Introduction

Welcome to our engagement event where you will be able to see our plans for the technical design and construction of the Lower Thorpe and Edgcote viaducts. Please fill in our feedback forms to let us know what you think. These can be found directly on the boards and on the feedback desk.

Who is EKFB?

EKFB is a joint venture that brings together international, market leading expertise from four renowned civil engineering and construction companies: Eiffage, Kier, Ferrovial Construction and BAM Nuttall.

All four partners bring specialist expertise in the design, construction, operation, financing and maintenance of railway networks, including some of Europe's high speed rail projects.

EKFB is proud to have been appointed by HS2 to deliver civil engineering works across an 80km section of the new high speed rail link between the Chiltern Tunnel and Long Itchington Wood. Our scope of the works includes 15 viaducts, 6.9km of green tunnels, 22km of road diversions, 81 bridges and around 30 million cubic metres of excavation.



An artist's impression of the Lower Thorpe viaduct

What are Key Design Elements?

These are structures along the route that have been recognised to be important. This could be due to their size, proximity to stakeholders or their location within sensitive areas.

The design for both viaducts has been developed with consideration for technical and structural requirements, as well as the impact on their surroundings.



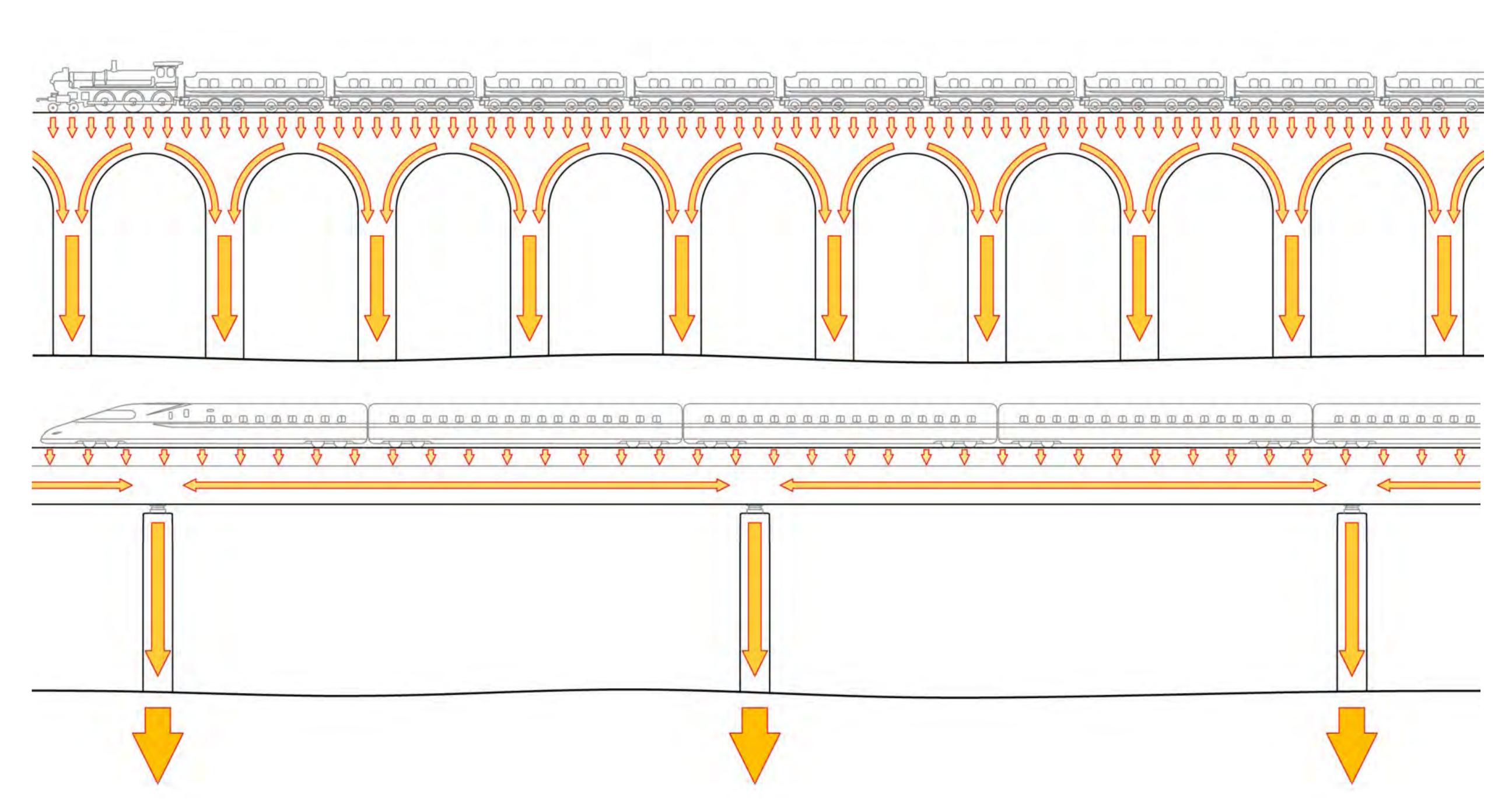
Working in partnership with



What is a viaduct?

A viaduct is a type of bridge, made up of multiple spans and connecting two points of terrain. On this project they will carry the high speed railway across valleys, rivers, roads and flood plains.

Modern high speed trains travel at around four times the speed of Victorian trains so they require a flatter, straighter track, passing over and under the natural landscape.



Differences between gravity loads on Victorian (top) and contemporary (bottom) viaducts

Modern viaducts have to cope with large longitudinal forces due to the braking and traction of high speed trains. They require stiff and strong supports to transfer the braking load forces from the train, which can be as much as a 770 tonne load, to the foundations.



An artist's impression of the Edgcote viaduct, showing the supports used on a contemporary viaduct

In keeping with HS2's design principles, viaducts along the route must:

- be designed sustainably;
- minimise maintenance and materials used;
- be considerate to the area where they are being constructed; and
- meet the technical requirements of the railway.

