

Toddbrook Reservoir

Safety First: The Suppressed Alternative.

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This short paper attempts to summarise the inherent risks to safety by the Toddbrook Reservoir and the current proposed plans for its reconstruction after the near catastrophic breach of the Dam recently. There are many major issues which are obvious after this event. The town has expanded and the reservoir is now within the town. The village school (1912) is only 300m in direct line from the toe of the dam. An actual breach of the dam (holding 240m gallons) would smash the school and roar into the town down the main street in seconds. The 182 year old reservoir which was always and is now surplus to requirements is in the wrong location. For this reason alone it must be decommissioned. The proposed set of plans is unstructured, is deficient in supporting documentation and seriously flawed. This Application is premature because the old damaged dam has not been assessed and repaired and overseen by an independent Engineer. There is no overall Reservoir System Safety Plan. The radical option to decommission the reservoir was suppressed by the CRT from any honest public consideration on some dubious unintelligible grounds. Nevertheless this paper analyses this safest of all options for Whaley Bridge which would remove all the dangers of death for the school children and town for ever and remove all of the objections to this plan. There would be no HGV traffic, no disruption to the town, the dam material would be removed and put back into the reservoir basin where it came from. The Todd Brook Nature Reserve would replace the old dangerous reservoir. This paper will be put up on my webpage as GA7 www.lymewood.co.uk

Government Health Warning.

Prof Balmforth and his Expert team were appointed by the Govt. to examine the causes of the near breach at Toddbrook plus all the contributory factors. Part B of the report examined many other reservoirs and as result he listed no less than 37 Safety and Operational maintenance requirements for proper management of the Reservoir sector. The HPBC Planning Committee should be very aware of this warning and that approval of this Application could lead to a future catastrophe with great loss of life as Prof. Balmforth bluntly emphasises on page 86 of his critical review (Part B):-

“The Environment Agency estimates that over 2.4m people in England are at risk from 2095 large raised reservoirs, most of which are currently designated as high risk. They present one of the largest threats to human life and property of any infrastructure sector in the UK.

The failure of a dam can lead to a sudden and large release of water which would be difficult for the population affected to envisage. The Toddbrook Reservoir incident in 2019 could have ended in disaster. Had the dam breached, and had this occurred at night and without warning, there would likely have been a significant loss of life.”

One could add if the dam had breached during school hours then there could have been a disaster far more catastrophic than the tragedy at the Aberfan school when, in 1966, 144 people died, 116 of whom were little children. The Safety of Toddbrook will be the legacy of all those in local and elected office who have the responsibility to ensure that the dam and every subsystem at least meets the critical safety standards outlined here.

The plans submitted fail to do this therefore they should be rejected by the HBPC Planning Committee.

The Alternative to the Toddbrook Reservoir.

The Safety for the School and Town and the elimination of unnecessary Risk must be of paramount importance when considering the possible reconstruction of the Toddbrook Reservoir. Nothing can be more important than Safety...not surplus Water for canals, not Sailing, not Fishing, not a scenic “lake” that is actually a dangerous ill maintained reservoir. The near breach of 2019 is the warning which should not have been ignored by those who bear responsibility for ensuring the safety of the Reservoir.

The Community of WB is now just a few days away from the decision that will determine the fate of this small Town and the risks that future generations will face, especially their children, as long as the Reservoir exists.

Prior to the event in August 2019 the reservoir should have been operated at ‘reduced volume’ because it had been downgraded to condition ‘**Poor**’ as a result of the ‘10 Year test’ in Oct 2018 due to the unfit state of the DAM. Astonishingly, in response, the CRT did not lower the reservoir as an ongoing safety precaution. There also was no drawdown response in the 7 days prior to the catastrophic damage. This is evidence of how this Govt. rated High Risk reservoir was managed for the safety of the Town.

What the CRT consistently ignored is the satellite evidence of July 2018 that reveals a sudden 30mm collapse of the dam crest at the LH end (where it failed) a year before the near breach. (See Dr Hughes excellent report AH1 page 44)

Since the near breach, the CRT has just arrogantly assumed that it has an unassailable right to repair and operate the reservoir without question or challenge or discussion with the ‘neighbours’ i.e. the Community of Whaley Bridge whose lives are at risk.

