Canal & River Trust
Making life better by water

Response to High Speed Two: Western Leg of Phase 2b Design Refinement Consultation

December 2020

Please find below the response of the Canal & River Trust (the Trust).

We're the charity who look after and bring to life 2000 miles of canals & rivers. Our waterways contribute to the health and wellbeing of local communities and economies, creating attractive and connected places to live, work, volunteer and spend leisure time. These historic, natural and cultural assets form part of the strategic and local green-blue infrastructure network, linking urban and rural communities as well as habitats. Our waterways are on the doorstep of 8 million people and reach some of the most deprived communities within the UK. By caring for our waterways and promoting their use we believe we can improve the wellbeing of our nation.

The Trust's work is focussed on making life better by water. The key objective therefore for the Trust, in responding to the consultation, is to protect our assets and interests and to ensure that as the proposal develops the impacts of the scheme on our inland waterways network or affecting third party restoration projects are appropriately mitigated.

The Trust has a range of charitable objects:

o to preserve, protect, operate and manage Inland Waterways for public benefit:
- o for navigation;
- o for walking on towpaths; and
- o for recreation or other leisure-time pursuits of the public in the interest of their health and social welfare;

o to protect and conserve for public benefit sites, objects and buildings of archaeological, architectural, engineering or historic interest on, in the vicinity of, or otherwise associated with Inland Waterways;

o to further for the public benefit the conservation protection and improvement of the natural environment and landscape of Inland Waterways;

o to promote, facilitate, undertake and assist in, for public benefit, the restoration and improvement of Inland Waterways;

o to promote and facilitate for public benefit awareness, learning and education about Inland Waterways, their history, development, use, operation and cultural heritage by all appropriate means including the provision of museums;

o to promote sustainable development in the vicinity of any Inland Waterway for the benefit of the public, in particular by:
- o the improvement of the conditions of life in socially and economically disadvantaged communities in such vicinity; and
- o the promotion of sustainable means of achieving economic growth and regeneration and the prudent use of natural resources; and

o to further any purpose which is exclusively charitable under the law of England and Wales connected with Inland Waterways;

provided that in each case where the Trust undertakes work in relation to property which it does not own or hold in trust, any private benefit to the owner of the property is merely incidental.

The comments below are made specifically in relation to the changes outlined in the Design Refinement Consultation. These comments should be read alongside the matters that the Trust have identified in previous consultations in relation to the locations specified. The Trust wish to re-iterate that we will require the crossing designs to follow the overarching principles for HS2 canal crossings agreed on HS2 Phase 1.

The Trust hopes that the following comments are helpful and looks forward to further dialogue with HS2 Ltd to ensure that the developing proposal addresses the impacts on and opportunities for the waterway network.

Please direct any queries to John Harris, HS2 Project Lead, Canal & River Trust, Aqua House, 20 Lionel Street, Birmingham. B3 1AQ. Telephone: 07710 175244, email: john.harris@canalrivertrust.org.uk

Proposed Design Refinement 1: Crewe Northern Connection and changes to the design of Crewe North rolling stock depot.

1a: What are your comments on the proposals to provide a connection between HS2 and the West Coast Main Line north of Crewe?

The Trust has no objection in principle to the proposals to provide a connection between HS2 and the West Coast Main Line north of Crewe. The canal in this area will however be severely impacted by the proposals and are of significant concern to the Trust. Very limited information has been provided to enable us to properly assess the impact of this change on the waterway corridor. Clearer visualisations from the waterway corridor are required of the proposed interfaces with the canal. We have provided some comments below on the interfaces with the Shropshire Union Canal (Middlewich Branch) at Clive Green Lane Overbridge and Shropshire Union Viaducts 1, 2 and 3 and surrounding area below.

Issue	Without prejudice potential mitigation
Clive Green Lane, Shropshire Union Canal	
Matters relating to the Shropshire Union Canal Offline Overbridge The introduction of the Shropshire Union Canal Offline Overbridge and associated earthworks and its proximity to the existing Clive Green Lane canal bridge is likely to create a sense of enclosure on this part of the canal.	Matters relating to the Shropshire Union Canal Offline Overbridge We would welcome further discussions with HS2 in relation to the design of the Shropshire Union Canal Offline Overbridge, associated earthworks and the provision of an Equalities Act compliant access to the canal for pedestrians and cyclists. A suitable ramped access could be constructed at right angles to the canal corridor along the southern Clive Green Lane