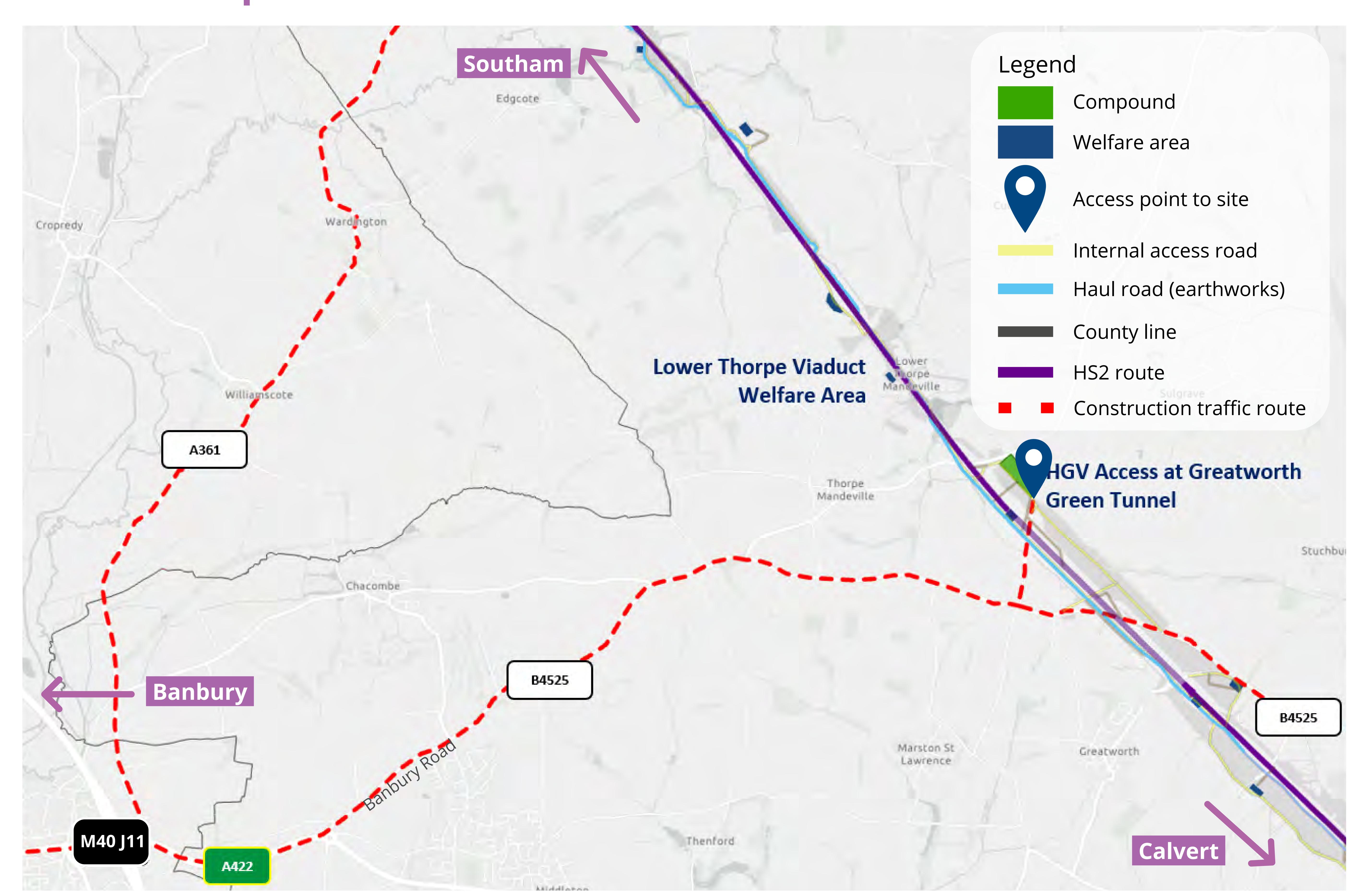


A key part of our planning process is to develop a considered and viable approach to construction traffic

We spend time developing these plans with stakeholders, emergency services and local highways authorities to ensure we are minimising the flow of construction traffic. We produce detailed traffic management plans which aim to reduce the impact on local communities.

For the Lower Thorpe and Edgcote viaducts, the following traffic measures and routes are planned:

Lower Thorpe



Map to show designated construction traffic routes

Designated routes

We plan to use the **B4525** and **Sulgrave Road** as our main construction route. This is to avoid construction traffic passing through Thorpe Mandeville and Lower Thorpe as much as possible.

