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Water quality constraints on Deployable Output of a Chalk groundwater source

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Groundwater Asset Management
10 September 2008

Plan Design Enable

Southern Water

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The challenge

"Maximising deployable output from a groundwater source that effectively becomes a river intake for approximately 10 % of the time"

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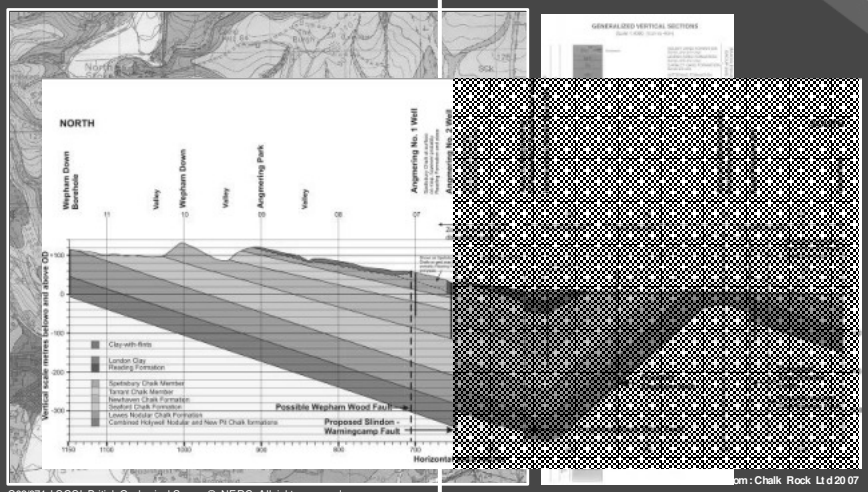
The geology



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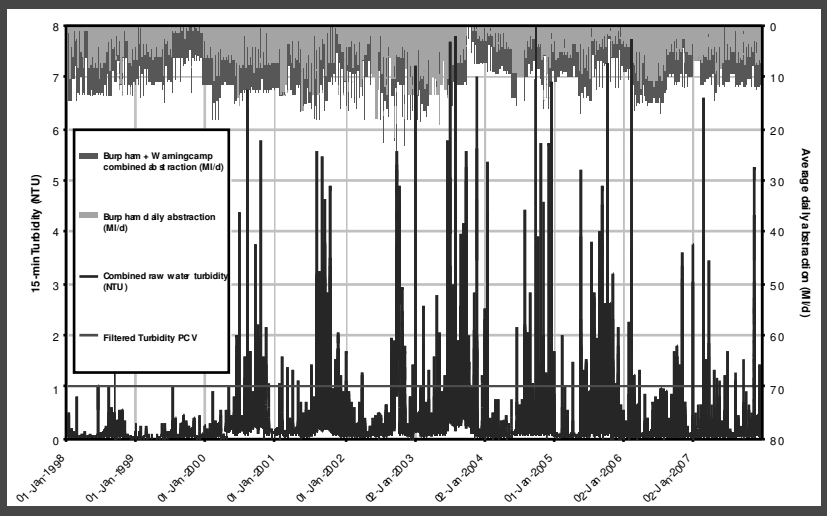
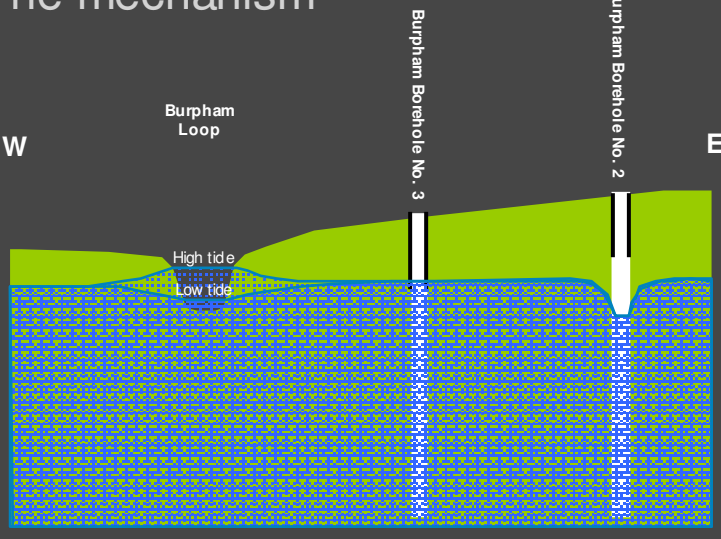
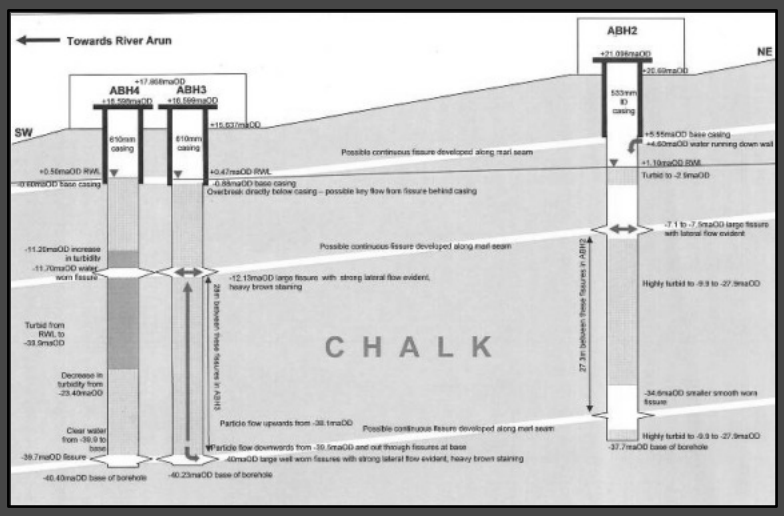
The problem