The proposed alignment of the Shropshire Union Canal Offline Overbridge is shown as being perpendicular to the canal corridor, which is welcomed. However, no profiles have been provided of the Overbridge. The Trust require that appropriate headroom for both the towpath and the navigation is provided. The Trust require that further information is provided to enable us to understand this proposal. Should this proposal progress the Trust wish to input into the design of this highway bridge crossing and ask that it embodies the HS2 Design Principles for Waterway Crossings which have been adopted elsewhere along the route. Subject to the new highway and bridge having footways it must provide for an Equalities Act compliant access to the canal towpath and the national cycle route for pedestrians and cyclists.	embankment (Grid B2). This would promote and encourage walking and cycling. We would welcome further discussion with HS2 on this matter. The design of the highway crossing should reflect the over-arching Design Principles for Waterway Crossings as agreed with HS2 Limited on HS2 Phase 1.
<u>Existing Clive Green Bridge</u> Map CT-06-310 shows that the existing Clive Lane Bridge would be stopped up as a highway at Wharf Cottage (Grid B3). Although it would appear that a HS2 access would also be created here to enable access to a balancing pond. This creates an awkward arrangement with two turning heads effectively side by side. This detail should be reconsidered. It is also unclear how either of the accesses would be secured and we would welcome this being clarified. No mitigation landscaping is shown on the northern side of these access tracks and as such would be visible from the canal corridor. It is also unclear how the stopped-up highway would be finished in a manner appropriate to the character of the area. The Trust would also like to have vehicular access here to be able to maintain the retained Clive Green Bridge. We would also welcome clarification on the treatment of the space on the towpath side of the canal between the new highway bridge and retained Clive Green Bridge (Grid B3). This would create an awkward deadspace and would require a suitable treatment to deal with potential anti-social behaviour.	<u>Existing Clive Green Bridge</u> We would welcome discussions with HS2 in terms of the future of the existing Clive Green Bridge and future access arrangements here. We would also welcome discussion with HS2 in relation to providing an Equalities Act compliant access to the canal for pedestrians and cyclists. As much of the existing waterside vegetation should be retained to provide screening to the transport corridors in this area.

If Clive Green Bridge is retained, then a public right of way would need to be maintained over it to allow people to access the canal corridor. The existing stepped access is not suitable for all users and the proposed works provide the opportunity to provide an Equalities Act compliant access to the canal towpath for all pedestrians and cyclists. Such an access would also provide a sustainable transport route for employees of the Rolling Stock Depot (RSD) to use the National Cycle Route along the canal towpath to access the site. We would welcome further discussion with HS2 on these matters.	
<u>Construction route</u> Map CT-05-310 shows that the Trusts existing canal bridge (Grid B3) would be used during the works as a construction traffic route. The road narrows over the bridge, making it effectively single lane and due to its profile and alignment often results in grounding of long vehicles or those with low ground clearance. HS2 should take the existing bridge constraints into account to ensure construction traffic does not damage the bridge.	<u>Construction route</u> We ask that HS2 assess the weight restriction of the bridge and ensure construction traffic using this route would not cause damage to our bridge.
<u>Temporary Bridges for construction</u> Although not shown on map CT-05-310, it is likely that temporary bridges would be required for the construction works associated with the Shropshire Union Canal Offline Overbridge. We would welcome clarification from HS2 in terms of the siting of temporary bridges, how they relate to construction routes and how the mitigation planting would repair any damage caused. The number and siting of temporary bridges should be properly planned to limit the impact of the construction phase on the canal corridor.	

Temporary road diversion Map CT-05-310 shows a temporary highway diversion through a triangular parcel of land, which is within the ownership of the Trust, and is currently mature woodland (Grid B2, B3). It is likely the majority of this woodland would be felled/cleared to accommodate the temporary highway diversion. There is also an open watercourse which passes through this woodland and is culverted under the canal. We are concerned about the unnecessary loss of this area of woodland which is within our ownership and ask HS2 to explore an alternative temporary alignment of the highway which preserves this area of mature woodland. Or consider an alternative phasing of the works which retains the use of the existing Clive Green Bridge for as long as possible and avoids the need for this temporary highway diversion. If an alternative route cannot be found, then we would ask that the woodland clearance is minimised as far as practicable. It would also be important that the existing watercourse through this woodland is protected during the works. We ask HS2 to clarify what the future use of this land would be following the temporary highway diversion. No landscape mitigation is proposed for this area. (Map CT-06-310 (Grid B3).	Temporary road diversion We would ask HS2 to review all alternatives to the temporary road diversion through the area of woodland within our ownership. We would also welcome clarification on the future use of this land following the temporary highway diversion.
Drainage Map CT-06-309-L1 shows a drainage ditch running to the canal (Grid I8) and then running parallel to the offside of the canal (Grid J9 J10). A further drainage ditch runs along the southern toe of the Clive Green Lane realignment embankment (Map CT-06-310 Grid A2, B2, B3, A3, A4, A5). The Trust would want assurances that the construction and operation of these drainage ditches running parallel to the canal would not undermine or harm the structural integrity of the canal. Both of these drainage ditches pass into a watercourse which is culverted under the canal (Grid A2). This culvert would be unlikely to be able to cope with any material increase in water flow. The culvert may therefore need to be upgraded/enhanced to have a capacity to deal with any increase in potential forecasted flows that it would be required to take. If a material	Drainage We re-iterate that the Trust requires that its consent is obtained for any discharge to the canal, to protect the canal from flooding, structural damage, environmental degradation and to ensure navigational safety. It cannot be assumed that the canal has the capacity to accommodate such discharge. It should not be assumed that our culverts have capacity to cope with any material increase in water flow. The culvert may therefore need to be upgraded/enhanced to have a capacity to deal with any increase in potential forecasted flows that it would be required to take. If a material increase in flows of water is to pass through this culvert, HS2 should ensure that it has sufficient capacity for any such additional flows and