Internal access roads

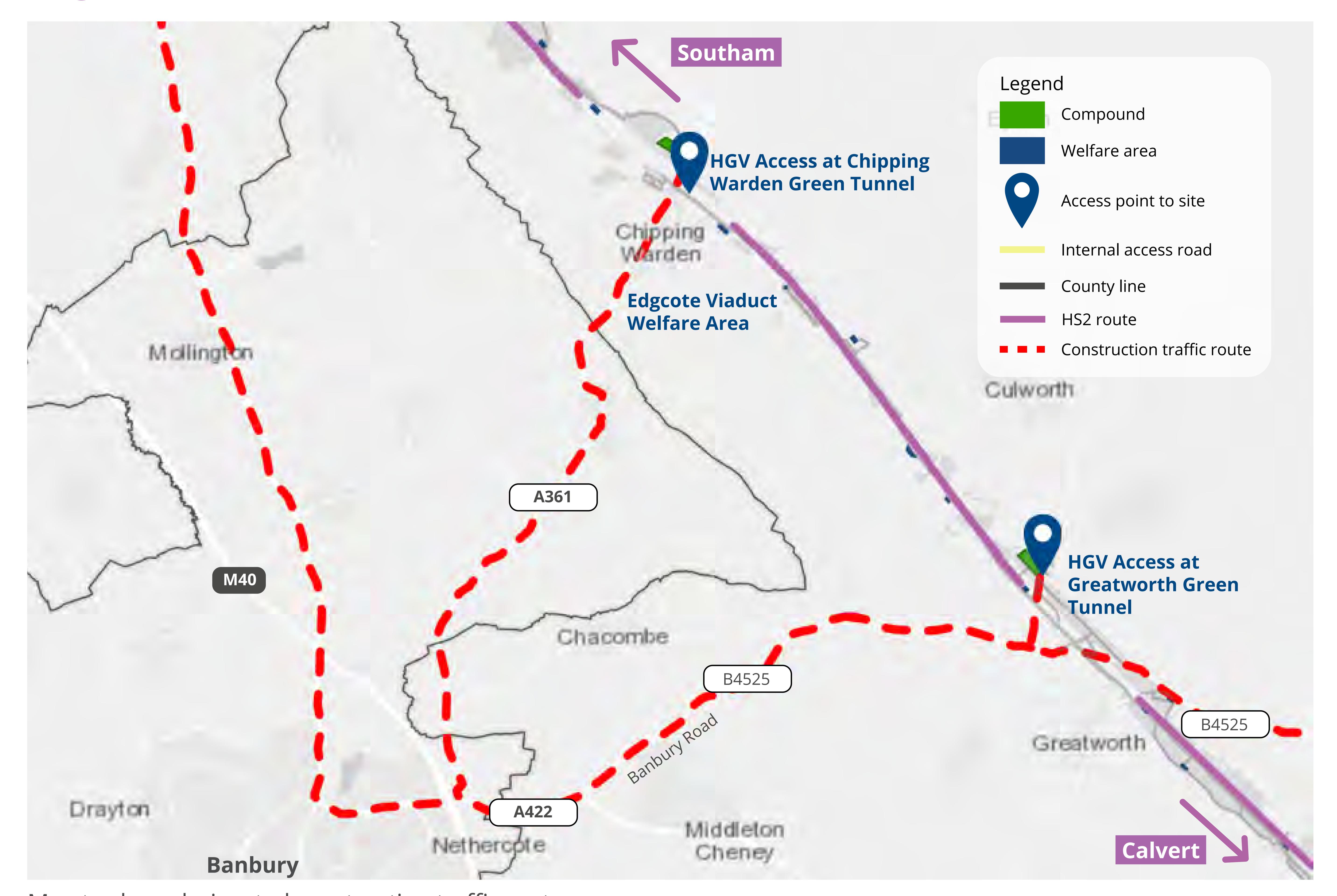
Heavy Goods Vehicles (HGVs) will have access to the site from the Greatworth Green Tunnel compound. From there they will travel north along our internal access road keeping traffic off the main roads.





Taffic affic

Edgcote



Map to show designated construction traffic routes

Designated routes

We plan to use the A361 from the M40 Junction 11 as our primary construction traffic route.

Did you know...

As a minimum fleet operators must be Fleet Operation Recognition Scheme (FORS) Bronze and working towards Silver.

FORS is a voluntary quality scheme, which aims to raise the quality of HGV fleet operations.



Fully tracked systems

All vehicles over 3.5 tonnes must be booked into site and will be tracked and monitored for the entire journey from start to finish so we can closely monitor the routes that are taken.

Internal access roads

Vehicles will use our internal access road, heading south from our Chipping Warden compound to access the viaduct.

A secondary route from the **B4525** to Greatworth Green Tunnel heading north along the internal access road can also be used.





Construction

Based on our experience in high speed rail and viaduct construction across Europe, we are currently planning the following sequences of construction for the two viaducts;

Lower Thorpe

The Lower Thorpe viaduct will be 210m long, with 6 or 7 spans. The deck of the viaduct will be a conventional reinforced concrete deck slab. The viaduct will be constructed by 'launching' the steel structures into position to help minimise working at height.



An artist's impression of the Lower Thorpe viaduct in 10 to 15 years time

Construction sequence:

We will be using 'bored pile' foundations for the supports.
This involves drilling large diameter holes in the ground and then filling them with steel and concrete.

The piers will be manufactured off site, and then assembled and filled on location.

