RAIL NEEDS ASSESSMENT FOR THE MIDLANDS AND THE NORTH

RESPONSE OF THE INLAND WATERWAYS ASSOCIATION

Inland Waterways Association

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 co-ordinating body for numerous local waterway societies and trusts that promote and protect waterways in their areas.

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 2b consultations in 2014, 2017 and 2018 and gave evidence to HS2 Select Committees in 2016 and 2018.

More recently, IWA has responded in detail to the HS2 Phase 2b Working Draft Environmental Statement (WDES) consultation in December 2018, and to the HS2 Phase 2b Design Refinement (DR) consultation in September 2019. These together constitute the current plans for HS2 Phase 2b and they affect inland waterways, both canals and river navigations, in at least 16 locations, including three canal restoration schemes.

The DR consultation included a statistical analysis of the responses to the WDES, and a selection of quoted comments, but there was no clear identification of the major issues or explanation of how these would be addressed. Neither were the consequential effects of the amendments proposed in the DR fully explained. This unsatisfactory situation persists, with the added uncertainty now surrounding the future of Phase 2b as a result of the current reviews by the National Infrastructure Commission (NIC) and the Infrastructure Projects Authority (IPA), intended to inform an Integrated Rail Plan.

Outstanding Concerns

IWA's detailed concerns about the current plans for Phase 2b as set out in our WDES and DR responses remain relevant but largely unanswered. They include some fundamental criticisms of the inadequate recognition of noise impacts on waterways, subsidence risks on the western leg route, and uncertainty for waterway restoration projects at Measham and Staveley. We have therefore appended the main text of those responses as supporting information to this response. Our new comments concentrate on the wider issues and questions about rail needs posed by the Call for Evidence that will or may, directly or indirectly, affect the use and environment of the waterways.

Review

IWA welcomes this fundamental review of HS2 Phase 2b in the context of the rail transport needs of the North of England and the Midlands. IWA's previous HS2 consultation responses have set out our concerns about the detailed physical, visual and noise impacts on the many affected sections of the inland waterways, including those under restoration. However, we have been constrained, partly by choice, and partly by the rules of the consultations from addressing more strategic matters. These include the overall concept and justification for HS2 and its major design parameters, the chosen route alignments and station locations, and the management of the project. There seem to us to have been fundamental design flaws with HS2 from the start, compounded by some subsequent decisions, that it is now time to recognise in order that the integration of Phase 2b with Northern Powerhouse Rail (NPR) and Midlands Rail Hub (MRH) can benefit by learning lessons from those earlier failings.

Disclaimer

IWA's long engagement with HS2 enables us to take an overview on these matters, and this response seeks to be as comprehensive as possible. However, any comments about matters not connected with inland waterways are the views of the author and may not represent IWA's corporate view.

HS2 Concept & Strategy

Following the pioneering high speed rail developments in Japan and France, and subsequent spread of the French TGV standards and network across Europe, the Channel Tunnel Rail Link or HS1 was seen as the starting point for a domestic high speed rail system. This got off to a bad start when a fleet of Regional Eurostar trains were built but never used. Meanwhile, the West Coast Main Line (WCML) four tracking was a major investment that increased capacity and speeds, but significant bottlenecks were left and the planned final stage of speed increase for the pendolinos from 125 to 140 mph was never achieved due to cost overruns and the necessary signalling and power supply upgrades being cancelled.

The long term disruption to services from upgrading an existing route, and the extended timescale and costs, suggested savings from building an entirely new line, which could also then be high speed as in France. However, the counter arguments were never really considered. These include the higher costs of building in a more densely populated country, and the more limited time savings where the major cities are relatively close together as they are in England. It can be argued that in Britain a high speed railway is only really needed and cost effective if it extends to Scotland, but HS2 as currently planned stops in Lancashire and Yorkshire which is only half way.

Speed and Capacity

The other major way in which HS2 differs from other countries is in design speed. If 186 mph is fast enough to cover much longer distances in Europe then designing HS2 for 250 mph is an indulgence, and the much straighter alignments required mean less scope for minimising landscape impacts and avoiding historic buildings, ancient woodland, etc. The greater environmental impacts and consequent opposition has led to more tunnelling being conceded with major cost increases.

The way in which HS2 was promoted from the start, emphasising its speed, and promising time savings to the exact minute before the route had even been decided was a hostage to fortune, leading to HS2 Ltd resisting even minor changes to reduce impacts if they would add a few seconds to journey times. The subsequent change of emphasis on increased capacity exposed muddled and defensive thinking. The argument that the WCML was “full” is a convenient exaggeration. The London end of the line, out perhaps to Milton Keynes, has little spare capacity but that is due to commuter trains, not long distance inter-city services. Solving a localised capacity problem by building a new line all the way to northern England never made a convincing argument.

Admittedly, there are other localised WCML capacity restraints, such as between Coventry and Birmingham, around Stafford due to the Shugborough bottleneck, and elsewhere, and a forecast longer term need to cater for projected passenger growth. But these issues could have been addressed by localised improvements, by completing the 140 mph upgrade, longer trains, reduced first class seating, etc. However, these solutions were not as attractive to politicians as a new line and we are now saddled with Phases 1 and 2a come what may, at an ever increasing cost, lengthening timescale, and diminishing business case.

Phase 1 & 2a Design Flaws

Although Phases 1 & 2a are proceeding, it will be a railway with fundamental design flaws. In London, the lack of a physical connection to HS1 and the rest of the European high speed network, with not even a cross-platform interchange, requires an inconvenient underground trip, taxi or long walk between Euston and St Pancras. At Birmingham, a terminal station at Curzon Street repeats the mistake made by the original railway builders nearly 2 centuries ago before it was replaced by the through station at New Street, where the majority of West Midlands services interconnect. But the ‘stand-alone’ design philosophy of Phase 1 means that most onward rail connections will need a trip on the metro, which will have limited capacity to cater for a whole train load of passengers, or a long uphill walk, thereby losing much of the time saved by travelling at high speed.

By contrast, the French TGV network was developed with new high speed lines between cities but using existing tracks into the existing city centre stations to maximise connections with the suburban and other lines.

With HS2 Phase 1, the only connection with the existing rail network, the Handsacre Link, will be of limited use. Ending this phase at Handsacre as originally proposed meant the 2 tracks of HS2 joining the 4 track WCML just before Colwich Junction and the 2 track bottleneck of Shugborough Tunnel; so 6 tracks funnelling

down into 2, which never made any sense. The operational absurdity of this was eventually recognised by HS2 in 2015 and the timescale for Phase 2a brought forward to avoid this. But by then HS2 had given an undertaking to Staffordshire CC that one train an hour would serve Stafford, so a very expensive piece of infrastructure with grade separated junctions at both ends will only have limited use.

Whilst we appreciate that the purpose of this review is not to go over old ground with Phases 1 and 2a, the fact is that flawed decisions taken on these phases affect the whole project and therefore Phase 2b, so it is legitimate to take these into account. The parallel IPA review will consider Phases 1 & 2a engineering specifications, environmental mitigation, management and other issues affecting delivery costs but is not open to public consultation, so an overview of all relevant facts here is justified.

The important design lessons for Phase 2b, NPR & MRH from the earlier HS2 phases include:

- maximising physical and service connectivity with the existing rail network in the north and midlands;
- designing stations for through traffic and not just as terminals;
- bringing forward proposals for onward connections to Scotland;
- considering incorporation of upgraded sections of existing lines as an alternative to a completely new line where this enables better connectivity or minimises environmental impacts;
- relaxing the 250 mph design standard wherever necessary to avoid significant damage to built and natural heritage.

Phase 2b Design Flaws

There have been fundamental design flaws with Phase 2b from the start, most of which remain, and have been added to by ill-conceived changes.

Concept and Route

Isolation: The concept for Phase 2b, as for all of HS2, was a stand-alone system not integrated with Network Rail, serving only city centre to city centre traffic with no provision for feeder or onward connections with existing lines.

