

# Small Dean viaduct: The launch



By Richard Byford, with Murray Cooke



Photo: Simon Eccles

*Wendover News volunteer Richard Byford standing beside the viaduct when it was being fabricated, holding up a banana for scale.*

On 31 January, the single most visual aspect of HS2's work in the Wendover area will appear across the road just outside the town. When all other works are completed and the contractors have left, this conspicuous reminder will be evident for all to see for centuries to come.

Many people remember what it used to be like to drive out of Wendover on the London Road, in the direction of Great Missenden. Not far after passing the church on the left, the road would be joined by traffic coming out of Hale Road – which was closed off some time ago. Further on, the road would be lined on both sides by trees and shrubs. A break in the vegetation on the left allowed a glimpse of a spinney in a small dip (which was marked "rifle range" on the old maps). Passing the gated boulevard leading to Boswells house and farm, you would see Road Barn Farmhouse, which had been built to look as if it had turned its back on the traffic. Apart from the addition in 1998 of the concrete-walled roundabout at the end of the bypass, most changes have been gradual. Not so now.

## **As long as a cruise liner**

In the last two days of January and the start of February, EKFB, the main contractor for HS2, will 'launch' a huge steel and concrete viaduct deck structure at an angle across the road and railway. If it were a passenger ship, it would be the 14th longest in the world, at 345 metres.



Picture: HS2

If the structure were placed along the combined length of Wendover High Street and Pound Street, it would reach from the Clock Tower to almost as far as the bridge over the existing railway – and stand nearly as high as the Red Lion hotel. Even if it were hypothetically possible to place such a massive structure in the middle of the town, then the 14 metre-wide flared top would have ripped out the top frontages of many of the shops and offices that line the street. At almost 4,500 tonnes, it weighs about the same as all the combined family cars in Wendover put together.

The end of the viaduct currently sits, mostly hidden from sight, behind a tall (permanent) embankment on the left hand side of the road as you drive South. The sliding move to its permanent position will take about 50 hours, spread over a four-day period.

## **Consultations and development of the design**

As a designated HS2 Key Design Element, the viaduct design came out for Public Consultation in September 2018. While the Department for Transport positioned the design as a "thing of beauty in the Chilterns Area of Outstanding Natural Beauty," when Wendover



Picture: HS2

*An artist's impression of the viaduct, showing the final design*

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HS2 Mitigation Group surveyed the local community, 94% of the respondents thought that the design was not acceptable in the AONB; and that quality of life would suffer due to the noise impact from the trains. However, detailed requirements had been developed by the HS2 Chilterns AONB Review Group (involving Bucks Council, the local District Councils, Natural England and the Chilterns Conservation Board) so the eventual design minimised the visual intrusion.

Design changes included changing the number of viaduct spans from six to seven, repositioning the piers to allow for future widening of the A413 during its 100 year design life, and realignment of Small Dean Lane to the north of the viaduct.

Many local people were surprised by the visual impact of the eventual design that has massive girders made of “weathering steel” which will look rusty and very visible to motorists with its limited clearance of only 6m above the road. (To illustrate: most delivery vans are under 3m. Articulated lorries are mostly under 4m and the highest double decker buses are usually less than 4.5m.)



Picture: HS2

An artist's impression of the viaduct showing a close-up of the weathered steel box girder, support fins and the bottom part of the 1.8m high textured concrete cladding

A spokesperson for HS2 Ltd said: “We recognise the importance of good design and each of these structures has been developed with consideration for the technical and structural requirements, as well as the impact on their surroundings. We will continue to engage with local people and organisations on these designs.”

In November 2018, the viaduct design was awarded by the HS2 Independent Design Panel, who said: “The panel warmly welcomes the designs being developed by Eiffage Kier with Moxon Architects – finding much to applaud in how the design team has creatively embraced this sensitive context while meeting the demanding requirements of high speed rail.” Residents of Wendover – some of whom will drive under it daily – were muted in their applause.

Full details about the viaduct are available in the “Design and Access Statement” available in the Bucks Council planning applications web portal with reference 23/00052/HS2.