The supports at the ends of the viaduct, known as abutments, will be reinforced concrete structures placed on piled foundations.

The steel sections of the deck will be assembled in the compound.

The sections of deck will be safely 'launched' into position under multiple launching sequences.

After this, the upper slab will be secured in place using precast concrete slabs.

Once the deck is complete, finishes such as waterproofing and parapets will be fitted before rail sytems can be installed.



An artist's impression of the Lower Thorpe viaduct in 10 to 15 years time



Construction

Based on our experience in high speed rail and viaduct construction across Europe, we are currently planning the following sequences of construction for the two viaducts.

Edgcote

The Edgcote viaduct will be around 515m in length, with 21 spans. The deck will be constructed from a reinforced concrete slab and pretensioned concrete beams, while the viaduct supports will be made from reinforced concrete. The construction process for the viaduct is as follows:



An artist's impression of the Edgcote viaduct in 10 to 15 years time

Construction sequence:

Like the Lower Thorpe viaduct, we will be using 'bored pile' foundations.

The piers will be manufactured off site, and then assembled and filled on location.

The supports at the ends of the viaduct, known as abutments, will be reinforced concrete structures placed on piled foundations.

The concrete beams will be lifted by crane onto the supports, and the mould for the deck slabs placed on top.

Once in position, the deck slabs and 'diaphragm' will be poured in-situ, which will hold the frame of the viaduct.

After the deck has been constructed, finishes such as waterproofing and parapets will be fitted before rail systems can be installed.



An artist's impression of the Edgcote viaduct in 10 to 15 years



The history of Edgcote

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As local residents will know, the area around Edgcote is of historic importance. The Battle of Edgcote took place on Danesmoor on the 26 July 1469 and was one of the significant battles during the War of the Roses. HS2 provides an unprecedented opportunity to reveal a new understanding of our past through Britain's biggest ever programme of archaeological investigations.



Archaeological works are important to our preparatory works for HS2 and we are discovering ancient environment and geological deposits containing evidence of human activity along the route.

Archaeological investigations explained

Here are some of the stages involved in our archaeological works.

Desk based research is the study of documents, records, maps and photographs.

Geophysical surveys use modern sensor equipment to understand what is below the ground, but without digging. These surveys use magnetometers to detect magnetic changes caused by the buried evidence of past human activity.

Trial trenches are usually dug mechanically. These shallow trenches vary from 50m to 200m in length and up to 2.0 m wide. Approximately 51 trenches have been dug across the site, closely supervised by experienced field archaeologists. Discoveries were surveyed, very carefully excavated by hand, cleaned and recorded.

Excavations may be familiar to you from television programmes about archaeological 'digs'. If the above investigations show significant archaeological remains, archaeological excavations will be made.

The information we gather comes together to give a rich picture of the site's archaeological context. HS2 Ltd is working with Historic England and local authorities to identify suitable museums and storage facilities for these artefacts, information

Areas of Archaeological Interest:

As you know, part of our works have involved archaeological trial trenching. This plan shows the extent of trial trenching undertaken at Edgcote.

- Area A has revealed a Romano-British settlement activity including evidence of rubbish, pottery and tiles (about 1800 years old).
- Area B is the location of a late Iron Age / Roman settlement to the south of the main settlement area known to exist north of the River Cherwell. Here we identified evidence of large ditches, pits and possible house structures.



A map showing Area A in green



A map showing Area B in green



Archaeology at Edgcote

Trenching at Edgcote has revealed archaeology dating to the late Iron Age and Roman period dating from around 100BC to 400AD.

A Romano-British farmstead enclosed by ditches dating from 2nd century AD is shown in the image to the right.

The remains reflect evidence which would be expected on a rural Roman settlement site within this landscape.

The next stage

Where significant archaeological remains have been identified archaeological excavations will be undertaken.



A map showing one of our archaeological site, named Area B, in green. Here we identified evidence of large ditches, pits and possible house structures

The images below show examples of Roman pottery shards found at Edgcote (1800 years old) during trial trenching.













