

# Summary of effects of HS2 London to West Midlands route refinements

A report to  
Government by  
HS2 Ltd

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# 1. Introduction

- 1.1 This report outlines the overall effects of the changes made to the London to West Midlands route in response to issues raised at consultation. A summary of each of the changes is set out in our advice *Review of possible refinements to the proposed HS2 London to West Midlands route*.



## 2. Engineering

2.1 The total length of HS2 (London to West Midlands) would be a little under 140 miles. The changes mean that:

- around 22.5 miles (not including the HS1 link) would be in tunnel or green tunnel – compared to 14.5 miles for the consultation route;
- around 56.5 miles would be in cutting; and
- around 40 miles would be on viaduct or embankment – around 10 miles less than the consultation route.

2.2 The remainder (around 20 miles) would be at or just below ground level. That means that overall around 79 miles – more than half of the route – would be mitigated by tunnel or cutting. Although the additional tunnelling would increase the spoil produced by bored tunnels that would require off-line disposal, overall the amount of spoil would be reduced, with green tunnels providing an opportunity for the sustainable reuse of spoil created.

# 3. Sustainability

3.1 The changes would significantly enhance the sustainability of the route compared with the consultation route. Our noise modelling shows that, along the entire route, fewer than five properties would experience high levels of noise. Importantly, only 60 dwellings may experience noise levels high enough that would see them qualify for additional noise insulation, compared to 150 for the consultation route. The number of properties that may experience a noticeable increase in noise is reduced by a third, from 4,700 to around 3,100.

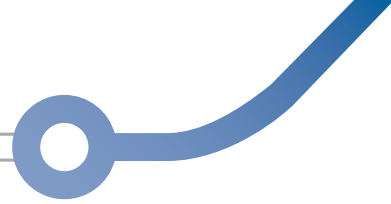
3.2 There would be 338 residential demolitions, four fewer than the consultation route. There would be a more substantial reduction in the number of dwellings at risk of land take, reducing from 342 to 172.

3.3 There would be about 4.5 miles of additional tunnelling and more than 3.5 miles of additional green tunnel. That would take the total length of the route in tunnel or green tunnel, and therefore without noticeable impacts at surface level from operation of the railway, to around 22.5 miles. Elsewhere the use of cuttings would significantly reduce visual impacts. We consider that, through Environmental Impact Assessment and further route design refinement, there is considerable scope to mitigate visual impacts further through the use of landscaping

and planting, and the sensitive design of viaducts.

3.4 Through the important protected landscape of the Chilterns Area of Outstanding Natural Beauty (AONB) the impacts of the route have been reduced by additional tunnelling and extended green tunnels. Of the route through the AONB, 7.5 miles would now be in tunnel or green tunnel compared to 5.2 miles for the consultation route; 3.75 miles would be in cutting, mitigating visual and noise impacts. This means that less than two miles of the 13 miles of the route through the AONB would be at surface level or above and we consider there remains considerable scope to mitigate this further through landscaping, planting and sensitive design of viaducts.

3.5 Compared to the consultation route, this revised route would also be better in terms of impacts on important heritage sites. The extended tunnel through the Chilterns AONB would avoid all impacts on Shardeloes Grade I listed house and Registered Park and Garden. The alignment change at Edgcote would substantially reduce impacts on the historic battlefield, the site of the Roman Villa and Edgcote House and Park and Gardens. These revisions address English Heritage's two key concerns about the impacts of the route.



- 3.6 The revised tunnel alignment through the Chilterns would avoid an important aquifer, significantly reducing impacts on water sources. There would also be a slight reduction in the length of route in flood zone.
- 3.7 There would be a reduction in the level of impact on ancient woodlands, and one fewer Biodiversity Action Plan habitat would be crossed.
- 3.8 The range of carbon emissions resulting from operations as a result of these changes would be negligible, although the changes would result in an increase in embedded carbon (i.e. resulting from construction), largely as a result of the additional tunnelling.

# 4. Cost

4.1 Overall, making these changes to the line of route would result in a reduction in the construction cost of HS2 (London to West Midlands) of around £500 million, although it should be noted that scope changes elsewhere in the project mean that, since consultation, in overall terms the total cost of construction has reduced by between £375 million and £425 million. We estimate it would cost £16.3 billion (in 2011 prices) to construct HS2 (London to West Midlands), including risk and project management.