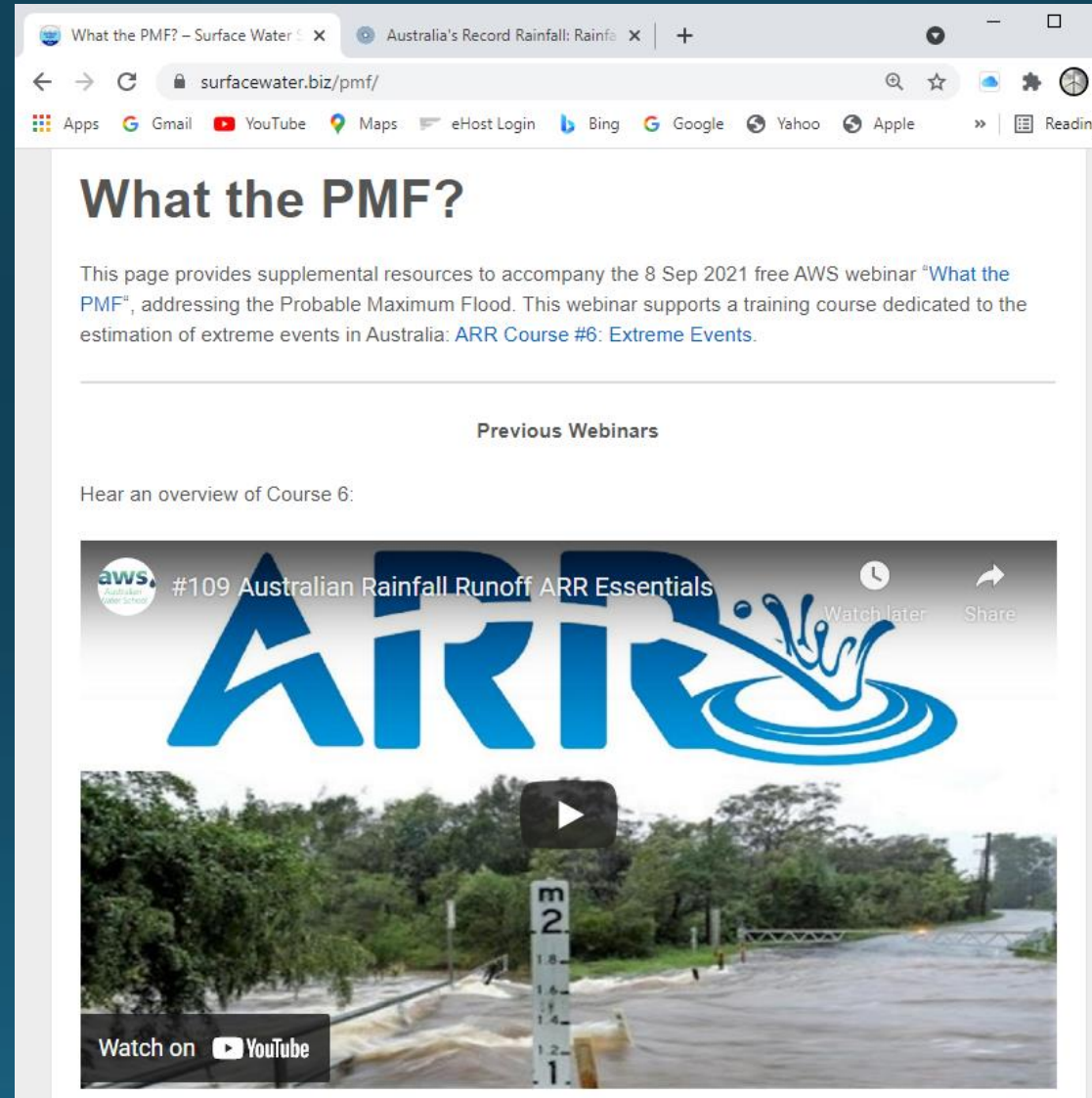




Consequence Assessment



Additional Resources



The screenshot shows a web browser window with two tabs: "What the PMF? - Surface Water" and "Australia's Record Rainfall: Rainf...". The address bar shows "surfacewater.biz/pmf/". The page content includes a heading "What the PMF?", a paragraph of text, a "Previous Webinars" section, and a video player for "AIRR".


What the PMF?

This page provides supplemental resources to accompany the 8 Sep 2021 free AWS webinar "What the PMF", addressing the Probable Maximum Flood. This webinar supports a training course dedicated to the estimation of extreme events in Australia: [ARR Course #6: Extreme Events](#).


Previous Webinars

Hear an overview of Course 6:

#109 Australian Rainfall Runoff ARR Essentials



Watch later Share



Watch on YouTube

Presented by:



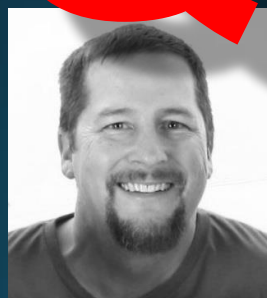
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QUESTIONS?