Funding and opportunities

HS2 Ltd has established community funding to support local environmental and economic improvements along the route. Through the Community and Environment Fund (CEF) and the Business and Local Economy Fund (BLEF) £40 million has been made available for local communities. These programmes were created to help offset the disruption of HS2 on local communities and so far, over 100 projects have been awarded funding.



In Northamptonshire, funding has already been allocated to some deserving local projects. The Thorpe Mandeville Village Hall Trust has been awarded £4,650 for internal refurbishment and £31,000 for much-needed building repairs and improvements.

This will go towards the replacing of rainwater goods and rerouting drainage to prevent future damp damage which is currently affecting the interior walls of the building, as well as re-tiling and insulating the roof and installing environmentally-friendly heaters.

For more information on the CEF and BLEF funding visit www.hs2funds.org.uk to find out more on the application process for your local causes.



The new play area in Boddington

Over £75,000 was awarded for a new play area in Boddington at the Charles Cowper Field. This impressive facility was opened in 2018 with parents and children consulted throughout the development process to ensure the end result would offer inclusive play opportunities for children of all ages and abilities, while enhancing the local rural environment.



The new play area in Boddington



Funding and opportunities



Mark Thurston, CEO of HS2 Ltd, and Julie King, Community Engagement Director at HS2

"As we deliver HS2, we have the opportunity to leave a positive legacy for the communities along the route of the railway. Our Community and Environment Fund, and its twin Business Fund, are starting to support important local initiatives, including building renovations and environmental projects."

Mark Thurston, Chief Executive Officer, HS2 Ltd

CITB Construction Skills Fund

EKFB has secured CITB Construction Skills Funding to deliver construction training in Buckinghamshire & North Oxfordshire.

Our training programmes, sponsored by the CITB, are delivered by training providers local to this area. Our courses are completely free and will provide the qualifications to build a successful new future in the world of construction and civil engineering.

Training has been delivered across three targeted programmes aligned to HS2 construction works. So far over 500 candidates have completed this training.

- Entry into construction inc. L1 Construction Skills, Manual Handling, Health & Safety, CSCS card
- Plant operatives CPCS card
- Women into Construction focus on IEMA Institute of Environment Management & Assessment and IOSH Institute of Occupational Safety & Health

To find out more about training opportunities, please visit www.ekfb.com/training

Supply Chain opportunities

We are keen to engage with supply chain partners who share our values and enthusiasm, regardless of how big or small your organisation may be. We believe in fair and inclusive procurement in order to stimulate a more competitive marketplace.

For more opportunities and information about how your business could become a supply chain partner of EKFB, please visit our CompeteFor page:

www.competefor.com/ekfb/



EKFB and HS2 are supporting theretraining of plant operatives

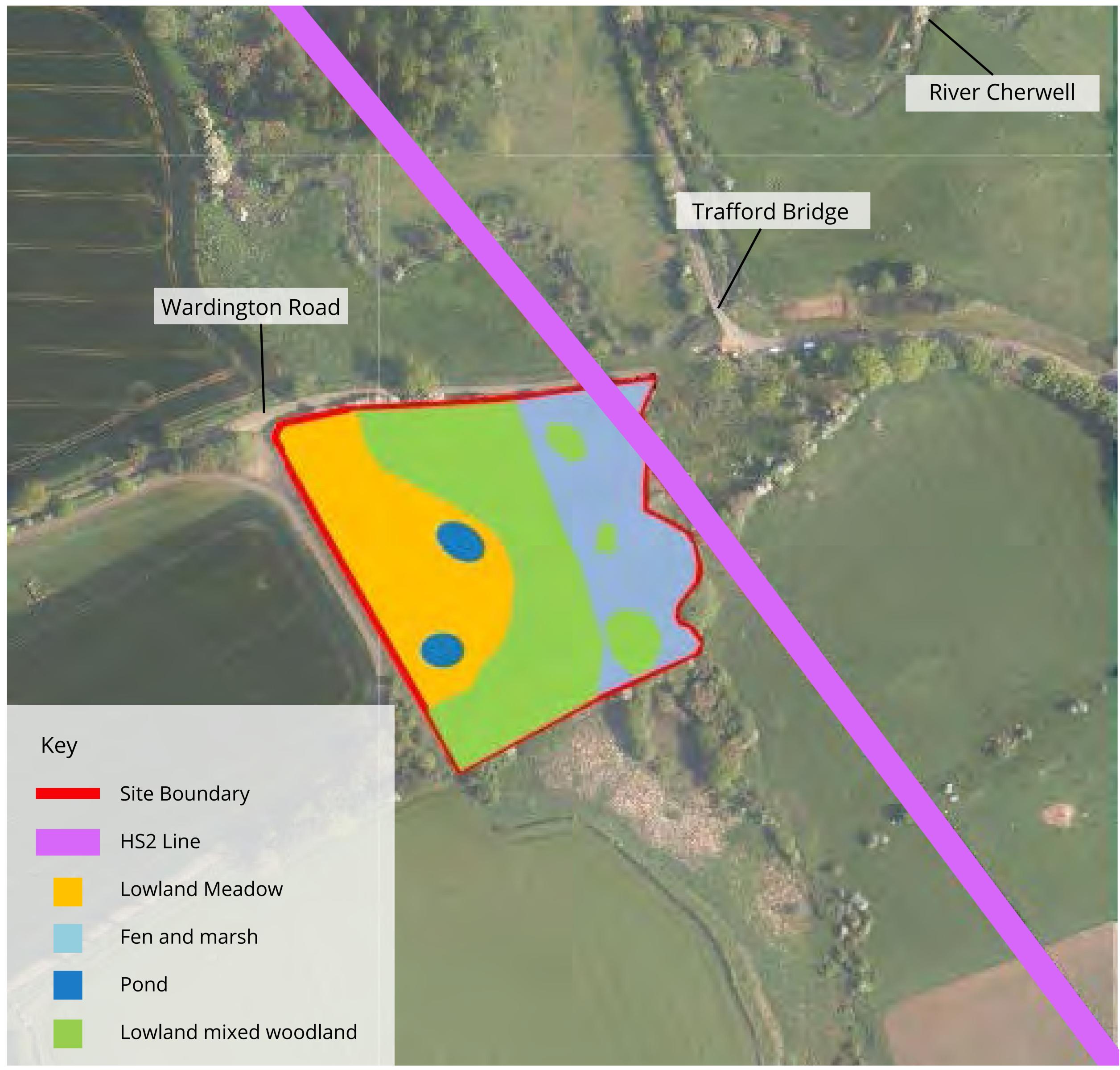


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Environment - Edgcote

For the Edgcote viaduct our environmental plans are focused on two sites, both located on the floodplain of the River Cherwell, south-east of Chipping Warden. The plans for each site are shown on the images below.



A map to show environmental mitigation sites along the River Cherwell

Key Site Boundary HS2 Line Lowland Meadow Wetland Meadow Wetland Meadow Lowland mixed woodland Hibernaculum/Animal dens Wardington Road

A map to show environmental mitigation sites along the River Cherwell

Grassland habitats

We will create grassland habitats to maximise the biodiversity of the area.

Woodland and other tree/shrub planting

We will plant woodland and other trees/shrubs to create diverse habitats and compensate for any loss of woodland.

Ponds, amphibians and newts

We will create ponds and suitable habitats that will support great crested newts and amphibians.



Environment - Lower Thorpe

For the Lower Thorpe viaduct, our environmental plans are focused on three sites all located to the north of, and around, Thorpe Mandeville. The plans for each site are shown on the images below.



A map to show environmental mitigation sites

Culworth Grounds Farm Key Site Boundary HS2 Line Pond Lowland mixed woodland Hibernaculum/Animal dens

A map to show environmental mitigation sites

Planting

We will plant woodland, other trees, shrubs and create grassland habitats to maximise the biodiversity of the area, create diverse habitats and compensate for any loss of woodland.

