Annex 2

Naburn Weir

Naburn Weir Briefing July 2017

The Environment Agency have recently modelled the effect of removing or lowering the weir at Naburn. The modelling shows that complete removal of the weir would result in a small reduction of water levels in York during a large flood event. The benefit gained by lowering Naburn Weir is unlikely to justify the cost of the work.

Naburn Weir and flood risk

The operation of Naburn Weir to reduce flooding has been reviewed several times, by both the Environment Agency and predecessor organisations.

A study in the 1950s looked at lowering the weir, but concluded that 'the meagre improvements obtained seem quite out of proportion with [the] expenditure'. In 2005 an Environment Agency study found even less impact, reporting that "our models indicate that neither Linton nor Naburn Weirs have a significant effect on levels during large floods", but in 2015 the draft York flood model noted that opening both lock gates at Naburn in advance of a flood did appear to reduce the peak flood level in York. Confidence in this finding was low, but it was considered worthy of further investigation.

In 2016 work was carried out using the Ouse and Wharfe Washlands model to investigate 3 possible scenarios:

- With complete removal of the weir and lock structures and favourably low tides downstream, river levels in a large flood would be reduced at Acaster Malbis by 10-20cm and in central York by 2-10cm.
- If the weir was reduced to half its current height, representing a more realistic scenario that could come from using a variable weir like those being installed in Leeds, water levels in a large flood would be reduced by less than 2cm in central York.
- Opening both sets of lock gates in advance of a flood showed a similar result to the second scenario above, with a reduction in flood levels of around 2cm in central York in a large flood.

In normal river flows any change to Naburn Weir could have a dramatic effect. If levels were allowed to fall below the current 'normal summer level', even temporarily in advance of floods, this could be to the detriment of navigation, bank stability, biodiversity, and aesthetic value. It would also have an adverse effect on riverside businesses and boat users. There are operational issues around the opening of two sets of lock gates at the same time, and doubts about the stability of a lock structure when subjected to sustained fast through-flows.

Changes to Naburn Weir for flood alleviation purposes remain an option, but the results noted above suggest that the benefits achieved are very unlikely to justify the related cost. We are aware that a hydropower company is interested in the site and we have been sharing information with them to look for any joint benefit.

The physical structure of Naburn Weir

In the mid-20th century the upper part of the weir was wooden boards, and these could be lowered in times of high flows. It is not clear quite when this system went out of use, but the last wooden boards were replaced with concrete in the late 1990s as part of the remedial work to compensate for mining subsidence in the area.

We understand that the intention was that as mining progressed and subsidence occurred new wooden boards would be added on top of the concrete to maintain the crest-level of the weir, but this was never required. Although some boards were in place at the side of the weir in recent years there are now none present.

Our latest survey in 2015 showed the top of the weir to be at a height of 4.91m above sea level (Ordnance Datum Newlyn). This is consistent with the long-standing 'normal summer level' of 5m above sea level in York and equates exactly to the 16.5ft above Ordnance Datum Liverpool recorded for the weir crest in the 1950s.

Conclusion

The latest modelling has shown that:

1. There is a small benefit upstream by lowering or removing Naburn Weir.
2. The benefit gained by lowering Naburn Weir is unlikely to justify the cost of the work.

It is unlikely that we will be able to take this option forward, however we will continue to review the information as we develop our plans for York and we will inform interested parties if this changes.