Unfortunately most of the Town has not questioned why a 182 year old damaged Dam just 300 yds from the School and Main Street should be repaired ever again. This must be the most supportable and most justifiable case for ‘*Nimbyism*’ that could ever exist, yet the Town has not exploited it....yet! The CRT went ahead and produced 14 options for a new spillway system then, without public discussion, unilaterally discarded twelve of them especially the most beneficial and most important one:-

“4.1 The ‘Do Nothing’ Alternative

Best practice guidance in EIA suggests that the assessment should consider the evolution of the Site in the absence of the proposed Scheme i.e. the ‘do-nothing’ or no development alternative. However, as the Trust is required to make repairs or alterations to the dam to meet statutory requirements under the Reservoirs Act, a do-nothing solution has not been considered for this project.”

In these two evasive and contradictory assertions by the CRT the fate of Whaley Bridge has probably been sealed. Here the CRT attempted to justify and ‘legalise’ their dismissal of the “Do Nothing” option by asserting an alleged “statutory responsibility.” to repair the reservoir which directly contradicts their responsibility to investigate the “Do Nothing” option.

This is obviously nonsense and it is not what the Reservoir Act says. An example of a self serving pretence which unfortunately has denied the Community the serious consideration of the benefits and safety of not having a very dangerous reservoir in a location which, for a new build, could never be approved by any Planning Authority. This is a measure of the CRTs un-quantified obsession for 'more water'. So they deliberately removed from any discussion what is obviously the safest of all options whilst ignoring the recent catastrophe.

If a reservoir is damaged then under the Reservoir Act the Owner has the responsibility to either **repair it or to write it off**. If it's a 'write off' the owner must make it safe in every respect especially the dam which must be physically disabled to make it impossible to ever store water. The "Do Nothing" phrase is stupidly misleading, 'Write Off' is more explicit. The Write Off costs must be funded by the Owner, for Toddbrook, certainly hugely less than £14-20m (the cost of the spillway).

Obviously CRT has not read their copy of Reservoir Act (1975) recently, because they claim that as Owners of 72 reservoirs they are not ever allowed to decommission a very dangerous old damaged one! Therefore Application HPK2021/0607 must not be approved. More time must be allowed for the Community to assimilate and understand the risks and to develop an alternative proposal which will remove, in perpetuity, ALL of the dangers for the Whaley Bridge Community and ALL of the objections to this Planning Application.

1.0 Water Supply: The Toddbrook Reservoir is not essential.

After the Marple locks were opened in 1804 the Combs Reservoir alone supported the canal system without Toddbrook for 36 years and this was during the massive increase in commercial traffic. But, by 1840, just when Toddbrook was actually opened, horse drawn canal traffic at 2 mph (much slower if using Locks) was in steep decline, being progressively and literally overtaken by the railway trains. In fact Toddbrook Reservoir was never needed even in 1840, Combs Reservoir was sufficient even at a time when water demand was strictly managed for the many water hungry mills. Toddbrook Reservoir has been out of service in the following periods:- 1800-1840, 1930-33, 1978-1983, 2019-2025 etc....54 years and the canal system did not dry up.

The Owner (CRT) has not made a coherent and credible case for repairing Toddbrook Reservoir based on water supply although this is the fundamental justification for the Application. Modern recreational traffic through the Marple and Bosley Locks is a fraction of the historic commercial traffic in 1806-1840 yet the CRT insists without justification that Toddbrook, Combs and Bosley Reservoirs must all be kept operational at historic maximum levels. Toddbrook is special, it's the only one of the trio that threatens a School full of little children and a busy Town.

For the last 2.5 years the water supply from Combs Reservoir, supplemented later by water pumped from the Goyt into the canal has been sufficient for the local canal system. Therefore why should a dangerous reservoir, which was and always will be rated High Risk by the Govt., located inside the town, 325 yds. from the school be re -

commissioned after a near breach of the dam that could have killed and injured so many?

Simply if there is a choice between the ongoing Safety of the School and the Community versus a surplus Water supply for recreational use of canals then it is obvious that Application HPK2021/0607 should be rejected on these grounds alone which are valid for ever. Therefore Toddbrook reservoir should be decommissioned.

2.0 Safety Assessment of the whole Reservoir System.

This Planning Application is very limited, it must NOT be seen as a Safety Assessment for the whole reservoir system which is what Appendix 1 shows as the minimum requirement. This Application simply seeks approval for the construction of a replacement subsystem (the Overflow) and an irrelevant Sailing Clubhouse. Approval must not be given by HPBC to this alone without considering the consequences for Safety when the overflow is integrated with the other hitherto neglected/damaged subsystems especially the damaged dam.

These existing sub systems, especially the dam, are all potentially unsafe and each requires fundamental safety assessments and radical upgrades. This would include the incorporation of modern technology and, particularly, commitments to new operational, maintenance and inspection procedures.

Furthermore the (*currently nonexistent*) Toddbrook System Safety Plan should also include all the new relevant operational and safety recommendations in the two critical reports by the Govt. appointed expert, Prof. Balmforth. These reports were specifically triggered in response to the 2019 near breach at Toddbrook so it would be quite ludicrous not to incorporate their recommendations in the very Reservoir where the near disaster occurred !

In addition there are my own recommendations regarding several additional safety issues missed by the Govt. appointed Inspecting Engineer, specific to Toddbrook which also must be included. I have summarised many of the necessary requirements for Safety of Toddbrook in Table 1 (appendix 1) but only 30% have been actioned. The Application must be rejected because there is no System Safety Plan for the entire reservoir system as there would be for any other Project by an industry that operates dangerous infrastructure in the Public Domain. Eg. Railways, Aviation, Nuclear, Chemical etc, as endorsed by Prof. Balmforth.

I reviewed Table 1 with Mr Hewitt (*who is appointed by the Secretary of State*) on 7 Dec in an amicable 2 hour phone conversation and he admits that he has not covered all the subsystems in the Table 1 List which is contrary claims by CRT claim in their submission to HPBC 2 Feb:-

“(Oct2019)..... the dam and reservoir were inspected under Section 10 of the Act and a report made which contained recommendations made to ensure the safety of the dam. report were made by a Qualified Civil Engineer (QCE),(Mr Hewitt) who is appointed by the Secretary of StateThe inspection considered all aspects of the dam and reservoir.”

Not true ! Only 30% of Table1 are covered. See Appendix
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3.0 The Work Sequence Is Wrong and Dangerous.

Incredibly the Overflow Weir is planned to be constructed **before** any investigative work and repairs on the damaged dam take place. The overflow weir plan will fix forever in concrete and steel the top water level (TWL) of the reservoir which fundamentally determines the safety of Whaley Bridge and the School.

Many operations are required on the damaged dam, like removing **all** the concrete, the Chute, all the Walls, the Crest Panels, the cross dam Abutment Walls, the Footbridge and all the temporary bags, investigating the erosion channels, repairing the clay core and shoulder, investigation the 175 ft longitudinal crack in the apron, confirmed in the excellent report by Dr Hughes see *AH1 on my web page*. To fail to do this first is the most serious and dangerous engineering error, a repeat of 1970 when British Waterways covertly destroyed the integrity of the old Dam which led directly to the near breach of 2019.

Thus the dam may prove to be totally unsafe or only safe for reduced loading i.e. water level. If that is the case, the already constructed new Overflow weir and spillway will be completely redundant having cost £14-20M. Once constructed the Weir level is not adjustable. The order of work must therefore be 'Dam First' then 'Overflow Second' then the weir level can be set to suit the load capability of old damaged dam. This is a major safety issue. This sequence is not negotiable for the Safety of the Town.

But the CRT claim that the overflow construction must occur first because the Aux spillway with its 'sticking plaster' bags on the damaged dam must be relied on in case the reservoir manages to fill up with 240 million gallons of water without anybody noticing. This would be despite the counter discharge efforts of 11 of the highest volume pumps available waiting on auto for one raindrop, the two 18 in. outlet pipes with valves fully open, the Bypass gate fully open, and the feed weir totally blocked.