Ponds

We will create ponds to ensure the site is suitable to support great crested newts and common amphibians.

Amphibians, newts and bats

We will ensure that the sites and the habitats we create will be suitable for bats, amphibians and reptiles.



A map to show environmental mitigation sites





Edgcote Viaduct

The Edgcote viaduct is 515m long and supported by 20 pairs of piers. It follows a subtly curving trajectory that will be apparent at slanted views looking along the length of the structure, such as from Trafford Bridge.

Running across the edge of Danesmoor approximately 1km from the Grade 1 Listed Edgcote House, the visual impact of Edgcote viaduct is of critical importance. Visible from the Welsh Road and Trafford Bridge, the viaduct first crosses and then passes alongside the River Cherwell, before also passing to the northeast of the site of the Battle of Edgcote.

Context

Distant views of the viaduct will be mostly hidden by existing hedgerows and woodland. The underside of the deck varies from around 6m up to a maximum of 8m above ground. The landscape will have a masking effect, especially from the southwest where the main visual impact will be from the trackside mounted Overhead Catenary System (OCS) above deck level. This is a system of overhead wires used to supply electricity to the railway.

The structure

The support piers and the deck are physically distinct elements, but have been designed in concert with each other, so that the two forms appear to 'lock together'.



An artist's impression of the Edgcote viaduct in 10 to 15 years time, showing how the surrounding landscape will mask the viaduct from long distance views



An artist's impression of the Edgcote viaduct in 10 to 15 years time, showing how the piers and diaphragm 'lock together' visually



An artist's impression of the Edgcote viaduct in 10 to 15 years time, showing how the landscape will aid in masking the viaduct and the Overhead Catenary System (OCS) on top of the deck

Lower Thorpe Viaduct

The proposed seven span, 210m long Lower Thorpe viaduct will run approximately northwest/southeast through a subtle split in the landscape at Lower Thorpe Mandeville.

Crossing Banbury Lane adjacent to its north abutment, the structure maintains a low-profile relative to the surrounding landscape.

Context

The proposed viaduct uses weathering steel for the primary deck beams. The beams will primarily be visible from viewpoints close to the viaduct, where their dark, russet brown colour will help to embed the structure in the rural environment. For visual contrast, the piers and parapets of the structure will be formed from precast reinforced concrete, providing a brighter edge to the structure. This visual difference will help to 'recess' the spanning depth of the structure.



An artist's impression of the Lower Thorpe viaduct in 10 to 15 years time, showing the low profile of the landscape in the surrounding environment

An artist's impression of the Lower Thorpe viaduct in 10 to 15 years time, showing how the viaduct will appear around the landscape, and the Overhead Catenary System (OCS) on top of the deck

The structure

Compared to the weathering steel beams, the concrete elements of the viaduct appear brighter, particularly at its close range viewpoints. This has given us the opportunity to finely detail the different components.

The outer face of the viaduct's protective walls includes a downward facing surface, protected from weathering by an overhanging component known as a "drip edge" above it. This directs water away from the structure and provides a decorative band to introduce patterning and three dimensional relief to the structure where it is most visible from eye level. A similar opportunity for detail is proposed on the transverse faces of the piers in a 'Vee' form below the bearing shelf where the structure above provides protection from the elements. This is an important feature of the design given the slanted view of the structure from Banbury Lane. The contrasting surfaces of smooth and textured concrete will add visual interest when close to the viaduct.

On both sides of the viaduct the parapets function as noise barriers with absorptive 'wood concrete' material mounted on the track facing side. Given the low height of the viaduct, this will be visible from certain elevated viewpoints and its muted, earthy ochre colour will blend with the rural environment.



An artist's impression of the Lower Thorpe viaduct in 10 to 15 years time, showing the contrast between the steel beams and the concrete supports



Ask the specialists

During the course of this four-week exhibition, we will be running three sessions for you to come and listen to some of our specialists behind the building of HS2 and ask any questions you may have.

> Click here to visit the HS2 events page to book onto one of our sessions with our experts in:









