# FLETCHING MILL

**Report by**

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**of**

**The Inland Waterways Association**

**for**

**Sussex Ouse Restoration Trust**

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## Background and Scope

1.1) Fletching Mill Lock (OS Ref TQ424229) on the Upper Ouse Navigation was designed by William Jessop and built by Pinkerton's for 'Rye' barges of 45ft by 12ft and drawing 4ft. The lock was opened in 1793 and was last used in 1868 after its trade had been captured by newly-built railways.

1.2) The sluice gates of most disused locks on the Ouse were opened after the closure to lower the pounds they retained in order to lower groundwater levels to enable adjacent water meadows to be converted to arable. However, at Fletching Mill this has not occurred. That is presumably because the mill continued to operate, requiring the historic water levels, which remain to the present day. The lock chamber was converted to become a flood management sluice, with undershot gates at the site of the original top cill. Downstream of the sluice the chamber was in-filled with concrete such that discharge from the sluice was over a concrete floor, level with the original top cill. The lock has been shortened by approximately eight metres with the entire chamber downstream of the middle of the original bottom gate recesses demolished; the walls being replaced with tapered brickwork.

1.3) The original by-wash weir, built alongside the lock to pass the flow, has been replaced by a concrete structure. However, some of the stonework in the southern training wall appears to be original. There is now a fish-pass just south of the weir.

1.4) A consultation paper 'Fletching Mill- What are your views?', published by Royal Haskoning on behalf of the Environment Agency, describes how the sluice gates were damaged beyond repair by floods in 2001. They were removed and the upstream end of the chamber sealed by a steel plate to retain the river. Most flow now passes over the by-wash weir, which is in poor condition. The paper also states that fish passage at the site is limited and there is instability along the by-pass channel and potential scour at Fletching Mill Bridge. It suggests that the weir be modified and that the channel upstream of the bridge be re-graded with a series of riffles so the weir has effectively no fall.

1.5) The Sussex Ouse Restoration Trust (SORT) proposes to restore the Sussex Ouse to navigation. This report is prepared at their request to advise on options that might assist both navigation restoration and the preservation of historic structures in their most sustainable form. The location was visited on 3rd April 2008 (with the permission of the landowners Mr & Mrs Wynn).

## Existing Status

2.1) The converted lock-chamber is in good structural condition. The sluice structure has been entirely removed, leaving only the over-bridge. Two steel channels, each anchored to one of the training walls just upstream of the lock, support a large metal gate at the end of the original lock chamber. Two holes cut in the plate pass a small compensation flow. The gate is 300mm below the chamber coping, but 300mm above water level retained by the weir. So only a significant flood would create a major flow

through the chamber. The gate is robust and well attached. It is safe except insofar as its presence prevents the pound upstream being dropped quickly (in the way the sluices could) in an emergency. The gate could be lifted by a crane or winch to allow it to slide up the two retaining channels and thereby drain the pound for planned maintenance to the weir.

2.2) The vast majority of all river flow is now over the concrete by-wash weir. There are signs of erosion downstream of the weir, especially in the northern bank, which has no training wall (though there is some concrete on the flanking slope). There is clearly a risk of erosion extending to the weir itself. Two mature trees directly adjacent to the northern edge of the weir are effectively preventing erosion by flood. However, should either of these trees be felled (e.g. by a gale) they would immediately create a breach at the end of the weir. It is agreed that the existing weir is a risk.

2.3) Downstream of the weir is a narrow, fast-flowing by-wash channel. At the road the flow passes through an arched bridge only 9ft wide. There are signs of scour alongside the road, caused by flooding over the road due to this bridge being insufficient to carry the flow. The current through the bridge, even at moderate flow, is very strong. Just to the west the new 6.4m wide Fletching Mill Bridge carries only compensation flow from the (blocked) chamber even though it has capacity to carry far greater flow.

2.4) The fish pass comprises four ponds, each 3.7m long, 2.0m wide and 1m deep. Flow between ponds is through apertures 0.6m wide and 1.0m deep. The structure is in good condition. So it is presumed that the limitation of fish passage referred to in the paper is to all fish except salmonids and that the problem arises from inadequate original design of the fish-pass.

## The Future

3.1) Ideally a restored navigation should follow the original route through the new Fletching Mill Bridge (which is sufficiently wide and high) and through the existing lock-chamber (extended downstream to restore its original dimensions). To achieve this the lock chamber must be (effectively) blocked by lock gates in much the same way it is presently blocked by the steel plate, with most flow continuing to use the by-wash weir (or whatever replaces it). The steel plate is securely fixed and is effective. In the short term it will have to be lifted out to drain the pound to allow repairs to the weir and by-wash channel. However, after that it should be slid back down between the existing steel channels and then remain (as it now is) for the long term.

3.2) Re-grading the by-wash channel would not directly affect navigation provided that the by-wash channel continues to carry most of the flow. Re-grading and introducing riffles would improve the ecological potential of the present poor environment. It would also either make the existing by-wash weir redundant or reduce its head sufficiently that it is no longer presents a risk. For both these reasons it is agreed that re-grading and riffles are the best solution in principle.