### Technical

The Design Award reflects wider considerations than just the visual impact, including the viaduct's ability to handle future generations

of trains running in both directions at speeds of up to 250 mph (400kph) on a bend. To gain the required rigidity, the piled foundations for the viaduct piers go down 49 metres and the viaduct deck is a sophisticated “dual composite” approach. This was pioneered by Eiffage for viaducts on the French TGV network and uses remarkably little concrete (compared to the HS2 Colne Valley Viaduct), minimising the amount of carbon involved in building the structure.



Photo: Richard Byford

Each of the ‘hammerhead’-topped upright piers sits on a thick concrete foundation, supported by reinforced-concrete bored-piles sunk into the hard ground 49 metres below

The viaduct deck has been assembled from steel girders ferried from France in 25m long sections then welded together on-site to form the 345m long structure.

Pre-cast concrete slabs were produced in Derbyshire, and installed to form the upper and lower layers of the deck structure. The resulting deck is expected to weigh 4,350 tonnes and will be slid north into place, at a rate of 8 metres per hour over four days. Although it will appear that it is being pushed over the road and railway, the actual motive power is provided by a very powerful winch pulling it using an attachment at the rear which will be repositioned in stages.



Photo: Richard Byford

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Photo: Simon Eccles

The dual composite viaduct was constructed in France and transported to site, initially by sea and then by road. Once in the EKF compound, the components were welded together electrically to make the structure shown in the above photograph. Each weld has been examined using x-ray to ensure there were no defects. The welds are the same strength as the structure's original construction material.

This photograph was taken in August 2024: Since then, pre-cast panels have been laid in the bottom of each section, and the concrete decking installed on the top. The addition of the concrete makes the structure much heavier and more challenging than the slightly longer viaduct already launched across Wendover Dean early last year.

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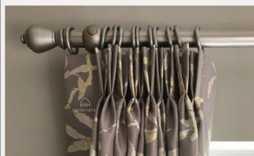
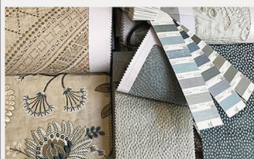
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*This photograph, taken in August 2024 from the top of the most northerly pier in the series, shows the route that the viaduct will take across the road and railway. The yellow crane boom (centre, top) indicates where the viaduct sits, ready for its ultimate journey.*

The A413 will be closed for one day to avoid motorists being distracted by the passage of the viaduct 6m overhead, and the Chiltern Line will then be halted for the following two days at the weekend, as the deck passes over railway tracks. An animation of the whole construction sequence is available at <https://tinyurl.com/sdv2023video>.

Once the deck is in place we anticipate future night time closures of the A413 throughout 2025 to allow for the road to be realigned onto its final track, and for the installation of the pre-cast concrete viaduct parapets above the road.

### The launch 'event'

You don't have to be a supporter of HS2 to be interested in the viaduct being launched over the road. Most people recognise that HS2 is going ahead (at least the bit near Wendover), so the viaduct is going to be built regardless. The launch will be spectacular and historic. It will also be educational – even if you have no interest in construction or aspirations to be an engineer. HS2 has been made

aware that many people in Wendover and the surrounding area will want to see what is going on, and has made arrangements for the activity to be observed from as close a position as it can make safe for public access. HS2's local engagement manager, Haroun Khan, met with Wendover News to provide some of the details.

He explained that areas from which you can view the viaduct will be limited by the terrain: the structure is only likely to move at a rate of about 8m/hr, so unless you stand still for quite a while, you won't notice much action. It will still be interesting, but you can have too much of a good thing: once you have seen it moving, you have seen it moving. Think of it as an interesting 30 minute visit – not as a day out.

From Wendover, your best bet is to walk along the London Road or Hale Lane until you get to the roundabout at the end of the Wendover Bypass. On Friday 31 January, the Bypass will be closed and it will be OK to enter the A413 on foot, as far as the safety barriers across the road.

A similar arrangement will be in place from the Wendover Dean side, but you will need to make a substantial detour to get there from the Wendover side. EKFB is intending to close the A413 to traffic as far south as the Great Missenden roundabout. The road to the A413 from Dunsmore will also be closed as well as other roads over on the east side. We walked the obvious footpaths that might give you a view of the scene, but it was not possible to find one that was not obscured by trees or undulations in the terrain. The tree-lined drive to the A413 from Boswells is a private road and access will be strictly forbidden to safeguard livestock in the fields through which it runs.

