



HS2

Corporate Plan

2022 - 2025



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Front cover image: Preparing the waterproof lining in the vent shaft at the Victoria Road crossover box.



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Image: The site of the 2.1-mile Colne Valley viaduct.

Deputy Chair's foreword



Sir Jon Thompson, Deputy Chair.

**“
HS2 is playing a key role in
the Government's ambition to
make the UK a net zero carbon
economy by 2050.”**

As we look to the next few years of HS2, we do so with confidence, tempered by an understanding that with a project of this size and scope, new challenges are never far away.

We are confident because the programme is gathering pace and momentum has been sustained through the difficult period of the pandemic. Phase One between the West Midlands and London is under construction. We are set to appoint the design delivery partner for Phase 2a, which extends the line to Crewe, so that construction can begin. Parliament is working through legislation to take HS2 into Manchester and the Government is planning further phases of high-speed rail to complete the network as part of the Integrated Rail Plan.

HS2 remains on target in terms of budget and schedule and, while pressures remain, our role in building Britain's future has never been more important.

The high-speed railway is playing a central role in the Government's plans to 'build back better', a strategy that sets out how to grow the economy through investment in infrastructure, innovation and skills. In this national effort, HS2 is the country's flagship transport project and we're proud to be raising the bar in all three of these areas. Our work will not only define how the railway is built but redefine the ambitions of future infrastructure projects too.

HS2's impact will not only be transformational for the way we build infrastructure – the railway, which will start operating by the end of the decade, will transform the way we travel, work and do business across our island. By bringing people closer together, connecting businesses to markets and joining up some of Britain's most productive places, HS2 will play a crucial part in levelling up.

This vision for our future includes taking on the greatest challenge of our time as we tackle climate change. HS2 is playing a key role in the Government's ambition to make the UK a net zero carbon economy by 2050. HS2's Net Zero Carbon Plan, published this year, sets out bold targets that will see HS2 become net zero for construction from 2035. We are making good progress and launched our first diesel-free site, at the Canterbury Road vent shaft in north-west London, in May. We plan to make all our sites diesel-free by 2029.

The Net Zero Carbon Plan also set out how HS2 will be powered by zero carbon electricity, making HS2 the cleaner, greener alternative for long-distance travel. With transport now the UK's largest emitter of carbon, HS2 will play an important part in combatting climate change on the path to net zero by 2050.



Deputy Chair's foreword continued

This work would not be possible without the in-depth strength of our supply chain. We count among our partners over 2,500 businesses that have worked on HS2, 97% of which are based in the UK. We are continuing our march towards a peak workforce of 34,000 people, with nearly 25,000 now employed on HS2 nationwide. This supply chain touches every corner and country of the UK, making HS2 a truly national endeavour.

We are now working at more than 350 sites on Phase One, between the West Midlands and London. In September, we will mark the second anniversary of main works starting. Before long, more tunnel boring machines will join the three already in the ground, the Colne Valley viaduct construction will begin in earnest and work will intensify at one of our busiest sites, Old Oak Common in west London. Rail systems contracts are due to be awarded next year, following hot on the heels of awarding the rolling stock contract to Hitachi and Alstom.

All this activity affects the lives of people along the route of HS2. The construction of a railway is a long, difficult process, particularly for local communities, with disruption and noise from our equipment and traffic a daily reality. We are determined to respect the people and places that are affected. We are

working to improve the support we provide local people and businesses, making sure we are open about what we are doing, that timely and accurate information is always available and that we act swiftly on concerns as they are raised. We recognise that we have sometimes fallen short and can do better to fulfil the commitments set out in our community engagement strategy.

HS2's legacy for communities should not be confined to sympathetic landscaping and nature recovery; it should also be about investing in communities through our local funds to help leave a legacy of which they can be proud.

These local commitments sit squarely alongside our wider efforts to help Britain to level up and combat climate change. HS2's fundamental role in these areas underlines our strategic importance to creating a fairer, more sustainable country. I'm proud to be part of this project and proud to be part of building Britain's future.

Sir Jon Thompson

Deputy Chair

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This supply chain touches every corner and country of the UK, making HS2 a truly national endeavour.”

Chief Executive Officer's introduction



Mark Thurston, Chief Executive and Accounting Officer.

“Against the backdrop of an ongoing pandemic, global economic uncertainty and rising inflation, HS2 now employs nearly 25,000 people with major works taking place at over 350 sites.”

The last year has been one of extraordinary progress for Britain's high-speed rail project. Against the backdrop of an ongoing pandemic, global economic uncertainty and rising inflation, HS2 now employs nearly 25,000 people with major works taking place at over 350 sites. We are regularly hitting construction milestones and are emerging from the pandemic in a strong position.

