Cheshire East's Reservoir Flood Examples

Cheshire East quote three examples of Flood experience in their **'Summary Options Report', Page 9, River and Flood Flows, 3.1 Dams have to be safe against extreme floods so that when these floods happen, the floodwater can safely pass through or over the dam, without washing it away. Thus, all dams have a "spillway" which is designed to pass these extreme "dam safety floods".**--

Below, I've produced a condensed report, taken from researching the internet, highlighting the human involvement contributing to the outcome of each event listed. Though Boscastle and Toddbrook resulted in unimaginable outcomes, Wet Sleddale I can only deduce the spillway performed as intended.

None of the listed events have any similarity with Poynton Pool's location, size or environment and as such may influence unnecessary concerns.

(The following information was taken from the internet).

Boscastle, Cornwall 2004. --. Flooding in Boscastle, England (2004) - Flooding in drainage basins - GCSE Geography Revision - WJEC - BBC Bitesize

Wasn't a Reservoir!

The physical issues were; Two months rain fell in 2 hours, coinciding with a high tide. The topsoil / peat quickly became saturated. The 'drainage basin' has many steep valley slopes, with impermeable slate surfaces. This increased the flow, run-off into the river.

Human influence was; Many trees had been cut down to increase farming areas, this reduced dissipation of the water and the uninterrupted flow rushed straight into the river. Increased building within the drainage basin, resulted in more impermeable surfaces creating further rapid flow into the river. A few small arched bridges crossing the river got blocked with flood debris allowing water to build up behind them.

The water pressure eventually burst through the bridges causing a surge of water up to 5m high travelling down the river taking everything in its path.

A large number of people had to be evacuated due to the holidays, but thanks to the emergency services no lives were lost.

Toddbrook Reservoir, Whaley Bridge, Aug. 2019; Embankment = 24m high, Surface area = 36 acres, Catchment = 4200 acres, (the following information was taken from the Independent Review by Prof. David Balmforth). Toddbrook Reservoir Independent Review Report (publishing.service.gov.uk)

Earth Embankment was completed in 1840 with an (Original) Spillway designed to prevent water from spilling over the earth embankment. Extreme rainfall damaged the original spillway in Dec. 1964. This led to the Inspecting Engineer requiring the overflow capacity to be

increased considerably and a new (auxiliary spillway) was constructed in 1970. 260mm higher than the original spillway.

The Auxiliary spillway was constructed at the opposite end of the original spillway using multiple concrete slabs cast over the prepared downstream face of the existing earth embankment (24m high) for a width of 76m across the embankment. 160mm rain fell 27th July – 31st July. 2019 (in two separate events). The resulting flood was smaller than the maximum flood the Auxiliary Spillway could accommodate. Water managed to get into the embankment, under the concrete slabs causing initially one concrete slab to collapse exposing a large void with brown slurry pouring out this resulted in more slabs to collapse and the ground outside of the spillway wall to subside.

The overall finding was: The cause of failure at Toddbrook Reservoir on the 1 August 2019 was the poor design of the spillway, exacerbated by intermittent maintenance over the years which would have caused the spillway to deteriorate. It has not been possible to say whether it was the poor design or the intermittent maintenance that was the primary cause of failure on the day. With consistent good quality maintenance over the years leading up to the event the spillway may not have failed. However, it would have been unlikely to survive the probable maximum flood which is many times greater than the flood in which it failed.

Wet Sleddale Reservior, Shap Fells, Cumbria; Embankment = 21m high, Surface area = 76 acres, Catchment = 12.14km2, 2300 million litres, the Concrete Embankment was completed in 1966 with a full height spillway.

The only thing I can find on the Internet is, Storm Ciara, Storm Dennis and Storm Jorge all hit the UK in Feb. 2020. The Monthly rainfall was exceptionally high. It was the wettest February since 1910, many rivers burst their banks. There are photos of the Wet Sleddale spillway operating in flood, but it functioned as it should distributing flood water into the river Lowther as it was designed to do.