Half Baked: HS2 ends in Lancashire and Yorkshire which is only half way to Scotland. No track upgrades north of Wigan are yet proposed and the non-tilting specification of the classic compatible trains means they will be slower than existing services, losing much of the time gained on the high speed track further south. To make best use of the major committed expenditure on Phases 1 and 2a, there should be a credible plan for services to Scotland. To at least maintain present speeds there would need to be major investment to bypass particularly tortuous sections of track in the Lune Valley and in Scotland, but this expense and environmental impacts could be avoided, certainly in the shorter term, by specifying tilting capability for the classic compatible train sets.

Route Selection: Unlike the Phase 1 route, which outside London and Birmingham is through open countryside, the route selected for the Phase 2b eastern leg adopts the HS1 principle of following existing transport routes. However, the M42, A42 and MI were designed with sweeping curves to better fit the landscape and limit driver boredom and fatigue. But HS2 needs much straighter alignments resulting in many places where diversions of these major roads are proposed to accommodate the railway. It is ironic that in arguing for a new railway and against upgrading existing lines that the disruption to travellers from engineering works was a major factor, but it is now proposed to do exactly that to road users. The criteria by which the eastern leg in particular was designed needs re-examining and, also for the other reasons given here, the whole route should be reconsidered.

Secrecy: The consultants tasked with examining route options and making recommendations appear to have been handicapped from the start by not having access to the most up-to-date mapping information and by a misguided insistence on secrecy. The secrecy was due to the Department for Transport's perception of 'blight' issues and, probably, political cowardice that public discussion of options and alternatives would be difficult to control. However, this meant that due to the limited contact permitted with only senior managers in local authorities, utilities, etc. the engineers were deprived of much relevant information. This included the existence of recently built and approved developments such as, in the case of waterways, the Chesterfield Canal restoration work at Staveley and the approved Ashby Canal reconstruction work as part of a housing site at Measham.

Geological Ignorance: The whole HS2 project was designed without sufficient regard to geological factors. The safety of high speed railways depends fundamentally on track stability with tolerance limits for ground subsidence being only a few millimetres. However, the Phase 2b eastern leg was planned through the East Midlands and Yorkshire coalfield and the western leg through the Cheshire salt field without any detailed consideration of subsidence issues. The records of mine workings are incomplete and in Cheshire much of the subsidence is from historic 'wild brine' pumping, remote from the extraction points, unpredictable and still active.

The lack of engineering geology research was compounded by the decision that no Ground Investigation (GI) could be done until Royal Assent was received with compulsory access powers. Most other civil engineering projects do GI upfront by local agreement with landowners, but HS2 adopted a "cart before horse" approach of fixing the route before assessing its suitability. For Phase 1, the GI needed was largely for cuttings and tunnelling through chalk and clay, for which much experience exists, but in the absence of GI data the increased engineering risks have been reflected in higher construction cost estimates by contractors. The coal mining and salt solution subsidence risks with Phase 2b are much greater and it would be exceptionally foolish to confirm the currently proposed routes without sufficient research and GI data, which may well require further route changes, especially through Cheshire.

Not Learning Lessons: A characteristic of the whole HS2 programme has been the hubris shown in not accepting expert advice and learning the lessons from earlier errors. Despite problems coming to light with the western leg compromising existing salt mining and gas storage sites, route changes were made without a full investigation and the amended route and design changes make it even more susceptible to unpredictable subsidence.

Similar incompetence was shown with route changes at Measham. There have so far been three different routes, all of which have been devised as limited desk studies without taking full account of vital local interests including housing and canal restoration, and before active work on Phase 2b was suspended a fourth route put forward by the developers was having to be considered.

This managerial competence deficit has persisted over many years as shown by HS2's apparent ignorance about the social impacts of a route change on the Shimmer housing estate in the Don valley near Rotherham.

Trans-Pennine Gap: The Y network provides faster routes from Manchester to London, and Leeds to London, which already have good services, but ignored the much more pressing need for a faster trans-Pennine connection between Manchester and Leeds. This was belatedly realised by Government and vague promises made and dubbed 'HS3'. However, a 250 mph high speed line across the difficult terrain of the Pennines would not be possible without tunnelling most of the way at vast expense. A 140 mph speed standard is more realistic and would still give a big improvement on present journey times. This most important deficiency in the northern rail network is now being addressed by NPR. But bringing forward a new or much improved Leeds to Manchester route should trigger a 'back to the drawing board' review of the whole Phase 2b route concept and the location and design of its stations.

Stations: The stations have been located and designed with no consideration for connecting services.

Toton is misleadingly called the East Midlands Hub but is equally inconvenient for both Derby and Nottingham, and does not serve Leicester at all. The Midland Main Line (MML) electrification which was irrationally curtailed would better serve all three cities and provide almost as fast a route to London as going via Birmingham.

Sheffield was intended to be directly served by a station at Meadowhall, but local criticism due to lack of ground investigation and design issues led not to an improved city centre station design, but to the illogical decision to bypass Sheffield altogether. Later addition of a service on existing lines via Chesterfield provides South Yorkshire with the worst of all worlds; the cost of a new high speed line but a low speed service (not to mention the fiasco about the Shimmer estate). Sheffield, South Yorkshire and Chesterfield could all be better connected to London by completing the MML electrification and upgrading, which would be nearly as fast as diverting via Birmingham and considerably less expensive.

Leeds is notable as one of few cities with a single central station maximising connectivity between all lines. But HS2 proposes a separate terminal station with no rail connection to any of them, preventing through services to Bradford. Worse, there is no provision for connection to a new trans-Pennine route as part of a

much needed northern network connecting Liverpool via Manchester to Leeds and on to Hull, York and Newcastle.

Manchester Piccadilly station serves south Manchester but has only a tram connection to Victoria for other routes. The proposed south facing HS2 terminal station perpetuates this Victorian disconnect with no proper provision for onward connections to Scotland, or any provision at all for integration with a new east-west trans-Pennine line from Liverpool to Leeds and beyond.

The 8 miles long tunnel under south Manchester is an expensive extravagance needed only to go via the airport, but the airport station is not funded by HS2, and there is already a rail service to the airport. HS2 would not want its trains to be overcrowded between the city centre and the airport, so the market for an airport station will be limited to travellers to and from Birmingham or London, which already have good access to their own more convenient airports. The economic case for this station and tunnel is therefore very dubious.

The route from Manchester to Crewe via the airport also results in a circuitous route around Knutsford (popularly attributed to avoiding the then Chancellor's constituency) and a major deviation from the shortest route, adding distance, travel time and further construction expense. The need for an airport connection and this whole route alignment should be reconsidered.

An alternative surface route into the city from the west or southwest via the Mersey and Irwell valleys to a station in Salford was considered at the route planning stage. This would better connect with an improved east-west aligned NPR trans-Pennine route. There are also serious engineering difficulties with the proposed route to Crewe crossing the Cheshire salt field with its unpredictable subsidence problems, so the whole Manchester section of Phase 2b needs to go back to the drawing board to optimise its route, station locations and design, and connectivity with NPR.

Waterway Impacts

The many questionable decisions about the route have had serious implications for a number of inland waterways. The full details are set out in the appended IWA responses to the Working Draft Environmental Statement and Design Refinement consultations, and include the following major impacts:

- Landscape, noise and heritage impacts on the Trent & Mersey Canal in the Dane valley north of Middlewich.
- Noise and visual impacts on the Middlewich Branch of the Shropshire Union Canal.
- Threats, uncertainty and delay to the restoration of the Ashby Canal at Measham.
- Visual and noise impacts on the Erewash Canal between Sandiacre and Stanton Gate.
- Threats, uncertainty and blight to the restoration of the Chesterfield Canal at Staveley and Norwood.
- Visual, noise and engineering impacts on the Aire & Calder Navigation near Woodlesford.

Management

The management of HS2 has been subject to much criticism, and the removal of responsibility for Phase 2b, and for Euston Station, from HS2 Ltd is a clear indication that Government is at last taking note and seeking to bring it under proper control.

The fact is that HS2 has always been politically inspired, and not primarily driven by engineering or commercial considerations. The parliamentary consensus in its favour has led to lack of scrutiny that has enabled HS2 Ltd to indulge in secrecy, extravagance, arrogance, incompetence and deception on an industrial scale, secure in the knowledge that they effectively had a blank cheque and compliant ministers that were content to misinform parliament and an increasingly sceptical public.