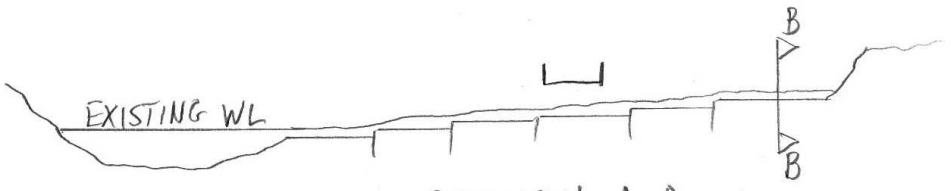
3.3) However, great care should be taken in designing the re-grading since there is a risk that, if the new riffled bed is not sufficiently stable, then it will be scoured and washed down the by-wash channel to be deposited in the slower-moving reach below the by-wash road bridge. The effect would be raised water and bed levels, extending up to the by-wash road bridge and exacerbating the existing road flooding problems. (Incidentally, this would also destroy the riffles, rendering the scheme of negative ecological benefit). Some form of bed stabilisation is essential. This might be intermittent Reno mattresses, withy bundles tied down, larger stone or concrete blocks, or sheet piles.

3.4) The existing bridge carrying the road over the by-wash channel is of far smaller capacity than the flow warrants. This results in the road flooding and the scouring already noted. At the same time there is minimal flow through the much larger new Fletching Mill Bridge. If half of the flow were to be diverted from the re-graded by-wash channel into the course of an original meander of the river that now forms a channel across the Withy Meadow (as shown in Appendix 1) then both road bridges would carry the flow. This would significantly reduce the frequency of road flooding and the risk to the by-wash bridge caused by erosion by scouring. If this proposal were adopted then it would be essential to reinforce the channel with the same treatment of riffling as the by-wash channel. Passing a greater flow through the new Fletching Mill Bridge would not affect the potential for navigation restoration.

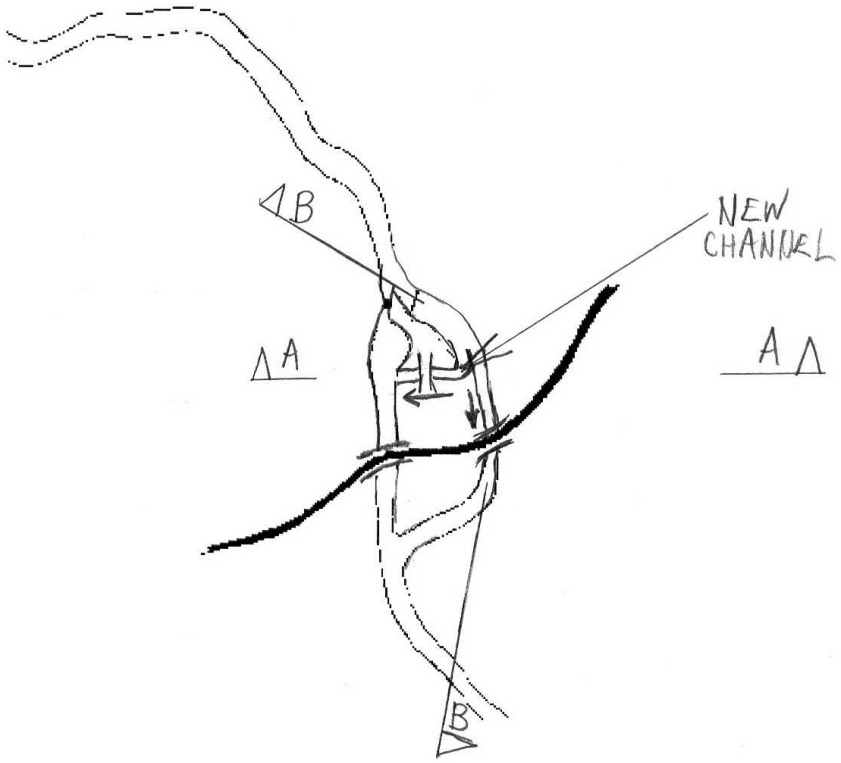
3.5) To control scour in the re-graded section and to make the riffles effective the weir and by-wash channel will have to be substantially widened. However, if the proposal made in Cl.3.4 were adopted then it would not be necessary to widen the by-wash channel downstream of the point where the proposed new channel diverges. There would also be no need to consider changes to the by-wash channel road bridge.

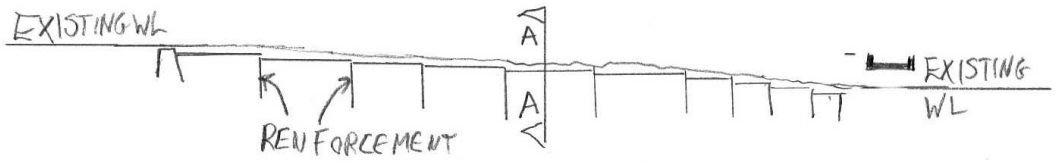
3.6) The majority of flow during any major flood does not pass over the weir at all. It spills over the eastern bank, upstream of the lock/weir and passes over the meadow to enter the ditch in the other side and either cross the road or run back into the by-wash and thence under (or over) the road. There is a case for acknowledging this and to ensure that nothing is done to change the present sustainable situation. In particular, do arrangements need to be put into place to ensure the meadow immediately north east of the weir is not ploughed? If it were to be flooded after ploughing then the resulting silt could be very damaging to both the river hydrology and the environment.

APPENDIX 1




SECTION A-A




SECTION B-B