It is astonishing that anybody, especially an Engineer, could claim that this reservoir could fill to the brim in such circumstances. If it is an issue of such under confidence then the obvious solution is to bring in another 11 pumps and then perhaps another 11 to be on the safe side. Then the safe work and logical sequence of 'Dam first' and 'Spillway Second' would occur.

The fundamental CRT fallacy is that in an unbelievable monsoon the water will actually reach the old primary spillway level before it reaches the new temporary Aux spillway weir (36cm higher) on the dam. So the new overflow construction would always be inundated first and the old Aux Spillway its current state which the CRT think will protect the construction, would never get wet ! This defeats the ill considered CRT argument for ' Spillway First'.

4.0 Decision on Top Water Level (TWL) is flawed.

The integrity of the Dam was deliberately destroyed by British Waterways in 1970 when they removed more than 6 feet of the clay core safety margin from the crest in order to install the Aux. Spillway. Immediately, and for 50 years, water erosion channels started to develop and this led directly to Aug 2019. Now not only does the Application propose

to construct the overflow weir **before** the dam is assessed and repaired, it compounds this fundamental error by setting the weir in concrete at the historic maximum level (as in 1840). So if the Overflow is constructed first, then the 182 year old damaged Dam will be forced to carry the maximum load despite any unexpressed doubts about its strength. There will be no choice, the Town and School will then be at maximum risk again as they were from 1970 onwards. An engineering plan which does this is very dangerous therefore the application must be rejected.

Even if it was thought that the dam was apparently safe, given the many unknowns engineering caution should be exercised and a decision to lower the max TWL would be considered wise and prudent especially by anybody who will have small children in the Village School during the next 50 years or more. But this safety option will be lost if the state of the dam is ignored and the new overflow system is constructed **first** with TWL set in concrete at maximum.

The CRT has no idea what is the safe life of this 182 year old much damaged High Risk dam. It will have to be decommissioned eventually and the owner will have to fund it.

The Time has come for this redundant broken reservoir, it should be now.

5.0 Summary.

- This is the strong case against the re-commissioning of the Toddbrook Reservoir. Time has marched on, the old damaged Reservoir has been in the wrong location for far too long and now in the wrong ownership. The safety and wellbeing of the Community overrides this ill judged Project.
- There is no overall Toddbrook Reservoir System Safety Assessment to authorise the start of reconstruction nor the future Operation and Maintenance Procedures incorporating all the Balmforth recommendations.
- This High Risk reservoir will always be a major threat to the town and school.
- The CRT claims that it needs the dangerous, 240 million gallons stored in Toddbrook. This is an unsubstantiated fallacy frequently asserted by the CRT, apparently blind to operational history without Toddbrook :- 1810-1840, 1978-1983, 2019-2025 etc.... .
- There are obvious alternative supplies in other reservoirs :- Combs, Bosley and the derelict but repairable conduit from the river Dane, legal abstraction from the Goyt instead of from the Toddbrook.
- In addition to the great danger of the Dam in perpetuity this unnecessary reconstruction will cause severe chaos in the town. There will be prolonged misery and emotional frustration for many residents and businesses whose peace, livelihood and well being will be under stress in their own homes and businesses for over 3 years or more. People actually matter more than this unnecessary reservoir.

The Application HPBC 2021/ 0607 should be rejected.

6.0 Safety First:- De-commissioning the Toddbrook Reservoir.

6.1 The suppressed CRT 'Do Nothing' option properly explored at last.

For the Safety of Whaley Bridge the application should not be approved because the Reservoir cannot be shown to be necessary as a canal water supply. Decommissioning requires the CRT under the Reservoir Act to disable the dam so that the reservoir could never fill up again. This would mean that the Todd Brook must always be able to flow unimpeded directly and naturally over the top feed weir into the former reservoir basin and onwards to the Goyt. In consequence the Bypass channel will no longer be fed by the brook. For fundamental safety reasons the Todd Brook must return to its natural route down the valley.