The development and scrutiny of the scheme has not been helped by the Hybrid Bill procedure and the antiquated Parliamentary petitioning system. Although MPs have been good at considering personal cases, the 'out of scope' status of route and station decisions, 'locus standi' challenges and the adversarial procedures of the Select Committees discouraged wider public engagement.

The insistence that the major route selection choices, which were made in secrecy at an early stage without public involvement, could not be challenged once MPs had voted on the principle of the Bill, is a

fundamentally undemocratic process that undermines public support for projects decided in this way. HS2 has been an object lesson in how not to design, promote and manage a large infrastructure project.

The Way Forward

Given the whole sorry saga of HS2 Phase 2b as described above, its many design flaws and major adverse impacts, it is opportune to conduct a root and branch review of the project as it currently stands, to apply the lessons from earlier errors, and to see what can be rescued from this farce. The urgent need is to suspend all work on implementing Phase 2b pending completion of a comprehensive plan for NPR and detailed consideration of how the two should interconnect. Effectively, this means going back to the drawing board and coming up with a comprehensive improved rail system for the north and Midlands that links into Phases 1 and 2a from London via Birmingham to Crewe.

The issues and suggestions considered above lead to clear recommendations of how this can be achieved:

- Start with a detailed engineering investigation of options for a new or improved trans-Pennine rail line from Manchester to Leeds and Sheffield. Re-engineering one of the existing routes is possible, but an obvious candidate is reopening the Woodhead route which was engineered to a high standard, was formerly electrified so has no gauge restrictions, and connects all three cities.

- The trans-Pennine line will then form the core of a Liverpool to Hull and Newcastle high speed network; realistically not the extravagant 250 mph standard of HS2, but a more practical and wholly adequate 140 mph standard using tilting train technology.

- The new station in Manchester, whether at Piccadilly or Salford, should be a through station, essentially east west aligned, and provide connections via Preston to Scotland as well as being at the centre of the Liverpool to Leeds, Sheffield, Hull and Newcastle NPR system.

- The connection with HS2 Phases 1 & 2a from Crewe should avoid the worst of the Cheshire salt field, probably by taking a route further west than the current proposal and using more of the existing WCML corridor towards Warrington. It could then join the NPR route following existing surface rail corridors into Manchester.

- The eastern leg of Phase 2b should be largely scrapped, although part of the projected route east of Leeds might be utilised by NPR. The London connection to the East Midlands and South Yorkshire, including Leicester, Derby, Nottingham, Chesterfield and Sheffield, should be by a fully electrified Midland Main Line, with track improvements to increase line speed to 140 mph wherever possible. An improved connection to Birmingham should be provided by similarly improving and electrifying the existing line via Derby.

- Leeds would continue to be connected to London via the East Coast and Midland Main Line routes, and would also have the high speed connection via Manchester to Birmingham and London.

- All new lines should be to 140 mph standard, or up to 186 mph where this can be achieved without significant environmental, heritage or landscape damage.

With these fundamental changes a better designed, more useful and cost effective integrated rail plan for the north and Midlands can be delivered in conjunction with Phases 1 and 2a of HS2. But there needs to be greater attention to avoiding and mitigating environmental and community damage, including minimising impacts on the users, heritage and restoration of the inland waterways.

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Inland Waterways Association
28th May 2020

SUPPORTING INFORMATION

HS2 PHASE 2B - WORKING DRAFT ENVIRONMENTAL STATEMENT

RESPONSE OF THE INLAND WATERWAYS ASSOCIATION (21/12/2018)

Introduction

HS2 Phase 2B affects inland waterways, both canals and river navigations, in at least 16 locations, including three canal restoration schemes.

This response identifies the adverse impacts at each interface and where changes are needed to avoid or minimise those impacts. It incorporates information from discussions with IWA Branches, individual canal trusts, and the Canal & River Trust.

Although there has been some progress in improving the proposals at a few locations, other changes have increased the visual or noise impacts on the waterways environment and the recreational and residential users of the waterways. Crucially, the issues threatening severance or severe damage to the restoration routes of the Chesterfield Canal and the Ashby Canal have not been adequately addressed. Overall, it is very disappointing how slow and insensitive HS2 Ltd has been in recognising and responding to the problems that IWA and others have highlighted.

Noise

In particular, there has been a fundamental failure to acknowledge that waterway users are not just 'transient' but in many locations people live on boats for varying periods of time, and those places should be provided with noise mitigation to at least the same standards as would automatically apply to residential buildings at that location.

Unlike buildings, however, boats cannot easily be retrofitted with double glazing, and their mobility and the outdoor lifestyle of boaters means that they are more dependent on external controls including noise fencing on viaducts and bridges, earth bunding and screen planting.

IWA contends that wherever boats are permanently moored, or permitted to moor temporarily overnight or for a few days or months, they are likely to be occupied residentially and those locations should be protected by noise mitigation to residential standards.

Whilst the design of bridges and viaducts is important, the minor additional visual impact of noise fencing should not be used as an excuse to deny the major audible benefits that it can provide. To static boat residents or waterway users encountering HS2 at walking pace it will in the long term be the operational noise that most impacts and disrupts their lifestyle and activities.

Detailed Comments on Waterway Interfaces

<u>WESTERN LEG</u>

SHROPSHIRE UNION CANAL, MIDDLEWICH BRANCH (MA02)

The Middlewich Branch of the Shropshire Union Canal will be affected by the proposed Crewe North Rolling Stock Depot (RSD) and the two rail bridges over the canal between Park Farm and Yew Tree Farm. The historic environment of the canal within the rural landscape will be permanently degraded by the visual impact of these HS2 structures, and the users of the canal will be subject to construction and operational noise impacts.

Crewe North Rolling Stock Depot

The location of the RSD is shown only in outline on the Proposed Scheme and Construction Phase plans, although the track layout is shown on the Operational Noise Contour Maps. However, there are no plans or sections of the RSD buildings, which will presumably be very large to take 400m long train units and are likely to be visible over long distances in this relatively flat landscape. The building heights are not disclosed,

and no visualisations are provided of their appearance from surrounding viewpoints, despite promises to the local MP to do so.

Extensive earth bunding with screen planting is shown on the east side of the HS2 main line, but only limited planting alongside the West Coast Main Line (WCML) on the west side nearest the Middlewich Branch Canal.

The plans show 'woodland habitat creation' planting in a narrow corridor extending along the offside of the Middlewich Branch Canal for over 2km between Canal Cottage near Wimboldsley and the WCML canal bridge. It is not clear if this is meant to provide visual screening of the RSD or if it is just compensatory habitat planting, although its absence between the WCML and HS2 canal crossings suggests the latter.

Such extensive woodland planting would change the whole character of a long section of the canal that currently enjoys open countryside views, to an enclosed woodland outlook on one side. Details of the RSD buildings and appropriate visualisations are needed to assess what screening benefit the proposed canalside planting may have, if any, given the long timescale for maturity of such planting. It is likely that earth bunding topped with planting located closer to the RSD, just west of the WCML, would provide better visual and noise screening for both the canal and other properties, without such wholesale changes to the historic character and environment of the canal.

It is not acceptable that there has been no consultation with Canal & River Trust (CRT) or with IWA as canal user representatives about the principle of this proposed canalside planting. There are also practical problems with the planting being shown right up to the edge of the canal which would cause increased maintenance costs to CRT. Any canalside woodland planting should be set back from the canal to minimise the increased maintenance costs from the need to regularly cut back overhanging vegetation, or from branches falling and leaves blowing into the canal necessitating more frequent dredging.

There is a further large area of 'woodland habitat creation' planting shown east of the HS2 bridges, just south of the canal opposite Yew Tree Farm, and there is a suspicion that this may be an after-use for either a large construction site or a materials dump, the details of which are not being disclosed at this stage. Extending for about 400m along the canal, this would also change the character of the canal without any clear visual or noise screening benefits.

Rail Bridges

The Proposed Scheme plan shows the two Shropshire Union Canal underbridges with their embankment toes intruding on the offside of the canal and blocking the towpath, which is obviously totally unacceptable. They should span the full width of the canal and its towpath and provide a minimum 3m air draught clearance. The design of the bridge structures is unknown but should follow the CRT design principles accepted for Phase 1. The bridges will impact on the setting of Hughes Bridge 25 which is Grade II Listed, and the location of the balancing pond shown near Park Farm should be moved to allow for screen planting between Hughes Bridge and the railway.