HS2 has moved from the drawing board to reality and is already delivering economic and social benefits as we build the viaducts, bridges, tunnels and stations for the most sustainable high-speed railway in the world. However, we cannot be complacent as we enter the project's most intensive construction period with activity stretching along more than 170 miles of the route between London and Crewe.

Phase One and Phase 2a

Two years on from issuing Notice to Proceed, we are progressing with building the major infrastructure for Phase One between the West Midlands and London and we are pushing ahead with extending HS2 to Crewe as part of Phase 2a.

Over the next three years, we will complete the bulk of the main civil engineering works on Phase One, supporting more than 34,000 jobs and racing ever closer to our target to create 2,000 apprenticeships. The railway between Birmingham and London will take shape with four HS2 stations being built

and tunnels being completed under cities and the countryside. Developing the HS2 route between the UK's two biggest cities will provide the first visual sign of a better-connected country.

Since my update in last year's Corporate Plan, we have launched three tunnel boring machines (TBMs). The two progressing under the Chilterns, named Florence and Cecilia, have built more than three miles of the twin-bore tunnel in Buckinghamshire. The third TBM, called Dorothy, is close to completing its one-mile journey and making our first tunnel break-through under irreplaceable ancient woodland at Long Itchington, Warwickshire. We have also started works on the Birmingham viaducts, the vast underground 'box' for HS2 at Old Oak Common in west London and secured the land we need to build HS2, completing our end of powers programme for Phase One.

Later this year, we will launch another TBM at Northolt, west London – the fourth of 10 we will use on Phase One. We are starting works on the 2.1-mile Colne Valley viaduct and will award major contracts for Interchange station in Solihull and major rail systems. We remain on schedule to start running initial services between Old Oak Common and Birmingham between 2029 and 2033.



Chief Executive Officer's introduction continued

On Phase 2a, our early works are well underway on the line between Fradley in Staffordshire and Crewe. We have shortlisted for our Phase 2a design and delivery partner, which will help deliver the huge benefits of HS2 beyond the West Midlands, with a major focus on the historic railway town of Crewe.

It was hugely exciting to award HS2's rolling stock contract to Hitachi-Alstom JV, who will build and maintain our fleet of 54 trains for Phase One and Phase 2a. This £2 billion landmark contract backs Britain's proud train-building heritage and will support thousands of jobs. It also provides the first glimpse of the 'bullet'-style trains that will transform the way millions of people travel. The design work taking place now in Birmingham will produce some of the fastest, quietest and most energy efficient high-speed trains in the world. The fleet will help HS2 provide more services, more seats and improved reliability, boosting investment and prosperity in the Midlands and the North.

Phase 2b

The Phase 2b hybrid Bill to extend HS2 to Manchester was deposited in Parliament in January this year and has passed its second reading with a large majority. This next phase will take the railway into the heart of the North West and is a vital part of our mission to create capacity on the existing rail network, better connecting the great towns and cities of the Midlands, the North and Scotland. Extending the railway north will reduce

our reliance on domestic flights and take more cars and lorries off our roads. It is key to our long-term goal of decarbonising the transport network and combatting climate change.

The Government's Integrated Rail Plan (IRP) was published at the end of 2021 and confirmed its commitment to invest £96 billion in our railways with HS2 at the heart of these plans. The IRP reconfigures plans for the eastern leg of Phase 2b and we will work with the Department for Transport and Network Rail to get legislation prepared to take HS2 to the East Midlands. Plans will be developed to continue HS2 services to Leeds as well as supporting an east-west connection between Leeds and Manchester as part of Northern Powerhouse Rail.

As our work expands across these three phases of the railway, it is important that we do not lose sight of our commitments to making HS2 a diverse and inclusive place to work. We are close to achieving our workforce targets for female and BAME employees and the work we carry out in this area will be one of the important legacies of HS2.

Setting new environmental standards

I am proud of the bold ambitions we have set this year to make HS2 a zero carbon railway both in construction and once our trains start running. Making HS2 zero carbon from day one of operations, combined with the modal shift opportunities the new railway creates, are vital to the UK's net zero ambitions.

The scale of the HS2 construction programme and our reach within the industry gives us a unique opportunity to leave a sustainable legacy for the infrastructure sector. Working with our supply chain, we are innovating to decarbonise construction, both in the design and delivery phase: if you walk on a HS2 site today, you'll see the construction site of tomorrow. I am excited that we have launched our first diesel-free site, at Kilburn in London, and by 2029 all HS2 sites will be diesel-free. Our target is for the entire HS2 project to be net zero from 2035, setting new cleaner, green standards for major infrastructure projects.