increase in flow of water is to pass through this culvert, HS2 should ensure that it has sufficient capacity for any such additional flows and consider the acquisition of the Trust owned culvert. The culvert should be included within the land potentially required for construction. A canal breach recently occurred on this section of canal and as such appropriate drainage arrangements and supporting infrastructure is critical. It would appear that there is a direct discharge to the canal, Map CT-06-310 (Grid B3), which takes the drainage from the ditch along the toe of the northern Clive Green Lane embankment and overflow from the balancing pond (Grid B4 B5). This balancing pond takes water flows from the Stanthorne Culvert (Grid A5, A6), the Clive Green South Embankment No.3 as well as the drainage ditch shown adjacent to the realigned Clive Green Lane (Grid A6, A7, A8). Any discharges to the canal would require the separate consent of the Trust. It cannot be assumed that the canal has the capacity to accommodate such discharge. It is unclear from Map CT-06-310 whether the other two balancing ponds (Grid A4) and (Grid B3, B4) would also discharge to the canal. If not, we ask HS2 to clarify where they would discharge to, as neither appear to have an outlet. Indeed, the balancing pond Grid A4 does not appear to have any inlets either. Vegetation planting has the potential to damage culverts and hinder access. Currently, most of the culverts will be accessible over fields and these routes should be maintained if possible or alternative routes provided. Landscaping mitigation planting should be designed accordingly.	consider the acquisition of the Trust owned culvert. The culvert should be included within the land potentially required for construction. Where drainage is to waterspace not owned by the Trust the impact of downstream flooding needs to be considered and discussed with the Trust. It cannot be assumed that the canal has the capacity to accommodate such discharge. We ask for clarification from HS2 in relation to the discharge from the balancing ponds and drainage arrangements here.
<u>Footpath closure over canal bridge no.23 and construction route</u> Bridge no.23 over the canal currently carries a public footpath, (Map CT-05-309-L1 Grid I8). The map shows public footpath Wimboldsley 1/1 would be extinguished from the canal bridge back towards the Rolling Stock Depot (Grid I8, I9, H9, H10, G10). The canal towpath here also carries	<u>Footpath closure over canal bridge no.23 and construction route</u> We ask HS2 to provide an alternative realigned public right of way to the canal corridor following public footpath Wimboldsley 1/1 being extinguished. A public footpath could possibly utilise the new realigned

National Cycle Route 5 which leaves the canal towpath at this bridge and heads westwards towards Clive Back Lane. The closure of public footpath 1/1 may be detrimental to our customers who may use this as a route to gain access to the canal corridor. It would not appear that a new/realigned public right of way to the canal is being provided and we would ask that HS2 clarifies this. Employees of the RSD along with local residents may wish to access the canal for leisure purposes. As such HS2 Limited should consider retaining FP 1/1 from the T-junction of the Lea Hall Access Road (Grid F4 Map CT-06-309) and westwards to canal bridge no.23. Bridge 23 is also shown as land potentially required during construction, but is not shown as a HS2 construction route. We ask HS2 to clarify their intentions for this bridge.	Clive Green Lane and provide a suitable ramped access at the Shropshire Union Canal Offline Overbridge (as detailed above). HS2 Limited should consider retaining FP 1/1 from the T-junction of the Lea Hall Access Road (Grid F4 Map CT-06-309) and westwards to canal bridge no.23. We ask for clarification from HS2 why our canal bridge no.23 is shown as being required for construction, but not as a construction route.
<u>Shropshire Union Viaduct 1, 2 and 3</u>	
<u>Amenity of the canal</u> The Trust have previously advised HS2 Ltd that this interface with our waterway is the second worst crossing of the entire route of HS2. It remains of significant concern to the Trust due to its scale and mass, pier alignment, low headroom's and significant adverse harm it would cause to the character of the area and canal environment and the lack of opportunity to provide appropriate mitigation. The design and layout of the Shropshire Union Canal Viaducts 1, 2 and 3, have changed from the previous twin crossing. The three viaduct crossings would be at different heights over the canal. Substantial earthworks are shown to carry these viaducts over the canal. The embankments need to be constructed so they do not interfere with the operation of the canal or impose loadings on the Trust owned land.	<u>Amenity of the canal</u> We would welcome discussions with HS2 to investigate potential solutions to this very difficult crossing. The design of the crossing should reflect the over-arching Design Principles for Waterway Crossings as agreed with HS2 Limited on HS2 Phase 1. In particular, the arrangement of piers and bank seats will need to be given further consideration to address the potential clutter of multiple piers and the awkward spaces created. In any case the piers would need to be moved so they do not encroach onto the canal towpath. A possible solution for the offside of the canal could for the bank seats of all three crossings to be combined into one to provide a neater finish and remove the awkward spaces these create. As an engineered edge to the canal would need to be provided, the combined bank seat and toe of the

The proposed fragmented crossings could assist with reducing the potential tunnelling of the canal corridor compared to the previous twin crossing. However, the magnitude of such a structure would lead to the canal environment being adversely affected. Based on the details shown it is difficult to envisage what the experience would be traveling along the waterway underneath the structures, especially with soffits of differing height, misaligned bank seat and piers. The visualisation provided does not really demonstrate what the experience of the structure would be from the canal corridor with the potential clutter of the multiple piers and earthworks. The visualisation does not show the security fencing that would be required on the track or earthworks and other paraphernalia which would add to the visual clutter. A consequence of the fragmented crossing is that it does create visually awkward and contrived earthworks between each crossing. The visual impact of these would be further compounded by the staggered bank seats which the crossings would be constructed upon. The existing canal here also has a soft edge. Due to the crossing an engineered edge would need to be provided to the canal here to replace the soft bank/edge which would otherwise dry out and cause canal stability issues. A possible solution on the offside of the canal could for the bank seats of all three crossings to be combined into one to provide a neater finish and remove the awkward spaces these create. As an engineered edge to the canal would need to be provided, the combined bank seat and toe of the embankment could then be moved closer to the canal edge. This would remove the need for both piers and bank seats on the offside and the awkward deadspace these create which would be difficult to maintain and manage and which lack the opportunity for landscape mitigation (Map CT-05-310 (Grid D5 D6). It would appear that some of the northern most piers of the viaduct crossings and their foundations would encroach onto the canal towpath (Grid D5, E6) this would be unacceptable to the Trust and would hinder our customers using the towpath and national cycle route 5. The piers need to be constructed so they do not interfere with the use of the	embankment could then be moved closer to the canal edge. This would remove the need for both piers and bank seats on the offside and the awkward deadspace these create which would be difficult to maintain and manage and which lack the opportunity for landscape mitigation (Map CT-05-310 (Grid D5 D6). Further design solutions for this crossing on the towpath side of the canal and access track are outlined in the following section below.

towpath. The alignment of the piers of each of the viaducts over the canal would all appear to be arbitrary and pay no regard to the alignment of the canal and do not adhere to the HS2 Design Principles for Waterway Crossings. The piers should be aligned so that they are orientated/aligned to the canal and be of a similar design to provide a degree of commonality between them. The Design Principles for Waterway Crossings have been successfully adopted by HS2 Ltd elsewhere on the route and used to refine the design of canal crossings. We would seek HS2 to continue this approach to ensure consistency and quality of crossings of waterways.	
<u>Yew tree farm access track</u> The Trust has serious concerns about the space to be created between the canal towpath, viaduct piers, Yew Tree farm access track and bank seats which would be incredibly awkward (Map CT-06-310, Grid D5, E6). The adverse visual impact would be compounded due to the siting of the farm access track and the likely engineering works required to achieve head clearance under the viaduct. Given the profile of the land with the canal/towpath on an embankment, the farm access track would need to be formed in a cutting below towpath level by quite a significant distance. As a consequence of these likely excavations, retaining structures would be required to support the canal. This is of significant concern to the Trust both in structural and visual terms. The treatment of this space and how it would be viewed from the canal corridor is of critical importance. Especially given the various security fences and associated paraphernalia that would be required to secure this access track and earthworks. We highlight that the introduction of an access track around the abutment of the Trent & Mersey Canal Viaduct at the intersection of HS2 Phase 1 and 2a at Fradley raised similar concerns for the Trust, resulting in a petitioning point. This was addressed by the re-routing of the access track via an undertaking between the Secretary of State and the Trust.	<u>Yew tree farm access track</u> We would welcome discussions with HS2 to investigate potential solutions to this awkward relationship created by this farm access track. If the farm access cannot be rerouted, it is suggested that an additional span is introduced into the Shropshire Union Canal Viaducts 1, 2 and 3 (Map CT-06-310, Grid D5, E6). The farm access track could then pass through the northernmost span. The existing ground is likely to be more uniform in level in this location reducing the potential for retaining structures being required to support the canal. If insufficient headroom is available in this location there is the potential for the existing land level to be reduced. Appropriate screening of the land from the canal would also be required.

It is acknowledged that the farm owner would be likely to require access to their land west of the viaduct crossing. We do question the practicality of the proposed access arrangement, particular given the low level of the railway crossing the canal. We would ask HS2 to explore all possible options to reroute the access track away from the canal and the associated visual, structural, topographical and headroom challenges. The balancing pond (Grid D5) would more easily be accessed for maintenance directly from the A54 Middlewich Road (Grid H3). If this farm access track cannot be rerouted. Then we would ask HS2 to re-engineer the northern side of this canal crossing (Clive Green North Embankments 1, 2 and 3). A possible option could be to introduce an additional back span between the canal/towpath and the back seats of the embankments. Although this still provides a challenging space, it would enable the farm access track to be sited further from the canal, create a more appropriate headroom, avoid potentially undermining the structural integrity of the canal and allow for a more natural graded treatment of the levels between the towpath and the access track.	
<u>Landscaping</u> Where the viaduct crossings are proposed, the existing hedgerow at the back edge of the towpath would likely be removed to accommodate the works and replacement planting would be unlikely to survive. We ask HS2 to clarify what boundary treatment/landscaping would be provided here. Map CT-06-310 (Grid D5, D6) show no replacement landscaping or mitigation between the works and canal towpath. At present the towpath hedgerow here would be providing a wildlife corridor, this would be severed by the crossing. HS2 Ltd should provide a means of access for wildlife to pass under the structure as part of the design and landscaping mitigation for this crossing.	<u>Landscaping</u> The Trust require HS2 to reconsider the design and location of the proposed woodland habitat creation adjacent to the Shropshire Union (Middlewich Branch) Canal and provide clarification on the reason the canal towpath is shown as potentially required for mitigation planting. HS2 to re-consider the landscape mitigation strategy which better reflects the existing landscape character of the area and adheres to the HS2 Design Principles on Place and Identity. For example, a combination of appropriate grassland habitat immediately adjacent to the canal and both wetland and a patchwork of small coppices of woodland habitat further away from the canal corridor. A patchwork of woodland would also have greater habitat potential and be more in keeping with the landscape character.

Map CT-05-310 shows the canal towpath would be potentially required for mitigation planting (albeit with a section of towpath excluded in Grid E7). It is unclear why our Infrastructure Trust Property has been included. No planting is shown on the towpath (Map CT-06-310). It is presumed this is a drafting error but would welcome clarification from HS2. In order to preserve the open landscape character, the fields adjacent to the canal to the east of Grids E7-E9 should not be given over to woodland habitat creation. The landscape character of the area consists of small coppices of woodland and open fields which respond to the topography of the land. The mitigation planting extensive areas of woodland planting. Such unnatural extensive areas of woodland in this landscape also change the open character of the area. We would ask HS2 to re-consider the landscape mitigation strategy and instead develop mitigation which better reflects the existing landscape character of the area and adheres to the HS2 Design Principles on Place and Identity. The stability of the canal will need to be considered in relation to any planting proposals.	As much of the existing waterside vegetation should be retained to provide screening to the transport corridors in this area. Additional planting of hedgerows should be provided to compensate for the loss of hedgerow below the viaduct and associated works. HS2 Ltd should provide a means of access for wildlife to pass under the structure as part of the design and landscaping mitigation for this crossing.
<u>Construction routes</u> The Trust owned bridge on Map CT-05-310 (Grid E9) is shown as being land potentially required during the construction phase along with Coalpit Lane. However, this is not shown as a construction route which seems to end at either end of Coalpit Lane (Grid B8 and J8). The Trust objects to the inclusion of our bridge. The Trust require HS2 to explain their intentions regarding the use of this bridge.	<u>Construction route</u> We ask for clarification from HS2 why our canal bridge is potentially required for construction, if it is not a construction route.
<u>Drainage</u> Map CT-06-310 shows a large turning head to serve the balancing pond (Grid D6, D7, E7). It is unclear why the access to the turning head needs to encroach so close to the canal corridor and we ask that this access road is reduced/truncated so it is set further from the canal corridor.	<u>Drainage</u> The access road and turning head should be reduced/truncated to set it further back from the canal and confined to Grid D7. We re-iterate that the Trust requires that its consent is obtained for any discharge to the canal, to protect the canal from flooding, structural

A drainage ditch is shown from this balancing pond (Grid E7) and runs parallel to the canal and then under Coalpit Lane and links to a watercourse downstream of a culvert which passes under the canal (Grid E9). The Trust would want assurances that the construction and operation of these drainage ditches running parallel to the canal would not undermine or harm the structural integrity of the canal. The drainage from a balancing pond (Grid G7) and the toe drainage from Stanthorne South Embankment No.2 would all enter the same watercourse which is culverted under the canal (Grid E9). This culvert would be unlikely to be able to cope with any material increase in water flow. The culvert may therefore need to be upgraded/enhanced to have a capacity to deal with any increase in potential forecasted flow that it would be required to take. If a material increase in flow of water is to pass through this culvert, HS2 should ensure that it has sufficient capacity for any such additional flows and consider the acquisition of the Trust owned culvert. The culvert should be included within the land potentially required for construction. A canal breach recently occurred on this section of canal and as such appropriate drainage arrangements and supporting infrastructure is critical. We have an existing culvert just to the east of the proposed viaduct crossing and would be likely to be within the land potentially required during construction (Map CT-05-310 Grid D5). Any works or vegetation planting has the potential to damage culverts and hinder access. Currently, most of the culverts will be accessible over fields and these routes should be maintained if possible or alternative routes provided.	damage, environmental degradation and to ensure navigational safety. It cannot be assumed that the canal or culverts have the capacity to accommodate such discharge. It should not be assumed that our culverts have capacity to cope with any material increase in water flow. The culvert may therefore need to be upgraded/enhanced to have a capacity to deal with any increase in potential forecasted flows that it would be required to take. If a material increase in flow of water is to pass through this culvert, HS2 should ensure that it has sufficient capacity for any such additional flows and consider the acquisition of the Trust owned culvert. The culvert should be included within the land potentially required for construction. Where drainage is to waterspace not owned by the Trust the impact of downstream flooding needs to be considered and discussed with the Trust. It cannot be assumed that the canal has the capacity to accommodate such discharge.
<u>Canal Moorings</u> The impact on third party operated long term moorings should be discussed with the mooring operator. The Trust do however receive an income from these mooring and as such the removal of these, due to the viaduct, would result in the Trust losing out financially and we would seek compensation for these losses.	<u>Canal Moorings</u> We would welcome discussions with HS2 in terms of the potential provision of replacement visitor moorings where they are adversely affected either by the construction phase of HS2 or the operation of HS2. HS2 Ltd should use all reasonable endeavours to reduce any impacts on moorings on the canal. Where such impacts cannot be avoided or