Construction of the two rail bridge crossings over a 2 year period will require canal closures for unknown periods affecting boaters and users of the towpath, and may need temporary canal bridges. Any disruption to canal traffic should avoid the busy March to October period, and any temporary navigation closures in the winter stoppage period should be kept to a minimum.

There are about 15 offside boat moorings at Park Farm which may be lost due to construction and degradation of their currently tranquil setting, and compensation should be provided. The popular visitor towpath moorings at Yew Tree Farm will also be badly impacted during construction and, unless noise mitigation is provided, during operation.

Noise

The Operational Noise Contour Maps show no noise fencing in the vicinity of the canal and predicted noise levels in the 'red' zone of 'significant effect'. The RSD will be a 24 hour operation and there will be late evening and early morning train movements into and out from the depot across the canal bridge outside the normal operating hours of the HS2 main line, and this will increase the noise impacts on the canal and its users.

IWA considers that all canal users should be provided with noise protection from HS2 trains at all canal interfaces. This requires acoustic fencing across the canal bridges and fencing or earth bunding to the adjacent embankments to at least the same standard as would be provided for residential properties at that location.

Other Impacts

Other visual and noise impacts on the Middlewich Branch Canal will be from the construction and presence of the large overbridges and embankments for the A530 and Clive Green Lane diversions, and the landscape mitigation planting should take account of this.

There will also potentially be light pollution along the canal from the night-time lighting of the RSD, which could affect the habitat and behaviour of bats, birds and other wildlife. Lighting should be internally directed and avoid undue light spillage in the surrounding area.

TRENT & MERSEY CANAL (MA02)

The Trent & Mersey Canal will be affected by three crossings over a 2 mile section in the River Dane valley north of Middlewich, from south of canal bridge 177 to north of the Billinge Green Flashes at Whatcroft. The impact of the 2016 Preferred Route on the canal is much greater than the original 2013 alignment which involved just one crossing of the canal. In the area of Whatcroft, the route was moved approximately 400m to the West and raised vertically by 3m, increasing the proposed track level above the canal water level at the three crossing locations.

The Trent & Mersey Canal is a linear Conservation Area throughout its 93 miles, designated for its historic and architectural significance and now used extensively for recreation. All three crossings are in scenically attractive and currently tranquil rural settings.

Construction of the proposed route will have a permanent visual and environmental impact on the Trent and Mersey Canal Conservation Area due to the height and mass of the viaduct structures and embankments and the operational noise. The proposed track level will be between 13m and 16m above the canal water level at the three crossing, and there will be a dominating view of the viaducts and embankments, rising up to 26m above adjacent land and the River Dane flood plain. It is essential to incorporate parapet or noise fence barriers at all three crossings to significantly reduce the operational noise effects of the railway.

During the construction stage all three rail crossings will require canal closures for unknown periods affecting boaters and users of the towpath, and the possible erection of temporary canal bridges. Any disruption to canal traffic should avoid the busy March to October period, and any temporary navigation closures in the winter stoppage period should be kept to a minimum.

River Dane Viaduct

The southernmost crossing of the Trent & Mersey Canal is approximately 150m east of canal bridge 177, at the northern end of the River Dane Viaduct and at a height of about 13m. The viaduct and adjacent embankment will have a major visual impact on the canal and its Conservation Area, and acoustic fencing is essential to minimise the noise impact on this currently tranquil section of the canal. The nearby canal bridge 177 is of the flat deck, iron girder construction technique adopted along this section of the canal to more easily enable it to be raised to counter subsidence than the traditional brick arched canal bridges, indicating early appreciation of the susceptibility of this area to subsidence due to natural brine solution and pumped extraction.

Puddinglake Brook Viaduct

The middle of the three Trent & Mersey Canal crossings is between canal bridge 179 at Whatcroft Lodges and the railway bridge 180A, with the canal crossed by the Puddinglake Brook Viaduct at a height of about 13m. The viaduct and adjacent embankment will have a major visual impact on the canal and its Conservation Area, and acoustic fencing is essential to minimise the noise impact on this currently tranquil section of the canal.

Billinge Green Flashes

The northernmost crossing of the canal near Whatcroft is by the Trent & Mersey Canal Underbridge at a height of about 16m. The Proposed Scheme plan shows the bridge with the toes of the two adjacent embankments intruding on both the offside of the canal and blocking the towpath, which is obviously totally unacceptable. The bridge should span the full width of the canal and its towpath. There would then not be space for the anomalously short embankment shown between the canal and railway underbridges, and the obvious solution is to combine these as one continuous viaduct structure. The Whatcroft Embankment also crosses part of the larger of the two canal-connected flashes at Billinge Green, where a spit of land separates the canal from the flash.

The canal at Billinge Green Flash is an extremely popular mooring site for visiting boats and other canal users because of its tranquillity and the view of the large open expanse of water across the flash, which is rarely found elsewhere on the canals. The considerable alterations to this setting would permanently damage this experience and have a major environmental impact on the Trent & Mersey Canal Conservation Area corridor.

HS2 will also impact on the tranquillity of the occupiers of boats moored at Oakwood Marina, which is located within the smaller flash at Billinge Green, only 100m to the West of the proposed HS2 route (just south of Davenham Road on the plans). This became operational in 2018 and has 83 berths but is not yet shown on the plans. There are further permanent boat moorings at Park Farm Marina which is within 400m of the proposed route (just north of Little Grebe Cottage on the plans) which will also be affected by noise from both the construction and operation of HS2.

The flashes connected to the canal at Billinge Green contain the remains of historic wooden narrowboats abandoned in the 1950s which are of archaeological interest. The area of the flash to be covered by the Whatcroft Embankment should be investigated and appropriately excavated prior to major engineering works.

Noise

The Operational Noise Contour Map shows no noise fence barriers across any of the 3 Trent & Mersey Canal crossings, and predicted noise levels in the ‘red’ zone of ‘significant impact’. It does indicate ‘noise related engineering features’ across the viaducts and bridge but it is not clear what this refers to or how effective it may be.

IWA considers that all canal users should be provided with noise protection from HS2 trains at all canal interfaces. This requires acoustic fencing across the canal bridges, and fencing or earth bunding to the adjacent embankments, to at least the same standard as would be provided for residential properties at that location.

Subsidence Risk

The Trent & Mersey Canal Underbridge is sited across part of Billinge Green Flash which is one of several large subsidence flashes in this area caused by salt mining, as elsewhere across the Cheshire salt field. The large imposed loads from the superimposition of embankments, the consolidation of the embankment fill, and vibrations from the pile driving for viaduct piers, could all re-activate the subsidence here and destabilise the ground. The records of mine working information are incomplete and in any case much of the subsidence is from historic ‘wild brine’ pumping, remote from the extraction points, unpredictable and still active.

The main reason given for realigning the preferred route in 2016 was to avoid known brining and gas storage infrastructure in the Lostock area, and minimise the risk of subsidence there due to the underlying geological conditions. However, the current route runs through an extensive area of unknown and unpredictable brine subsidence risk which is likely to prove much more problematic. The choice of this route will give rise to major ground stability risks during both construction and operation stages, will require expensive engineering to reduce those risks, and may ultimately prove impractical. This has been a problem for many centuries, well-known locally, but not apparently to HS2.

The currently proposed route poses a major threat to the stability of the Trent & Mersey Canal channel and structures, and to the construction and operation of HS2. It should not proceed further without a full geological assessment and extensive ground investigations, and the reappraisal of alternative routes between Crewe and Manchester avoiding the Cheshire saltfield.

The increased height of the current route appears to be based on the mistaken belief that avoiding cuttings through the unstable ground would limit the risk of subsidence, whereas in fact reduced ground loadings are likely to be less of a threat than increased ground loadings from the higher embankments. If this route does proceed then the vertical alignment should be reviewed to include cuttings through higher ground and to lower the embankments and viaducts, whilst maintaining necessary clearances over the canal, roads and railway. This will both reduce the risks of ground subsidence and significantly reduce the visual impact of the line on the Trent & Mersey Canal, the landscape and nearby properties.

BRIDGEWATER CANAL (MA04)

The Bridgewater Canal is a heritage asset of national importance, being the first major canal built in England by the pioneering engineer James Brindley, which played a significant part in enabling the industrial revolution. This section of the canal was completed by 1769 and its bridges, aqueducts, warehouses and other structures remain largely as built.

HS2 crosses the Bridgewater Canal at a skew angle at Agden, directly over the boat moorings of Lymm Cruising Club. These line the south side of the canal adjoining Warrington Lane, extending northeast from Spring Lane Bridge to Lymm Marina and the boat repair and service premises of Hesford Marine. The canal environment, the canal and towpath users, and the boat moorings here will all be badly affected by both the construction and operation of HS2. As elsewhere, the canal boat moorings are used residentially for various periods of time and should therefore be afforded at least the same degree of noise mitigation as for residential properties.

The adjacent embankments appear to be shown on the plans with false cuttings providing some screening and noise protection. There is also a 2m noise fence barrier shown between Lymm Road and the canal but only on the east side of the embankment. However, it is not clear what the “noise related engineering features” across the Bridgewater Canal Underbridge as shown on the Operational Noise Contour map actually refer to. To protect canal boat and towpath users there should be noise fencing across the bridge on both sides and this needs to extend onto both embankments to avoid sound spillage around the ends of the fences. The inadequacy of the present proposals is shown by the ‘bulge’ in the noise contour colours around the canal underbridge, with the Bridgewater Canal close to the bridge subject to levels in the ‘red’ zone of significant effect.

The Bridgewater Canal is a broad waterway and its dimensional standards as built should be maintained for both navigation and maintenance, with a minimum headroom at the underbridge of 4m. The design should follow the general design principles proposed by Canal & River Trust and accepted for HS2 Phase 1 canal crossings.

In the construction phase there will be impacts on the canal from the Bridgewater Canal Satellite Compound and the Lymm Road Satellite Compound, and the consecutive programming of the works on the underbridge and embankment means there will be disruption to canal users here over 4 years. Screening of the compounds should be provided to limit the noise nuisance to canal users.

It is estimated that 14 of the moorings will need to be vacated for a significant time for construction to take place and appropriate arrangements should be made and compensation paid for their temporary relocation.

MANCHESTER SHIP CANAL (MA04)

The Manchester Ship Canal is a commercial navigation with only limited recreational use. It is expected that the viaduct crossing will maintain the headroom and width required by the maximum size of ships that can use the canal. As a very high and prominent structure the design should aim to be iconic in nature and of inspiring appearance rather than just utilitarian.

LEEDS & LIVERPOOL CANAL, LEIGH BRANCH (MA05)

The grade separated junction of HS2 with the West Coast Main Line at Abram requires a high embankment that will be visible from the Leeds & Liverpool Canal’s Leigh Branch across the Hey Brook valley. Noise mitigation should be provided to reduce the transmission of noise towards the canal.

In the construction phase the Pennington Satellite Compound will have additional adverse impacts and screening should be provided to limit the noise nuisance to canal users.

EASTERN LEG

COVENTRY CANAL (LA02)

The Coventry Canal at Polesworth is crossed by Polesworth Viaduct, spanning an entrance to the old colliery basin which provides attractive and tranquil moorings for about 12 canal boats including residential use, and also a base for holiday hire boats. The basin and wharf have historic and industrial archaeological value as one of the last on the narrow canal system to be used for loading coal from the adjacent colliery. The former colliery site alongside the canal has been reclaimed as the Pooley Country Park and Heritage Centre and is now a well-used recreational facility.

Both the public facility of the country park and the private moorings will be severely damaged by HS2, with the line cutting through the country park on embankment and in cutting, destroying heritage buildings used for light industry and the visitor centre. Although a diversion of Pooley Lane and a new access road will now be provided to the remainder of the park and the scout hut, the direct physical damage and the constantly intrusive noise will severely limit future use and enjoyment of the country park facilities and could make the canal boat moorings uninhabitable for residential use.

The boat moorings include permanent residential moorings and, as is common, the others are often used residentially overnight, at weekends or for longer periods. The Operational Noise Contour map shows 2m high noise fencing only on the east side of the viaduct across the Coventry Canal, with the boat moorings subject to noise levels in the red zone (more than 65 dB daytime and more than 55 dB night-time) which is not acceptable.

A noise fence barrier should therefore also be provided on the west side of the viaduct and the adjacent Pooley Lane Embankment to reduce operational noise at the canal to below the equivalent “significant effect” level for residential properties.

There will also be major impacts on the Coventry Canal and the boat moorings during the construction phase, and an access must be maintained at all times to the moorings otherwise compensation will need to be paid for their temporary relocation. Temporary closures of the Coventry Canal and its towpath for construction of the viaduct should be programmed for the quieter winter ‘stoppage’ period. The Polesworth Viaduct Satellite Compound is close to the canal and should be screened to limit the noise nuisance to canal users.

ASHBY CANAL (LA03)

The northern part of the Ashby Canal between Moira and Snarestone was closed by 1966, but has been under progressive restoration for the past 25 years. The section from Moira to Donisthorpe was reopened by 2005, and in that year Leicestershire County Council obtained a Transport & Works Act Order to restore the canal from Snarestone to Measham. The required land was purchased and a section of canal north from Snarestone has since been completed. A further section of canal was due to be reconstructed as part of the Measham Wharf and housing site development which has planning consent but has been delayed and blighted by the constantly changing plans for HS2.

The original 2013 Phase 2 route on the west side of Measham crossed the restoration route of the Ashby Canal without any provision for a bridge despite the existence of the TWA Order.

The 2016 Preferred Route belatedly recognised that the original route would have destroyed Measham’s major employment site and proposed a new route to the east of Measham. This avoided the Ashby Canal within Measham and the major housing site that was planned to include its restoration. However, it would have crossed the canal route on the edge of the town at entirely the wrong level, requiring a canal diversion from the TWA route with major engineering challenges, and making no provision for this.

In 2017 the third route at Measham was announced, reverting to the west side but avoiding the major employment site. However, this cuts through the housing site rendering it largely unviable and losing the

community benefit of the associated canal restoration. Again, no bridge or provision for the canal restoration was included on the plans at that stage.

All these routes appear to have been devised as desk studies without taking full account of vital local interests. Accordingly, the housing site developer has since submitted plans for an alternative route that would both protect the main employment site and avoid the housing site, enabling the canal restoration to proceed, known as Route 4 (see below).

The Current Plans

Following our earlier representations, IWA is pleased to note that the Proposed Scheme plan now shows an Ashby Canal Restoration Underbridge at the end of the River Mease Viaduct. A further bridge for the canal is shown under the proposed access road to a large balancing pond situated between HS2 and the A42. Both these bridges should provide a minimum of 3m air draft clearance and conform to the other TWAO design standard dimensions.

The A42 is to be realigned starting from a point just west of where it crosses the historic Ashby Canal route, and if Route 4 is accepted the realignment would commence further west. Either way, the Design Manual for Roads & Bridges requires DfT highway improvement schemes to include navigable crossings for recognised waterway restoration projects. The canal route is protected in the NWLDC Local Plan and IWA therefore expects that the work to realign the A42 should include an underbridge for the continuation of the canal restoration. This should also be to the TWAO dimensions, although the water level could possibly be reduced if necessary to provide sufficient headroom by construction of a canal lock between the HS2 and A42 bridges, which may assist in reducing the height of the balancing pond access road. A canal bridge under the A42 would also provide a towpath connection and obviate the need for the lengthy diversion of footpath P75/6 which as indicated would create an additional obstacle to the canal restoration unless a footbridge is provided across its line on the west side of the A42.

If for any reason the Route 4 alternative is not adopted and the current HS2 plans do proceed then the authorised Waterside housing site will not be built and HS2 Ltd will undoubtedly have to pay substantial compensation to the developer. The development would have provided about 1.1km of reconstructed canal at a cost of about £3.5m as a community benefit, and IWA would expect this to be funded as part of the compensation package. The obvious arrangement would then be for Leicestershire County Council to receive this part of the compensation and for them to construct the canal as they are already authorised to do so by the TWA Order.

Extensive noise barriers are shown on the Operational Noise Contour map along the east side of HS2 to protect housing but mitigation fencing should also be provided for future users of the Ashby Canal on the west side north of Burton Road.

Alternative Route 4

An alternative route for HS2 at Measham is being promoted by the affected housing site developer Measham Land Co. and other local interests, known as Route 4, which would move both HS2 and the A42 realignment further west. This would enable the housing site and the integral canal reconstruction to proceed, and would also reduce the number of residential properties affected, be broadly cost neutral in construction, avoid the development compensation payments, and minimise the overall adverse impacts. It is supported by IWA, although we realise that it will be decided on a broad balance of economic, social and environmental factors.

With support from the local MP, the Secretary of State has agreed to review and consult on this alternative. It is also noted that the HS2 Independent Design Panel has visited Measham and recommended development of a masterplan and collaborative engagement with the community, which could include “contributing to the restoration of the canal”.

IWA looks forward to acceptance of the Route 4 alignment and the removal of the threats to the continuing restoration of the Ashby Canal.

If this does become the final route then the same requirements for both an HS2 and an A42 crossing of the canal will still apply, although the exact locations of the bridges will of course change.

RIVER SOAR (LA05)

The Ratcliffe-on-Soar Viaduct passes close to Redhill Marina where the extensive boat moorings include two marina basins and extend along the riverbanks both upstream and downstream, from Redhill Lock almost to the confluence with the River Trent. The moorings include residential users who will be significantly impacted by noise and visual intrusion, and noise mitigation fencing should be provided across a long section of the viaduct to minimise noise intrusion on the moorings.

The great length of the viaduct will have a major landscape impact which should be mitigated through good design.

TRENT NAVIGATION, CRANFLEET CUT (LA05)

The Long Eaton and Toton Viaduct crosses the Trent Navigation's Cranfleet Cut directly over canal boat moorings of the Nottingham Yacht Club, extending along the canal banks and in a mooring basin. These include residential boats and noise fencing should be provided across the viaduct to minimise noise intrusion.

EREWASH CANAL (LA05, LA06)

The Erewash Canal will be affected over several miles through Long Eaton and north to Stanton Gate.

Long Eaton

The HS2 route through Long Eaton is on embankment and viaducts which will be visible from the Erewash Canal. In particular, there are open views across Toton Yard to the new Toton Station site. The canal environment and its users will be affected by both construction and operational noise and the indicated noise fence barriers should be extended to protect not only the nearest housing but also the amenity and recreational corridor of the canal.

Sandiacre

At Sandiacre Lock a balancing pond access is shown crossing by the listed canal bridge, and there are concerns about construction vehicle weights and sizes and possible impacts on the bridge parapets.

Between Toton and Stanton Gate the viaduct along the valley crosses the Erewash Canal at a very skew angle and may need a short canal diversion to enable a shorter span crossing with less visually intrusive piers. There is also an auto-transformer station that will be visible from the canal around Pasture Lock, and screen planting should be provided by relocation of the balancing pond.

Canal users travel only at walking pace and boaters will take 15 minutes or more to pass through each lock. They will also moor up for lunch or overnight in convenient or attractive locations, so are very vulnerable to any excessive noise impacts from HS2 trains. If their use of a long section of the canal is not to be discouraged and unduly restricted by a degraded sound environment, then it is imperative that the viaduct has acoustic fencing barriers to mitigate the noise, and that these are designed to achieve at least the same standard of noise reduction as would be afforded to residential buildings at that location.

Stanton Gate

The M1 realignment at Stanton Gate will require a new canal bridge but there are as yet no dimensional details. It should span the full width of the canal and its towpath and provide a minimum 3m air draught clearance. The design of the bridge structures is unknown but should follow the CRT design principles accepted for HS2 Phase 1.

NOTTINGHAM CANAL (LA06)

Although the Nottingham Canal is abandoned and not currently proposed for restoration, much of its towpath remains used as a footpath and a long section of the canal between Eastwood, Trowell and Wollaton is capable of restoration as a local amenity. However, the Proposed Scheme plan shows the Trowell Embankment across the canal, near the A609 Nottingham Road Underbridge, with the towpath closed and a

footpath diversion. IWA considers that this unnecessary blockage should be avoided by providing a bridge where HS2 crosses the Nottingham Canal of adequate height and width to maintain the continuity of the towpath (Trowell Footpath 23) and of the canal for future restoration.

CHESTERFIELD CANAL (LA11)

The Chesterfield Canal has been progressively restored over a number of years with public funding and voluntary labour from Worksop to Kiveton and between Chesterfield and Staveley, where it is currently being further extended by the Chesterfield Canal Trust (CCT). Its route is safeguarded in the relevant Local Plans. However, completion of the restoration between Staveley and Norwood Tunnel has been blighted by the plans for HS2 since 2013 and the present plans remain a threat to the project at Staveley, at Norwood, and possibly also at Chesterfield.

Staveley Infrastructure Maintenance Depot

The vast size and massive land take of the proposed Staveley Infrastructure Maintenance Depot (IMD) will significantly affect the environment and context of the Chesterfield Canal for most of its length between Hollingwood and Staveley. This section of canal has been restored as a public amenity and is very well used for towpath walking and cycling (estimated as 75,000 people annually), recreational boating and angling. It currently enjoys a largely open rural outlook which greatly adds to its amenity, but this is threatened by the IMD. The proposed Landscape Mitigation Planting and the canalside Woodland Habitat Creation needs to be planned to provide screening of the IMD buildings and its operational noise whilst minimising the loss of open views from the canal.

Any canalside woodland planting should be set back from the canal to minimise the increased maintenance costs from the need to regularly cut back overhanging vegetation, or from branches falling and leaves blowing into the canal necessitating more frequent dredging.

No information on the noise impacts of the construction and operation of the IMD has been provided, so the extent of this and the effectiveness of any mitigation measures cannot be assessed. However, given the size of the site, the nature of the operation, and night-time working, the impacts of noise are likely to be severe on the environment, amenity and tourism value of the canal, as well as local residents.

Mineral Railway Line

Reuse of the disused mineral railway line to access the proposed IMD should not be incompatible with restoration of the Chesterfield Canal at the original rail bridge crossing at Lowgates, west of Eckington Road Bridge, but HS2 has repeatedly failed to confirm the rail level at that point.

The mineral railway line was subject to some mining subsidence prior to its closure, reducing the headroom over the original canal level. Although the bridge deck was removed, the route was not fully abandoned and CCT needed to allow for its possible reinstatement. The Trust has therefore invested significant funds and voluntary labour in building a new canal lock at Staveley and restoring the channel below Ireland Close and Eckington Road at a lower level to pass under the mineral line. Recent excavation of the crossing point has found the original rail bridge abutments to be substantially intact and in good condition, allowing reinstatement of the rail bridge deck with sufficient headroom for the canal and its towpath.

The Trust has repeatedly tried to engage constructively with HS2 engineers to confirm the proposed new track levels to enable them to continue the canal restoration work without uncertainty about the compatibility of the future HS2 works. But despite several promises the necessary assurances have not been forthcoming, and there is no acknowledgement of the need to accommodate the canal route under the railway in the present consultation.

A recent statement to Parliament by the Secretary of State [HoC Transport Questions 1/10/2018] makes clear that the Government expect HS2 to avoid obstructing canal restoration projects. HS2 should now with some urgency work with Chesterfield Canal Trust and Derbyshire County Council (landowners of this part of the canal) to confirm the levels and that the reinstated railway will provide the necessary clearance over the restored Chesterfield Canal, in order to avoid severance of the protected canal route and to enable its restoration to proceed.

Public Realm at Staveley

The Proposed Scheme plans show three areas of 'public realm' along the Chesterfield Canal route; around Staveley Basin and on either side of Eckington Road Bridge. This is described as "to mitigate against loss of community areas by providing new areas of public realm along the Chesterfield Canal" with "a flexible public square around Staveley Canal Basin" and proposed "stepped terrace seating". However, this has not been discussed with Chesterfield Canal Trust.

It is not clear where the "stepped terrace seating" is proposed to be located or why this has been suggested. The land around Staveley Canal basin is already a public space with plans to develop it further as a mixed recreation, residential and small business development in support of the public use of the canal, and such seating is no part of those plans. Most of the other two indicated 'public realm' areas have already been used as part of the restored canal or are needed to continue that work, so the purpose of HS2 designating them public realm is not clear, and the threat of HS2 compulsorily purchasing them is not acceptable.

Norwood Tunnel

Norwood Tunnel is historically important as one of the first major canal tunnels planned by the pioneering canal engineer James Brindley. It was in use from 1775 to 1907 when part of it collapsed due to coal mining subsidence. The Chesterfield Canal has been restored up to the eastern portal of Norwood Tunnel, and it is planned to reopen the first section of the tunnel to navigation. The central section of the tunnel will be bypassed by a surface level canal at a slightly higher level, incorporating a marina, and present plans for the western end require further locks up to a new summit level passing under the M1 by an existing culvert.

These plans were published in 2010 (Next Navigation: Restoration of the Chesterfield Canal between Staveley and Kiveton Park. Chesterfield Canal Partnership) but appear to have been entirely ignored by HS2. The Proposed Scheme plan shows almost the whole area between the Norwood Tunnel west portal and the M1 occupied by the Wales Embankment and landscape earthworks, leaving no space for the flight of locks needed to access the existing motorway underpass.

An Accommodation Underbridge is shown for Wales Footpath 14 and what appears to be a culvert for Wales Footpath 17 Diversion, but there is no accommodation for the canal route. These plans needs major changes to provide a sufficiently wide surface corridor for the canal, its locks and the necessary water storage 'side ponds', spanned by a wide canal underbridge.

An alternative recently considered by CCT is to bore a new tunnel under the highest ground at the western end. This would start close to the western portal and run just south of the original tunnel and at the same level to pass under HS2, the M1 and the highest ground. It would then connect with the central surface level section and the eastern end of the original tunnel as described above. This would reduce the number of new locks needed and the height of the summit level, giving construction, operational and water supply benefits.

HS2 should now with some urgency fully engage with the Chesterfield Canal Trust and the Canal & River Trust (landowners of Norwood Tunnel) to consider, design and cost the optimum engineering solution that will provide a restored section of the canal from Norwood to east of the M1 in conjunction with the construction of HS2.

Chesterfield

An essential part of Phase 2B is now improvement to the Midland Main Line through Chesterfield which is very close to the Chesterfield Waterside development. This will provide a terminus for the restored canal, but there is no assessment of the economic or environmental impacts on it of the railway works.

SHEFFIELD & SOUTH YORKSHIRE NAVIGATION (LA13)

The River Don Viaduct will cross the Sheffield & South Yorkshire Navigation at Mexborough where it is still used as a commercial navigation, as well as increasingly for recreational boating. The viaduct piers should span the full width of the canal and its towpath and provide the necessary headroom specified by the Canal & River Trust. The viaduct will be a major landmark structure and its design should seek to seamlessly integrate with and enhance the location.

DEARNE & DOVE CANAL (LA13)

The proposed restoration of the Dearne & Dove Canal by the Barnsley, Dearne & Dove Canals Trust could be affected in two ways.

Electrification and signalling works to the existing Dearne Valley Railway Line adjacent to and crossing the Dearne and Dove Canal at Swinton should not further inhibit the future restoration of the canal on its historic route.

The identified alternative route using the canalised River Dearne for navigation will be crossed by the River Dearne Viaduct, and the viaduct piers should be located to provide a clear span of the river and sufficient width of its banks for future construction access and provision of a towpath.

AIRE & CALDER NAVIGATION (LA15, LA17, LA18)

HS2 crosses the Aire & Calder Navigation by the River Calder Viaduct, the River Aire Viaduct, Leeds East Viaduct and the Leeds HS2 Station deck, as well as running close to the canal between Woodlesford and Stourton.

The Aire & Calder is a commercial navigation as well as being used increasingly for recreational boating. Each of the crossings should conform with the Canal & River Trust's current minimum dimensions, and the Leeds East Viaduct access to the Rolling Stock Depot should provide sufficient headroom for future commercial navigation improvements to Euro Class 2 to access the proposed new inland port upstream at Stourton. Where temporary bridges are required, these and the main viaduct construction should be planned to minimise interruptions to navigation and provide ample advance notice

The River Calder Viaduct across the Aire & Calder Wakefield Branch is close to boat moorings below Kings Road Lock (near Rose Farm) and appropriate noise mitigation should be provided.

Where retaining walls are proposed near the tight bend in the navigation at Rodhill Corner, their construction should not narrow or restrict the navigation for larger commercial vessels.

The visual impact of the new Leeds Station on the Canal Wharf Conservation Area of the Leeds & Liverpool Canal and its listed warehouse will be significant, and great care will be needed with the station design and layout to minimise this. The station deck spanning the River Aire will have a significant visual impact on the environment and users of the navigation and light wells should be provided to break up the otherwise oppressive dark tunnel effect on the river.

(ends)

HS2 PHASE 2B – DESIGN REFINEMENT CONSULTATION

RESPONSE OF THE INLAND WATERWAYS ASSOCIATION (2/9/2019)

Introduction

The HS2 Phase 2b Design Refinement proposals affect parts of the Coventry Canal, the Erewash Canal, the Nottingham Canal and the Aire & Calder Navigation.

This response considers both adverse and beneficial effects of the proposed changes and suggests mitigation needed to minimise the adverse impacts.

Design Refinement Comments:

Consultation Document

The Design Refinement Consultation document describes the major changes at each of the route refinement locations, but does not refer to or adequately explain many of the other consequent or associated design changes, which is a major deficiency. These other changes are apparent only by comparing the Design Refinement plans with the previous Working Draft Environmental Statement plans, but the reason for some of these changes is not always apparent. In most cases, the DR consultation plans are also at a smaller scale than the previous plans, which does not aid their interpretation.

3. REALIGNMENT OF THE ROUTE AT JUNCTION 10 OF THE M42, NORTH WARWICKSHIRE

The change to a bored tunnel under the M42 affects the vertical alignment northeast to Polesworth. Although not mentioned in the consultation document, it is apparent from the plans that the section of HS2 through Pooley Country Park will now be in a shallower cutting and the realignment of Pooley Lane has been changed from an overbridge to a crossing under the end of Polesworth Viaduct close to the Coventry Canal. Whilst this reduces the overall visual impact of the road realignment on the Park it would increase the physical impact on the canal and moorings and consideration should be given to how this can be mitigated.

In IWA's response to the Phase 2b Working Draft Environmental Statement of 21 December 2018 we described the impacts of HS2 and the mitigation required as follows:

> The Coventry Canal at Polesworth is crossed by Polesworth Viaduct, spanning an entrance to the old colliery basin which provides attractive and tranquil moorings for about 12 canal boats including residential use, and also a base for holiday hire boats. The basin and wharf have historic and industrial archaeological value as one of the last on the narrow canal system to be used for loading coal from the adjacent colliery. The former colliery site alongside the canal has been reclaimed as the Pooley Country Park and Heritage Centre and is now a well-used recreational facility.
>
> Both the public facility of the country park and the private moorings will be severely damaged by HS2, with the line cutting through the country park on embankment and in cutting, destroying heritage buildings used for light industry and the visitor centre. Although a diversion of Pooley Lane and a new access road will now be provided to the remainder of the park and the scout hut, the direct physical damage and the constantly intrusive noise will severely limit future use and enjoyment of the country park facilities and could make the canal boat moorings uninhabitable for residential use.
>
> The boat moorings include permanent residential moorings and, as is common, the others are often used residentially overnight, at weekends or for longer periods. The Operational Noise Contour map shows 2m high noise fencing only on the east side of the viaduct across the Coventry Canal, with the boat moorings subject to noise levels in the red zone (more than 65 dB daytime and more than 55 dB night-time) which is not acceptable.
>
> A noise fence barrier should therefore also be provided on the west side of the viaduct and the adjacent Pooley Lane Embankment to reduce operational noise at the canal to below the equivalent "significant effect" level for residential properties.

> There will also be major impacts on the Coventry Canal and the boat moorings during the construction phase, and an access must be maintained at all times to the moorings otherwise compensation will need to be paid for their temporary relocation. Temporary closures of the Coventry Canal and its towpath for construction of the viaduct should be programmed for the quieter winter 'stoppage' period. The Polesworth Viaduct Satellite Compound is close to the canal and should be screened to limit the noise nuisance to canal users.

All of the above remains valid, plus now there will be some additional disturbance from the proximity of the Pooley Lane realignment to the canal and the boat moorings. Drawing 2DE02-ACI-CV-DPP-L001-000002 Rev.P06 is not sufficiently detailed to fully assess this impact, but the road should be designed to be set back from the canal edge under the viaduct, if necessary by moving back the viaduct abutment or providing an additional span. It should maintain access to the moorings and minimise impacts on the heritage of the canal and the country park. Also, the additional habitat creation now shown should not be at the expense of the remaining industrial heritage in this area.

Conclusion

On balance IWA has no objection to this change, subject to the Pooley Lane realignment being designed to limit its impact on the Coventry Canal and the boat moorings, improved noise fencing around the Polesworth Viaduct crossing of the canal, and minimising disruption to the boat moorings during the construction phase.

5. REALIGNMENT OF THE ROUTE AT TROWELL, NOTTINGHAMSHIRE

The change of alignment to avoid diverting the M1 motorway will have both benefits and dis-benefits for the environment and users of the Erewash Canal. It will be beneficial to users to avoid the disruption of having to demolish and replace the M1 bridge over the canal. However, there are further changes not explained in the consultation document but apparent from the accompanying plans that have implications for the canal.

Stanton Gate Erewash Canal Underbridge

At Stanton Gate the road is shown realigned with a new canal underbridge, although it is not clear why. It may be related to the height of the HS2 Stanton Gate viaduct at its crossing of the existing road where that is rising to bridge the existing railway. However, the canal, road and rail levels on the cross section drawing do not appear to correspond with each other or with the ground level shown, making interpretation difficult. Works are also indicated to the Network Rail (NR) tracks here although again there is no explanation of this.

The new road bridge over the canal and its towpath should provide a full width crossing and a 3m air draught clearance, and the design of the bridge structure should follow the CRT design principles accepted for HS2 Phase 1. It should also provide a ramped access to the canal towpath.

It is not clear how much of the existing road will be retained or whether this will include the current canal bridge. As this has sub-standard headroom over the canal and towpath its removal would be beneficial and help to reduce the cumulative impact of the new bridges and viaduct on the canal environment.

Stanton Gate Viaduct

Between Stanton Gate and Sandiacre the Stanton Gate Viaduct along the Erewash Valley will be a very prominent and visually intrusive feature, crossing the Erewash Canal twice, at Stanton Gate with headroom of about 8m, and at Sandiacre with about 13m.

However, it is not clear why the viaduct is so high and rises even further in the middle, giving more than 15m clearance above ground level. A further change to smooth out the vertical alignment and reduce its maximum height above the valley floor should be considered to both lessen its visual impact and to reduce construction costs. Given that trains here will not be running at maximum line speed due to the proximity of Toton Station, the vertical curvature should not be so constrained as to need this anomalously 'humped' alignment. We are not convinced that current plans provide the optimum solution.

The canal crossing at Sandiacre is at a very skew angle and the Canal & River Trust (CRT) previously considered whether a short canal diversion to give a less skew crossing would enable the viaduct piers to be less intrusively positioned and dimensioned. However, the change now proposed moves the crossing point

further south where it is even more tightly constrained between the NR tracks and existing terraced housing. As the canal could not now practically be realigned here, the viaduct design will have to accommodate the very skew canal crossing, and should as far as possible follow the CRT design principles accepted for HS2 Phase 1.

Stanton Gate Auto-transformer Station
Near Stanton Gate there is an auto-transformer station that will be visible from the canal around Pasture Lock, and screen planting on its eastern side should be provided, if necessary by relocation of the balancing pond.

Noise mitigation

IWA's response to the Phase 2b Working Draft Environmental Statement of 21 December 2018 also addressed the issue of noise mitigation and our comments remain relevant, as follows:

> Canal users travel only at walking pace and boaters will take 15 minutes or more to pass through each lock. They will also moor up for lunch or overnight in convenient or attractive locations, so are very vulnerable to any excessive noise impacts from HS2 trains. If their use of a long section of the canal is not to be discouraged and unduly restricted by a degraded sound environment, then it is imperative that the viaduct has acoustic fencing barriers to mitigate the noise, and that these are designed to achieve at least the same standard of noise reduction as would be afforded to residential buildings at that location.

Nottingham Canal

The Design Refinement substantially changes the elevation of HS2 where it crosses the route of the Nottingham Canal, near to the A609 Nottingham Road, from being on embankment to being in a cutting about 9m below the canal water level. Although the Nottingham Canal is abandoned as a navigation and not currently proposed for restoration, much of its towpath remains used as a footpath and a long section of the canal between Eastwood, Trowell and Wollaton is capable of restoration as a local amenity. The section of canal that will be cut through by HS2 forms part of the Erewash Valley Trail long distance footpath and both the Nottingham Canal Local Nature Reserve and Nottingham Canal Local Wildlife Site, extending for 6 miles (9.6 km) from Eastwood to Bramcote.

The one-day survey reported in the WDES Vol.2 Community Area LA06 report at page 219 showed Trowell Footpath 23 that follows the canal towpath was used by 173 pedestrians and 70 cyclists on that day. This is a significant level of use and therefore at the very least a foot/cycle bridge should be provided over HS2 to maintain the continuity of the public footpath and the Erewash Valley Trail here.

However, IWA considers that severance of the canal itself and its extensive wetland nature reserve should be avoided by providing an aqueduct, although this may need to be just south of the original canal alignment to give sufficient vertical clearance, in order to maintain the continuity of the canal channel for water supply and future restoration.

Conclusion

For the above reasons, on balance IWA supports this change subject to: reduction of the maximum height of Stanton Gate Viaduct and the inclusion of effective noise barriers; the detailed design of Stanton Gate Erewash Canal Underbridge; screening from the canal of the Stanton Gate Auto-transformer station; and maintaining the continuity of the Nottingham Canal towpath and channel.

6. LEEDS CORRIDOR, WOODLESFORD TO LEEDS STATION

Compared with the Proposed Scheme plans, the Design Refinement plans for the Leeds Corridor are anything but refined, showing the edges of the Aire & Calder Navigation as a series of steps instead of a smooth curve and without blue colouring of the waterway, which does not aid their interpretation.

The change of alignment to avoid diverting the existing Hallam railway line will have both benefits and dis-benefits for the environment and users of the Aire & Calder Navigation. From the Woodlesford Tunnel to west of the M1 motorway crossing HS2 will be further away from the canal although more elevated on a

viaduct. The overall balance of visual impact is difficult to assess without more information including cross sections.

West of the M1 crossing, the alignment converges on the canal and runs directly alongside it adjacent to the major bend in the navigation at Rodhill Corner, but is now on a high viaduct here crossing over the motorway and the Hallam Line. This will significantly increase the visual impact of the scheme on the waterway in this area. The very skew alignment of the Hallam Line crossing will require extended spans with more intrusive viaduct piers which will further increase its visual impact. No viaduct piers should intrude into the navigation and if any retaining walls are necessary near to Rodhill Corner, their construction should not narrow or restrict the navigation for larger commercial vessels.

As well as a commercial navigation, the Aire & Calder is increasingly being used for recreational boating which will be more sensitive to noise disturbance from both the construction and operation of HS2. The noise impact of a surface route would have been mitigated by woodland planting but will now depend on noise barriers along the viaduct, on which no information is offered.

Although the Leeds East Viaduct access to the Rolling Stock Depot is not within the indicated extent of the DR consultation, its alignment has been altered on the Design Refinement plans so confirmation is needed that it will not only conform to the Canal & River Trust's current minimum dimensions but will provide sufficient headroom for commercial navigation improvements to Euro Class 2 to access the proposed new inland port upstream at Stourton. Also, if any temporary bridges are required, these and the main viaduct construction should be planned to minimise interruptions to navigation and provide ample advance notice.

Consideration should be given to using the Aire & Calder Navigation for transport of construction and demolition materials for this and other sections of HS2 that are close to the navigation to help reduce road congestion and environmental impacts.

Conclusion

For the above reasons, IWA cannot support this change unless every effort is made at the detailed design stage to minimise the physical, visual and noise impacts on the Aire & Calder Navigation, including sensitive design of viaduct piers alongside the canal and extensive use of noise barriers along the viaduct.

(ends)