By law the dam must have a wide central wedge removed right down to the level of the Todd Brook. So after 182 years the brook will once again follow the same deep stream bed which is still visible in the reservoir basin, meandering through the valley as it last did in 1840. The remaining parts of the dam would not have to be lowered completely before being contoured by landscaping into the new *Todd Brook Nature Reserve*.

Therefore the reservoir basin, the Todd Brook Valley, would return as an appropriate green amenity with new pathways, circular walks, ponds, bridges etc. The existing dam foot way (250 ft long) could be recycled in sections to provide elevated walkways in certain wet places. The rare Step Gauge and the monumental side Abstraction Weir should be preserved as important legacies from the past.

Predominately it should become a Nature Reserve with somewhat limited pathways and routes and therefore would require minimal maintenance not like a more formal Park. Already in just 2.5 years 'Nature' has taken over. It should be allowed to continue to be a natural selecting area, an accessible new amenity replacing the old dangerous reservoir. The work would be much quicker and greener than the proposed reservoir reconstruction, many trees could be saved if the CRT can be stopped from pre-empting the planning decision and ignoring the safety and health of the Community.

The SSSI status (a card much overplayed by the CRT and generally misunderstood by many) is only relates to *one single* species, Dwarf Bladder Moss, which would find the new Nature Reserve with its ponds and wet land to be a suitable if not better habitat. In fact it already has had 2.5 years dry experience of 'no reservoir' apparently without complaint. It is prolific in Northern Ireland. But provision of a habitat for this dwarf can never be outweighed by the life of one small child let alone a whole school full of children and their teachers.

Much of the valley, just below the top weir, would be a wet land which would flood and fill sometimes, but without any harm or damage. Counter to any baseless claims by the CRT the Todd Brook would not require any special management. It will become a stream again just like the many hundreds of other Pennine streams that feed into Rivers. But it would be engineered properly to converge with the Goyt in an intelligent direction, with the flow of the river, not **opposing** it as is still carelessly planned by the CRT for the redesigned spillway.

6.2 What happens to all the excess material ?

The most innovative and important feature of this proposal is that no material would come to or leave the site, to be carried up and down Reservoir Road. The town and district would not be blighted by HGVs for 3 years as has been so carelessly planned by the CRT.

Why ? Because ALL the excess material, earth, rock, concrete must be landscaped into various places in the reservoir basin. That is exactly where it came from in 1830-40 anyway. The concrete might provide hardcore for a temporary road in the basin for dumpers to pile and compact the spoil from the dam otherwise it would be buried. A single demolition crane would be placed at the RH side of the crest (by the discharge pipes) to smash up and grab the concrete. The existing Sailing Club might have been re used as an Information Centre for the Nature Reserve if the CRT don't manage to demolish it first. The Brookfield pond water supply and drain are not forgotten.

7.0 Safety First for Whaley Bridge.

- The Town and School are made safe for ever by removing the dangerous reservoir.
- The CRT have no perpetual right to have a Reservoir inside a Town.
- All the excess material, earth, concrete and stones would be landscaped in the old reservoir basin.
- No HGVs with concrete, materials,. No Construction Site
- Safety First: Most footpaths for school children and everybody unaffected.
- No traffic chaos in the transformation because all excess material from the dam must be returned to the reservoir basin, whence it came.
- One dangerous water asset is replaced by a very safe, healthy green natural asset with much more accessibility than before.
- The Nature Reserve would attract visitors and benefit the town and businesses.
- Carbon footprint inevitably is many times better than *unspecified* CRT option.
- This alternative is possible, it is safe, it is achievable, it is quick. It is right.
- Re-commissioning the reservoir is a dangerous mistake. It brings no Benefit to Whaley Bridge. The application HPBC 2021 0607 should be rejected.

This is an outline of the Principle, more details could follow, it will require a detailed plan, but definitely not managed by the CRT. There will be hurdles and problems, but all are surmountable if the Town actively works for and wants Safety. But none are so unimaginable as where to put the Memorial to all those who died in the great (avoidable) Toddbrook Breach of 20xx

Graham Aldred.