The Trust also has popular visitor moorings on the Shropshire Union Canal (Middlewich Branch) along the towpath between our canal bridge (Grid C4) and canal bridge (Grid E9). The Trust will seek the equivalent reinstatement for the visitor moorings and may wish to discuss other visitor moorings in the area. HS2 Ltd should use all reasonable endeavours to reduce any impacts on moorings on the canal. Where such impacts cannot be avoided or mitigated, HS2 should work with the Trust and any affected third-party mooring operator to consider how this should be addressed. If temporary or permanent replacement moorings are required HS2 Ltd should ensure sufficient land 'potentially required for construction' is included to cater for any replacement moorings. The Trust would welcome early discussions with HS2 Ltd in terms of this matter.	mitigated, HS2 should work with the Trust and any affected third-party mooring operator to consider how this should be addressed. If temporary or permanent replacement moorings are required HS2 Ltd should ensure sufficient land 'potentially required for construction' is included to cater for any replacement moorings. The Trust would welcome early discussions with HS2 Ltd in terms of this matter.
<u>Temporary Bridges for construction</u> Although not shown on map CT-05-310, it is likely that temporary bridges would be required for the construction works associated with the Shropshire Union Viaducts 1, 2 and 3. We would welcome clarification from HS2 in terms of the siting of temporary bridges, how they relate to construction routes and how the mitigation planting would repair any damage caused. The number and siting of temporary bridges should be properly planned to limit the impact of the construction phase on the canal corridor.	<u>Temporary Bridge for construction</u> We would welcome discussions with HS2 to investigate potential suitable locations for temporary bridges and appropriate mitigation planting.
<u>Borrow Pit MA02-C near Yew Tree Farm</u> We have concerns related to the potential impact the excavation of the large borrow pit near Coalpit Lane may have on the canal (Map CT-05-310. Grid G7-8, H7-8). Depending on how these large excavations are dewatered it could have an adverse impact on the local water table. This in turn could impact the stability of the canal which is formed on an embankment here. The canal also has culverts, sluice and weirs in the vicinity of the borrow pit which could also be adversely impacted.	<u>Borrow Pit MA02-C near Yew Tree Farm</u> The Trust would wish to understand how the area around the borrow pits might be impacted by dewatering activities. We would want assurances from HS2 that any dewatering activities in the borrow pits would not have an adverse impact on the integrity of the canal or associated infrastructure.

Proposed Design Refinement 1: Crewe Northern Connection and changes to the design of Crewe North rolling stock depot. **1b: What are your comments on the revised proposal for the Crewe North Rolling Stock Depot and the inclusion of an Infrastructure Maintenance Base at the site?** The Trust has no objection in principle to the proposed changes to the Crewe North Rolling Stock Depot and the inclusion of an Infrastructure Maintenance Base at the site. However, very limited information has been provided to enable us to assess the impact of this change on the waterway corridor. Clearer visualisations from the waterway corridor are required as well as details of the height, mass and operational activities at the Rolling Stock Depot. We have some comments to make on the drainage to Trust owned culverts and the landscape mitigation shown.	
Issue	**Without prejudice potential mitigation**
<u>Shropshire Union Canal (Middlewich Branch)</u>	
<u>Visual amenity</u> The size of the Rolling Stock Depot (RSD) has increased from 60ha to 65ha. Our ability to consider the impact of the RSD is impeded by the lack of detailed information available, particularly in relation to the height and mass of the buildings, operation activity and lighting requirements etc. Based on the visualisations provided, the RSD would be visible from the canal corridor. Although the visual impact of the RSD on the amenity of the Shropshire Union Canal may be filtered to a degree by the existing West Coast Mainline, there would still be some impact Landscape mitigation planting is shown on Map CT-06 308a and Map CT-06-309-L1. The landscape character of the area consists of small coppices of woodland and open fields which respond to the topography of the land. The mitigation planting shows large tree belts in particular around the access road to the balancing pond (Map CT-06 308a, Grid H4, H3, I3, J3) and extensive areas of woodland planting (Map CT-06-309-L1 Grid F6, F7, G7 and G8). Such unnatural extensive areas of woodland in this landscape also change the open character of the area. We would ask HS2 to re-consider the landscape mitigation strategy and instead develop	<u>Visual amenity</u> The landscape treatment to the east of the canal between the West Coast Main Line need to be agreed with the Trust to minimise views of the Rolling Stock Depot (RSD). HS2 to re-consider the landscape mitigation strategy which better reflects the existing landscape character of the area and adheres to the HS2 Design Principles on Place and Identity. For example, a combination of appropriate grassland habitat immediately adjacent to the canal and both wetland and a patchwork of small coppices of woodland habitat further away from the canal corridor and towards the West Coast Mainline. A patchwork of woodland would also have greater habitat potential and be more in keeping with the landscape character and help to break the skyline of the RSD. As much of the existing waterside vegetation should be retained to provide screening to the transport corridors in this area.