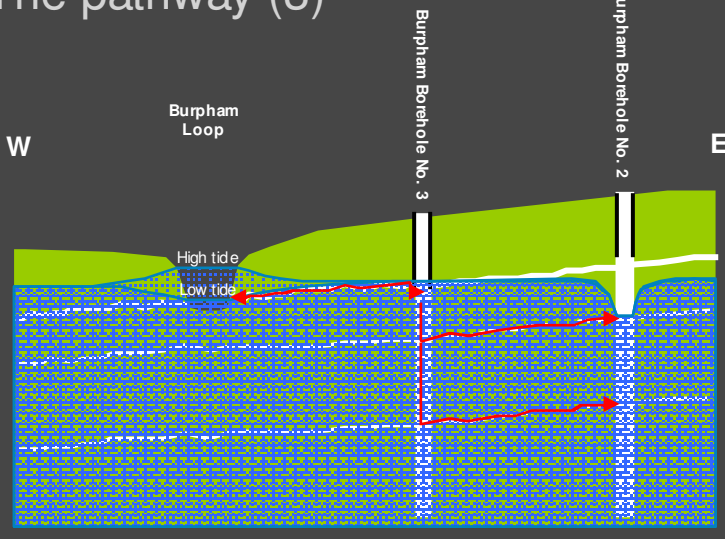
The mechanism



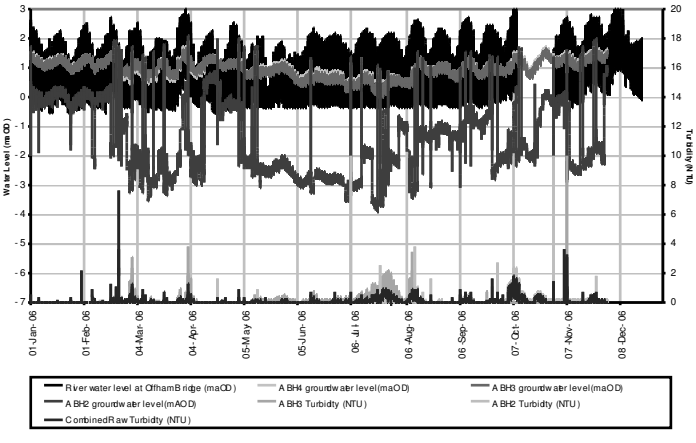
The pathway (1)



