

HS2 PHASE 2A – ADDITIONAL PROVISION 2 - ENVIRONMENTAL STATEMENTS

Introduction

The Inland Waterways Association (IWA) was founded in 1946 and is a membership charity that works to protect and restore the country's canals and river navigations. IWA is a national organisation with a network of local branches and volunteers who work with navigation authorities, national and local government, and a wide range of voluntary, private and public sector organisations for the benefit of the waterways and their users. The Association also provides practical and technical support to waterway restoration projects, and acts as a national 'umbrella' organisation for numerous local waterway societies and trusts that promote and protect waterways in their areas.

HS2 Phase 2A Additional Provision 2 affects parts of the Trent & Mersey Canal between Wood End, Fradley and Handsacre and also at Great Haywood,

This response concerns the potentially adverse impacts and suggests actions that are needed to avoid or minimise those impacts.

General Principles

IWA's general principles for the protection of waterways impacted by HS2 are:

- Protection of Routes – No canal should be lost or blocked, whether a restoration project or a navigation in use, and where the route crosses a waterway, the waterway should be restored to a minimum of navigation standard, whether the navigation is presently extant or not.
- Navigation – There should be minimal disruption to navigation during the construction phase, and any necessary impacts should be integrated with the navigation authority's planned stoppage programmes.
- Waterway gauge - there should be no detriment to the constructed gauge of any waterway due to HS2, particularly in respect of headroom, taking account of any proposed enhancements on freight waterways. Any waterway crossings or other alterations to the waterway should comply with the appropriate navigation authority's policy of headroom over water, over towpaths, and on minimum width.
- Mitigation – wherever possible mitigation should be completed in advance of construction.
- Betterment – opportunities should be sought to achieve betterment for waterways within the planning process as compensation for environmental and heritage damage caused by HS2's construction and operation.

Engagement

IWA has engaged with HS2 since 2010 on behalf of its individual and corporate members and the wider public interest in waterways. We have commented in detail on previous Phase 2 and Phase 2a consultations in 2013, 2016 and 2017 and gave evidence to the HS2 Phase 2a Select Committee in July 2018.

IWA is pleased to note that AP2 provides for reduction in the height of the Kings Bromley and River Trent viaducts and the intervening Bourne Embankment, as requested in IWA's consultation response in September 2017 and our petition in February 2018.

We also note other changes in AP2 which will either reduce impacts on the canal, are neutral, or may have a minor adverse impact:

CA1 Fradley to Colton

At Fradley, moving the balancing pond access track away from the canal will be beneficial.

At Handsacre Junction, changes to connect HS2 with the WCML slow lines instead of the fast lines may have minor additional visual impact on the canal.

CA2 Colwich to Yarlet

At Great Haywood, some additional land is included for construction on the north side of HS2 between the canal and the existing railway, which will marginally increase construction impacts on the canal.

Vol.5 CA2 Community Impact Assessment

The Community Impact Assessments identify impacts on various residential and non-residential communities. IWA suggests this should include the community of moorers at Great Haywood Marina. There are over 200 boats moored in and adjacent to the marina and many of these are occupied residentially for varying periods of time. The marina buildings provide various practical and social facilities for the moorers who form a recognisable local community.

Borrow Pits Groundwater Drawdown affecting Trent & Mersey Canal

Vol.5 CA1 Water Resources Assessment Paras. 2.4.6 to 2.4.8 and 2.4.19.

Vol.2 CA1 Fradley to Colton CA Report Paras. 3.7.15 to 3.7.24 and 5.3.63

Groundwater drawdown from dewatering the Borrow Pits at Kings Bromley South, Kings Bromley North and Shaw Lane could affect water retention in the Trent & Mersey Canal.

The plans show possible routes for Groundwork Recharge Pipework including connections to the canal.

Puddle Clay Lining

The reference to the canal having a one metre thick lining of puddle clay is to an ICE article that is just a brief internet article, and apart from the fact it actually says 3 feet, not one metre, it is a secondary source with no references. It seems to have been taken from a Wikipedia article on Puddling, which does give some references.

The puddle clay thickness quoted by various authors all seem to be derived from a single reference in Samuel Smiles *Lives of the Engineers* 1874 on James Brindley, where puddling is briefly described as "It is usually applied in three or more strata to a depth or thickness of about three feet".

The Illustrated History of Canal & River Navigations by Edward Paget-Tomlison gives the most detailed description of early canal construction methods including puddling. However, it makes clear that the bed was puddle clay lined only where it was cut through porous materials, and the sides were clay lined only where they were built up above ground level.

No detailed records survive from the construction of the Trent & Mersey Canal in this area in the 1770s, but from observation parts of the canal are cut into the edge of a river terrace made of gravel and without any sign of lining on the offside, although presumably the towpath bank is clay. In other areas, such as near Brindley Bank Aqueduct in Rugeley the canal is cut through sandstone rock which is again unlined, but presumably not too porous. The embankment and aqueduct at Brindley Bank would of course have been fully lined and it is perhaps only on such major elevated structures that the full thickness of 3 feet of puddle clay would have been used.

The 'threatened' section of canal between Wood End and Handsacre is largely at ground level and, apart from where it crosses a few streams, may well be largely unlined. The canal water level and local groundwater level have presumably been in balance for centuries since construction. However, if the water table were to be lowered now by several metres then seepage would most likely increase; although whether this would be marginal or catastrophic is uncertain.

Experience of restoring many different canals over the years is that even where there is clay puddle, 3 feet is very much a maximum puddle thickness and not the norm. For example, much of the Lichfield section of the Wyrley & Essington Canal seems to have had only a few inches of clay lining.

Given that no detailed records of the construction of the Trent & Mersey Canal survive, any factual information on clay linings that the Canal & River Trust, and before them British Waterways, may have gathered over the years during repair work, new bridge construction, etc. will be instructive.

Measurement and Monitoring

Given the considerable uncertainties about the original construction of the Trent & Mersey Canal and the extent and current condition of clay lining, the consequences of reducing the ground water table under the canal cannot be predicted with any certainty.

Therefore, it is imperative that HS2 installs a series of canalside water table monitoring boreholes alongside the potentially adversely affected section of canal between Wood End and Handsacre with regular manual or automated measuring and reporting for some time before and throughout the period of borrow pit operations.

There should also be continuous monitoring of the canal water level at intermediate locations and flow measurements at each end of the affected section.

Such comprehensive data, along with information from CRT on the main water feed rate variations into this long level pound (extending from Colwich to Wood End) will provide early warnings of any issues and enable appropriate avoidance or mitigation measures to be taken.

Avoidance and Mitigation

In the event of borrow pit dewatering increasing leakage and seepage from the canal, AP2 provides for recharge from water pumped from the borrow pits, treated and transported via several pipelines to discharge into the canal.

The location of water feeders into the canal and of overflow weirs to remove excess rainfall operate together as a closely balanced historic system to maintain a near constant water level in the canal to allow navigation and avoid any danger of overtopping. The standard canal freeboard is only 1 foot to 18 inches (30 to 45 cm) so there is only limited capacity for additional point inflows unless these are carefully balanced and controlled. There are also potential problems with scouring from any substantial new inflows.

Therefore, it cannot be assumed that such recirculation of water to compensate for increased leakage will be practical at the indicated locations without detailed hydrological and engineering design work.

This should therefore be regarded as a last resort and the priority should be to avoid causing significantly increased water loss from the canal in the first place. The suggested measures include wet working of the borrow pits that avoids the need for dewatering or the installation of groundwater cut-off structures.