mitigation which better reflects the existing landscape character of the area and adheres to the HS2 Design Principles on Place and Identity. Map CT-06 308a (Grid G2, H2, I2, J2 and J3) show an increased number of ecological mitigation ponds along the offside of the canal. These would be sited close to the canal and we would welcome further details on these in terms of depth and proximity to the canal to better assess the likely impact. The Trust wish to also understand the drainage arrangements for these ponds.	
<u>Drainage</u> Wimboldsley culvert is shown on Map CT-06 308a (Grid I4, I5, I6 and I7) passing beneath the RSD and West Coast Mainline. This culvert appears to be potentially receiving a large volume of water from a balancing pond (Grid I8) and drainage ditches at the toe of the Walley's Green Embankment (Grid F7, G7, H7, I7, I8, J7) as well as the overflow of the large balancing pond (H4, I4 and J4). These all join an existing watercourse which is culverted under the canal (Grid J2). This culvert would be unable to cope with any material increase in water flow. The culvert would therefore need to be upgraded/enhanced to have a capacity to deal with any increase in potential forecasted flows that it would be required to take. If a material increase in flow of water is to pass through this culvert, HS2 should ensure that it has sufficient capacity for any such additional flows and consider the acquisition of the Trust owned culvert. The culvert should be included within the land potentially required for construction. A canal breach recently occurred on this section of canal. and as such appropriate drainage arrangements and supporting infrastructure is critical. Similarly, the drainage from the balancing pond (Grid D4) and the A530 Nantwich Offline culvert (Grid E3, E4, D4) both flow towards a ditch which passes into a culvert under the canal (Grid F1). This culvert would be unable to cope with any increase in water flow. The culvert would need to be upgraded/enhanced to have a capacity to deal with the forecasted	<u>Drainage</u> We re-iterate that the Trust requires that its consent is obtained for any discharge to the canal, to protect the canal from flooding, structural damage, environmental degradation and to ensure navigational safety. It cannot be assumed that the canal or culverts have the capacity to accommodate such discharge. It should not be assumed that our culverts have capacity to cope with any material increase in water flow. The culvert would therefore need to be upgraded/enhanced to have a capacity to deal with any increase in potential forecasted flows that it would be required to take. If a material increase in flow of water is to pass through this culvert, HS2 should ensure that it has sufficient capacity for any such additional flows and consider the acquisition of the Trust owned culvert. The culvert should be included within the land potentially required for construction. Where drainage is to waterspace not owned by the Trust the impact of downstream flooding needs to be considered and discussed with the Trust. It cannot be assumed that the canal has the capacity to accommodate such discharge.

flows that it would be required to take. If water is to pass through this culvert, HS2 should ensure that it has sufficient capacity for any additional flows and consider the acquisition of the Trust owned culvert. The culvert should be included within the land potentially required for construction. A canal breach recently occurred on this section of canal. Vegetation planting has the potential to damage culverts and hinder access. Currently, most of the culverts will be accessible over fields and these routes should be maintained if possible or alternative routes provided. Landscaping mitigation planting should be designed accordingly.	
Proposed Design Refinement 3: Changes to the design around Manchester Piccadilly High Speed station **3a: What are your comments on the inclusion of two additional platforms into the design of Manchester Piccadilly High Speed station?** **The Trust has no objection to the inclusion of two additional platforms into the design of Manchester Piccadilly High Speed station. We do however have comments to make on the works associated with the station.**	
Issue	**Without prejudice potential mitigation**
<u>Ashton Canal, Ducie Basin and Rochdale Canal</u>	
<u>Construction Compounds</u> The inclusion of two additional platforms at Piccadilly High Speed station has moved the station approximately 60m closer to the canal corridor. A main construction compound is shown on Map CT-05-365b (Grid I7, I6) which would border Ducie Basin on the Ashton Canal. Due to the existing land levels here, there is a substantial retaining wall between the Basin and the construction compound. Therefore, any works on this land must not compromise the integrity of this retaining wall. A high-quality protective boundary treatment to the canal basin is required for the duration of the works.	<u>Construction Compounds</u> We would ask HS2 to ensure the structural integrity of the existing Ducie Basin retaining wall is safeguarded during the works. In addition, we would ask HS2 to provide a high-quality protective boundary treatment to the canal basin for the duration of the works. We would welcome clarification from HS2 in terms of the suitable development use the site would be returned to.