The pathway (3)

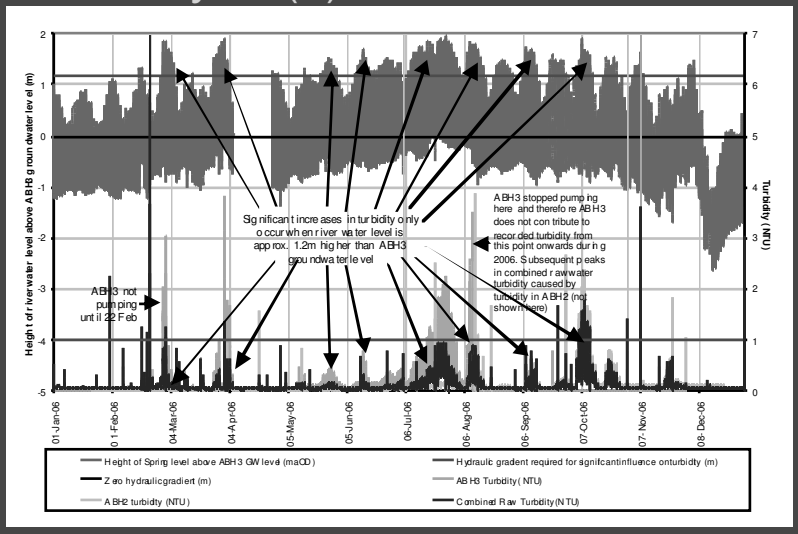


The analysis (1)



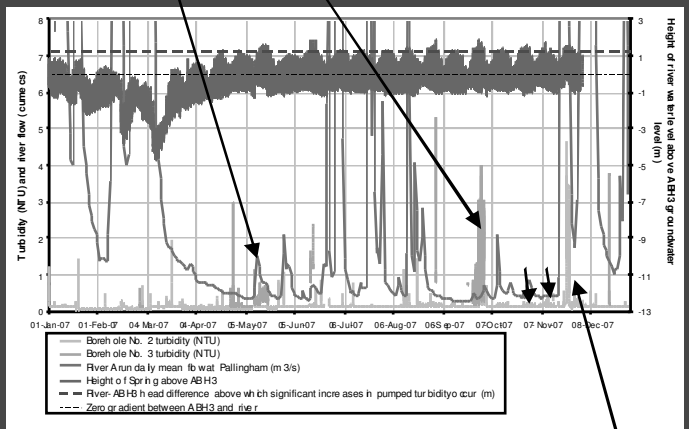
The analysis (2)

M J3



The analysis (3)

Despite having relatively low flows and similar magnitudes of aquifer-river hydraulic reversals during both periods, ABH3 pumped turbidities much higher end Sep than mid May. Possible explanation is the accumulation of turbid water in the fissure network over the summer during successive hydraulic reversals >1.2m

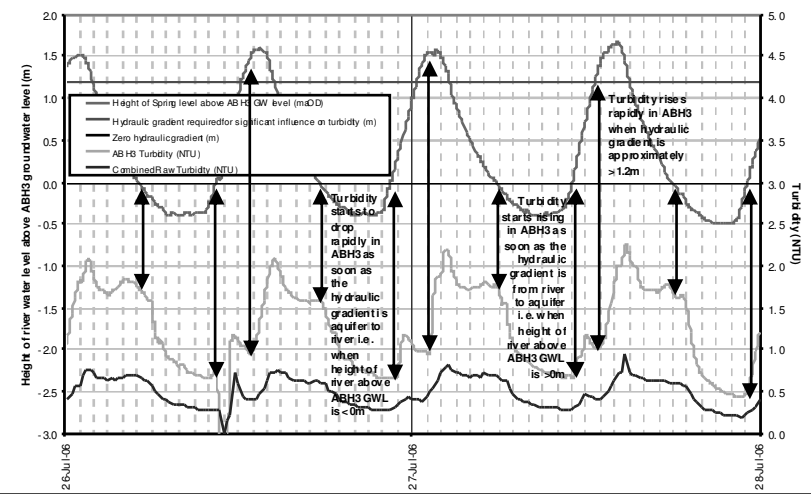


Of the Burpham boreholes only ABH2 is pumping in Nov 2007 (ABH3 couldn't be started because such high turbidity) and the reason for ABH2 having such high turbidity here and not on the previous 2 spring tides must be that river turbidities are high due to the high flows in the river (turbidities are 10 times higher than during low flows)

Slide 9

M J3 Text box RHS - ABH2 turbidity does appear to be shown on graph.
Packman, 03/09/2008

The analysis (4)



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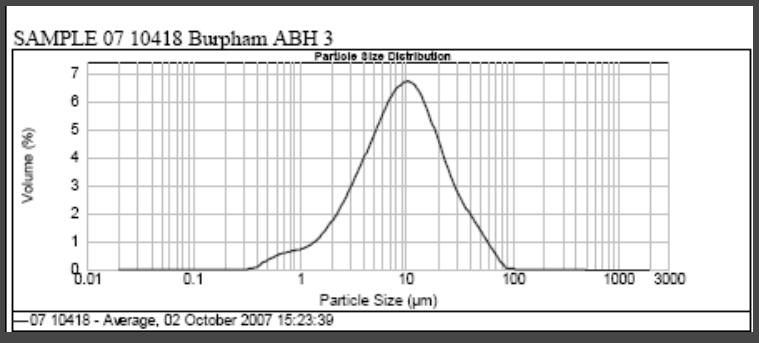
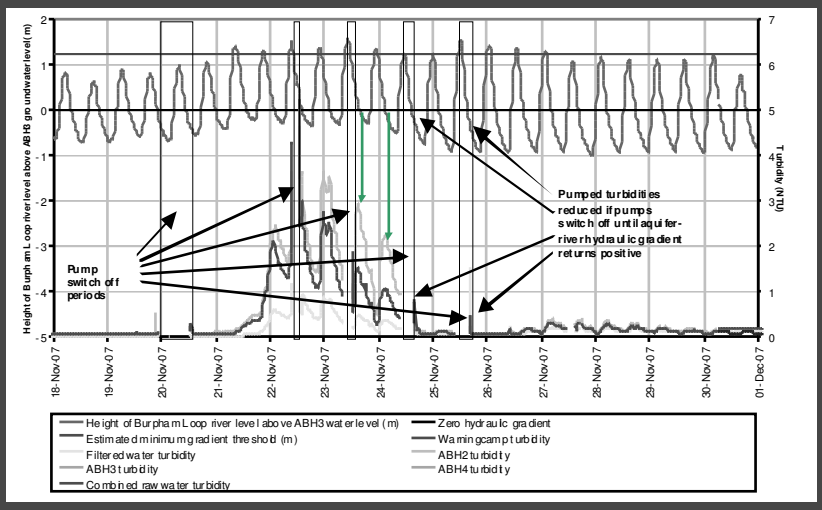
The analysis (5)



The solution



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The impact of the solution

- PDO originally 7.7 Ml/d and MDO 5.3 Ml/d based upon precautionary operation of source. Water quality was a poorly defined constraint.
- PDO now increased to 14.0 Ml/d and MDO to 9.3 Ml/d due to better understanding of timing and mechanism of turbidity breaches. Turbidity still a constraint but a well defined constraint.
- Filter replacement costs can be minimised by operation of sources according to new protocols developed

The conclusion

Improve the hydrogeological understanding of your source – it may be a more cost-effective solution to a water quality constraint than treatment