On Saturday and Sunday 1-2 February, the A413 will be open once again, but the Chiltern Line Railway will then be closed. The viaduct will still be moving, but safe viewing areas will be limited. Vehicles will be transiting the roundabout, as they do normally, and it will be best to stay well back from the moving traffic. If you choose to go on those days, be particularly careful of passing vehicles – particularly as drivers are likely to be distracted. Children should be kept under close supervision at all times.

**A longer, more detailed version of this story (along with later updates if available), will be found at [bit.ly/42dZhlq](https://bit.ly/42dZhlq)**

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# Update: Other HS2 news

## Ellesborough Road

During December the diversion was fully opened for two way traffic following removal of the old electricity sub-station and a repair to the gas main. We remain concerned about the design of the junction, as west-bound traffic tends to cut the corner and we are requesting a Road Safety Audit by Bucks Council before a serious accident occurs.

## Wendover Green Tunnel foundations

In December work started at the foundation level for the first section of the Green Tunnel near the site of the old Cricket Ground, and the scale of the eventual structure can now be seen.



Photo: Murray Cooke

This is the only section of the tunnel where excavation down to the required level could be achieved, but the section south to Bacombe Lane should be completed in 2025.

## Grove Farm Culvert shaft

The 17 metre deep caisson shaft has been completed in the big hole next to Bacombe Lane. The 2.4m diameter culvert will be mined using a Tunnel Boring Machine which is due to be lowered into position and launched towards Grove Farm in the first quarter of 2025. Clearly the ground conditions are suitable for tunnelling after all.

## HS2 Railway Systems contracts

HS2 have now announced the winners for "Railway Systems" contracts covering the installation of the track, the overhead catenary pylons and mobile wireless masts which will follow completion of the civil engineering. We are awaiting details of what these (and the line-side power transformer sites) will actually look like.

## HS2 Project plan reset

HS2 Ltd and the Department for Transport (DfT) were quizzed by the Public Accounts Committee about the cost escalation and project delays reported to Parliament in December. The new HS2 CEO has concluded that their Civil Engineering contracts need to be re-negotiated and a new project baseline plan needed which will take until mid 2026 to be agreed.

This will include completion of the civil engineering prior to the start of installation of the railways systems. DfT are hoping that trains will start running between Old Oak Common and Birmingham by 2033, but this is not committed by HS2.

Given this new push to cut costs there is a potential threat to Wendover that not all the reinstatement works we would expect, provision of the Chilterns Cycleway and most importantly, Noise protection would ultimately be carried out. In addition there is always the threat that once Green Belt land will be reclassified as "Grey", suitable for development. Our 2025 action plan seeks to escalate these issues.

## Noise

We are still pursuing responses for noise mitigation. So far HS2's assessment methodology fails to adhere to the limits set in Undertaking and Assurance 73 to keep peak night time noise below 60dB. Their analysis only deals with noise mitigation if it is seen to exceed 65dB. This means that far more homes could be affected by the likely noise exceedances than first thought. Over 400 homes in Wendover could be affected.

The issue has become more acute in Aylesbury with over 2,150 existing homes in Aylesbury likely to be affected, and that does not include the new housing developments to the west of Aylesbury.

We will continue to raise this issue (working with Greg Smith MP, Laura Kyrke-Smith MP and our Bucks Councillors) to ensure both Wendover and Aylesbury secure noise mitigation that meets the undertakings in the HS2 Act.

## Issues with HS2?

If you're affected by the construction activity, please contact the HS2 Help-desk team on 08081 434 434 (which is available 24 hours a day) or email [hs2enquiries@hs2.org.uk](mailto:hs2enquiries@hs2.org.uk) to get your issues resolved. It helps if you have photographic evidence and please get a complaint reference number so that we can follow up issues as needed.

## Need our help?

If you need further help, want to join us, or have ideas and suggestions that would mitigate the community impact, then get in touch at [enquiries@whs2.org](mailto:enquiries@whs2.org).

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