22 /02/ 2022.

Please visit my secure webpage www.lymewood.co.uk for links to my several reports over last 2.5 years. Also all Expert reports are linked there..

Appendix 1. Table 1: Safety Assessment & Technical Approval is required for the following integrated Plans and Procedures before any physical work commences. *Extract from Doc (Sept 2021).see GA5 on my website. www.lymewood.co.uk*

TITLE OR PURPOSE	PLAN STATUS
<p>DAM: Removal of all 1970's concrete and temporary bags. Assessment and repair of damaged structure. Major work sequence errors in overflow plans. 1) Overflow constructed before dam repaired, 2) Max TWL as original. Installation of modern monitors reqd. Decision on reservoir level. Public Access across the Dam. Estimation of the safe future life of this Dam. Fundamental Safety Issue</p>	<p>No formal plan. Some structural studies done. Work sequence errors from Overflow plan. No specific safety plan</p>
<p>NEW DESIGN RESERVOIR OVERFLOW SYSTEM. Option chosen and description produced, not very accessible due to inappropriate doc design by CRT. Decision on reservoir level required (TWL).Fundamental Safety Issue</p>	<p>Planning application into HPBC. Invalid max TWL defined prior to all Dam repairs.</p>
<p>DISCHARGE VALVES & CANAL FEED CULVERTS. Valves to be modernised, safer, moved ex dam, upstream hydraulic operation. Plus emergency discharge large dia. pipes into spillway. No 1 canal discharge culvert to be repaired. Deliberately blocked in 1990 reason then not given. Critical Safety Issue</p>	<p>These engineering upgrade intentions seem to be committed. But no coherent single document.</p>
<p>THE ABSTRACTION WEIR. (side not head) Proposal to repair and operate this weir as the primary Fill Weir. The Operation and Emergency procedures must be described in the Toddbrook Safety Plan.(non existent !)</p>	<p>Intentions Unknown, not discussed. Not part of any plan</p>
<p>HEAD WEIR, GATE CONTROLS. BYPASS & FEED CHANNEL. Sluice gate proposal Dec 2019, apparently abandoned. Critical Safety Issue</p>	<p>Intentions Unknown, not discussed. Not part of any plan</p>
<p>VEHICULAR ACCESS TO THE HEAD WEIR. Critical Safety Issue. Ref Aug 2019 emergency. Incredibly not on current plan with HPBC.</p>	<p>Critical Importance re 2019 but not recognised or planned.</p>
<p>REDESIGNED OVERFLOW CONVERGENCE WITH THE RIVER GOYT. Critical Safety Issue. Ref. Aug 2019 emergency video evidence</p>	<p>No redesign but Invalidates Flood Risk Assessment</p>
<p>PROTECTION FOR THE FERNILEE/ERRWOOD RESERVOIR DELIVERY PIPE. Very Critical Safety Issue.</p>	<p>No Plan. Not recognised as a very serious safety issue</p>
<p>INSTALLATION OF RAIN GAUGES IN TODDBROOK WATERSHED. Essential for flood management. Critical Safety Issue</p>	<p>No plans. Not considered necessary</p>
<p>1)NORMAL OPERATIONAL MAINTENANCE AND INSPECTION PROCEDURES. Critical Safety Issue 2)OPERATIONAL PROCEDURES PRIOR TO AND DURING FLOODS. These procedures must be written to incorporate all the new and repaired system facilities in the list above. They should be submitted as part of the Safety Plan for Toddbrook System.</p>	<p>No recognition of this requirement despite Prof Balmforth's two excellent reports on deficiencies in Resr. Management.</p>

All these safety issues are discussed in detail in GA5 "Repairing Toddbrook Reservoir" on my webpage. The Reservoir Safety Plan as a single topic has not been produced by the CRT. This table was updated after a 2 hr. phone meeting (7 Dec 2021) with Mr Martin Hewitt, the Govt. appointed Qualified Civil Engineer (QCE). His remit appears limited, so 70% of the above could not be discussed. There is no Repair and Safety Plan for the whole reservoir system..