Map CT-06-365b show that the construction compound would then be returned to a suitable development use. We would welcome clarification from HS2 in terms of the suitable development use the site would be returned to.	
Heritage considerations The proposed station during construction and operation has the potential to adversely impact a special part of the canal system in Manchester, in and around the junction of the Ashton and Rochdale Canals. As well as historic wharfage such as Whittles Wharf, there are also historic locks and bridges, some of which are designated, most are of heritage value, and in particular Store Street Aqueduct is of high heritage value and Grade II* Listed which would form part of a construction route to the station.	Heritage considerations We would ask HS2 to ensure the Heritage Impact Assessments fully consider the impact on the waterway related infrastructure and mitigate accordingly. Appropriate archaeological recording should take place, including consideration of some interpretation works in publicly accessible areas.
Flooding As the proposed HS2 station and work compounds would be below the level of the Ashton and Rochdale Canals in this area. Any flood risk assessment for the development here should consider the potential for flooding from the canal.	Flooding We would ask HS2 to consider the potential flooding from the canal to be considered within the design of the station and mitigated accordingly.
Energy generation for the new Station There is potential for water from our waterways to be used for heating and cooling the new Station and provide a source of renewable energy. We would welcome the opportunity to explore the potential for this further with HS2.	Energy generation for the new Station Please liaise with the Trust over the potential use of our waterway for heating and cooling opportunities.

Proposed Design Refinement 3: Changes to the design around Manchester Piccadilly High Speed station 3e: What are your comments on the proposed changes to the road network around the new Manchester Piccadilly High Speed station? The Trust have no objection in principle to the proposed changes to the road network around the new Manchester Piccadilly High Speed station. We do however have comments to make on the relationship of the station with the canal corridors, which may be further undermined by the changes to the road network.	
Issue	**Without prejudice potential mitigation**
<u>Ashton Canal, Ducie Basin and Rochdale Canal</u>	
<u>Changes to Road Network</u> The space between the station and Ducie Street would be critical to knitting the station successfully into the City. Unfortunately, the proposed changes to road network through truncating Store Street and realigning it to join Ducie Street, would likely result in further severance between the proposed station entrance and the waterway corridors.	<u>Changes to Road Network</u> We would welcome discussion with HS2 in terms of how the station and realigned road network could be better integrated with the canal corridor to maximise the potential for the canal networks to be used as a sustainable transport route to the station.
<u>Construction route</u> A construction route is proposed under Store Street Aqueduct. This is a Grade II* listed structure with a 4.6m height restriction. Due to this height restriction, this route is not suitable for high sided vehicles. The Trust require restrictions on the vehicles that can use Store Street as an access or diversion route, and a review to determine if extra warning signage and impact protection beams should be provided or are appropriate given the heritage status of the structure.	<u>Construction route</u> We ask for clarification from HS2 in terms of the restrictions and protection measures that would be used to protect our grade II* listed aqueduct.
<u>Land potentially required during construction and interface with the waterway</u> There is the potential opportunity to create a fantastic entrance to the HS2 Piccadilly Station from the canal corridor. Unlike the visualisation	<u>Land potentially required during construction and interface with the waterway</u> We would welcome discussion with HS2 in terms of reconsidering how the northern entrance of the HS2 Piccadilly Station could better integrate with

shown 'View south of Ducie Street' which would be dominated by the vehicular access. Currently, positive towpath use through Manchester is adversely affected by the disconnected towpath route at the junction of the Rochdale Canal and Ashton Canal, and further adversely impacted by the paucity of the gateway to the canal from Dale Street (CT-05-365b and CT-06-365b Grid I7 and J6 respectively). The canal is in a tunnel in Grid J6. Through transformational city making around the HS2 Piccadilly Station the opportunity exists to uncover the Rochdale Canal. This would enhance the City placemaking around the Station by strengthening the connection to the heritage of Manchester, unlock the health and wellbeing potential of the canal to the Station Plaza, improve the wider towpath use in the City, and begin to reclaim the Rochdale Canal from antisocial use. Whilst we recognise that this is not within the remit of the HS2 scheme per se, we consider that it is critical that this is part of the wider discussions about the regeneration opportunities that bringing HS2 to Manchester can deliver for the benefit of all.	the canal corridor and utilise this sustainable transport route along the canal towpaths. The section of the Rochdale Canal which is in a tunnel/underpass in Grid J6 (Map CT-05-365b), due to development above it, is the only part of the Trust's entire 2000 mile towpath network that is required to be gated at night. This is due to the level of crime and anti-social behaviours that occur here. In recognition of the scale of the problems associated with the underpass, the gating of this section of towpath was by way of a Public Space Protection Order. This was a multi-agency approach led by Manchester CC, as a joint project with the Trust, the Police and Fire Service. The proposed HS2 Piccadilly Station therefore provides a once in a generation opportunity to resolve a significant problematic area within Manchester as part of regeneration just to the north of the station and the area to be covered by the construction land. Potentially opening up the canal frontage here provides an opportunity to enhance connectivity and to transform the station and this part of Manchester and potentially provide a space akin to the Regent's Canal and Kings Cross Station in London.