This year, we also announced the shortlist for our Washwood Heath train depot and network control centre, which will transform a 30-hectare brownfield site into HS2's nerve centre. A disused railway site, closed since 2004, will be transformed, bringing a major boost to the local community, creating about 500 long-term jobs and freeing up extra land for development.

As part of HS2's Green Corridor, we have successfully planted over 800,000 trees and shrubs and created more than 100 wildlife habitats. In addition to HS2 being vital to the UK's net zero ambitions, we are also working hard to support nature recovery along the route too.



Chief Executive Officer's introduction continued

Our ambition is to secure a 10% net gain in biodiversity on the Phase 2b route to Manchester. This builds on the targets we have set for Phase One and Phase 2a to move beyond no net loss and secure biodiversity gains.

Challenges ahead

When our budgets were set in 2019, the pandemic had not started and a war in Ukraine was unforeseen. Events outside our control have led to rising costs for goods and materials. These challenges are affecting every part of the country and every sector and we are working hard with our supply chain to minimise the impacts.

Amid the pressures being faced with the cost of living, it is right that people ask if HS2 is a priority for the country. My response is simple: the need to level up our economy, create more opportunities for the Midlands and the North and combat climate change is more important now than ever before.

My team will always keep taxpayer value for money at the forefront of our minds, but nothing is as important on this project as people's safety. Our core belief is that everyone should go home unharmed, whether they are part of our workforce or live and work near our sites. We have a good safety record, but we must never become complacent. As project momentum increases, and our workforce continues to grow during peak construction, safety will remain our top priority.

Unfortunately, we continue to see illegal protester activity along the route. This potentially endangers both the activists themselves and our workforce and is coming in at a considerable cost to the taxpayer. We know HS2 can divide opinion but opposing zero carbon public transport with dangerous and costly illegal activity should be condemned.

Respecting people and places

Building HS2 affects the lives of local people and I am mindful of the disruption caused by construction, particularly as our work ramps up. We will always try to do the right thing and reduce our impact on communities, but I recognise we have not always got this right. I have renewed our commitment to respecting people and places as we build the railway, ensuring we listen, inform and respond to local people and effectively consult with new communities as the programme moves further north.

As part of our commitment to communities, we have now provided funding for 197 local projects to the value of over £11 million. We will continue to support initiatives that improve the quality of life for people along the route and have already started funding projects along Phase 2a.

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Acknowledgements

In closing, I want to thank the HS2 Minister for his support, guidance and critical oversight. I also want to thank independent Construction Commissioner Sir Mark Worthington and outgoing Residents' Commissioner Debbie Fazan for their dedication in supporting residents. I look forward to working with the new Residents' Commissioner Stewart Jackson and wish him well in his role. I'd also like to thank the HS2 Ltd Board, my Executive team and everyone working tirelessly on this once-in-a-generation project to create zero carbon rail travel, unlock opportunity and rebalance the economy.

Mark Thurston

Chief Executive and Accounting Officer

Highlights of the year

June 2021



Permanent construction starts at HS2's Old Oak Common station in west London.

September 2021



HS2 hits its 20,000 jobs milestone on the first anniversary of main works starting on Phase One.

December 2021



Hitachi-Alstom JV is awarded the £2 billion contract to build HS2's trains.

January 2022



Launch of the HS2 Net Zero Carbon Plan and Environmental Sustainability Vision, supporting zero carbon rail travel.

January 2022



Phase 2b hybrid Bill, seeking legal powers to extend HS2 to Manchester, is introduced.

March 2022



Updated designs for a more efficient 10-platform, single-stage build for HS2's Euston station are unveiled.

HS2: the route ahead

Britain's new high-speed railway is being built between the South East and the North West, with HS2 trains connecting London, Birmingham and Manchester with the biggest cities in Scotland.

HS2 trains will integrate with new lines and upgrades across the rail network to deliver faster travel to major towns and cities including Liverpool, Sheffield, Leeds, Nottingham and Derby.

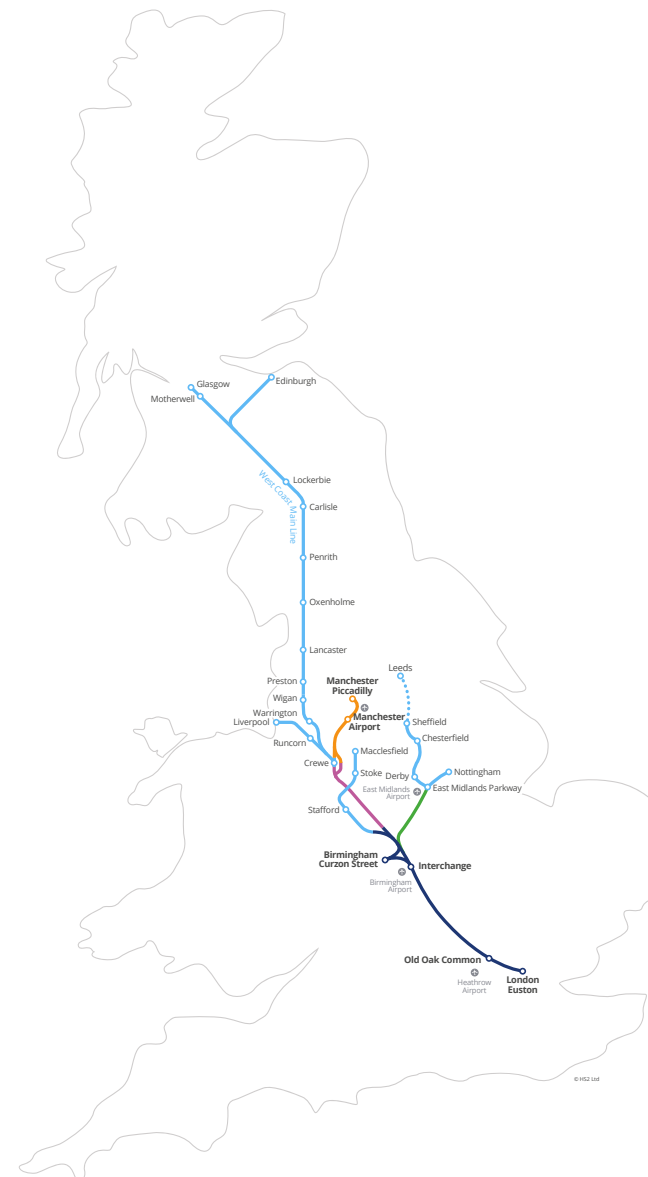
The Government's Integrated Rail Plan (IRP) sets out how HS2 will link with other projects such as Northern Powerhouse Rail and the Midlands Rail Hub.

Key

- Destinations served by HS2
- HS2 Phase One
- HS2 Phase 2a
- HS2 Phase 2b Crewe – Manchester
- HS2 East
- Potential HS2 services on existing network

The Government is looking at the most effective way to run HS2 trains to Leeds and to the North West and Scotland.

Based on current indicative train service specification.





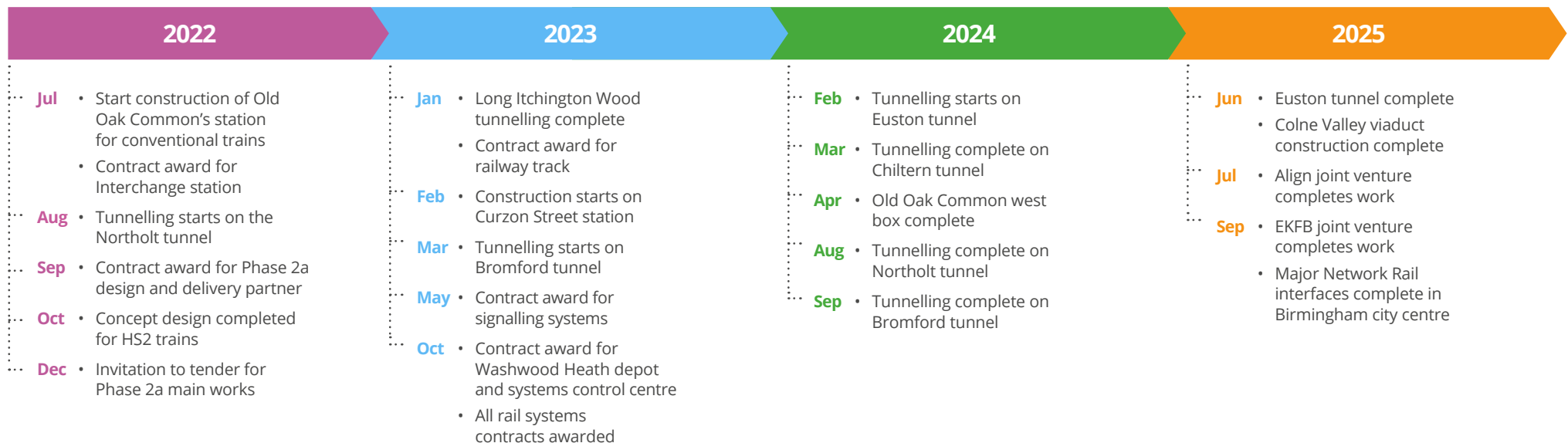
Project milestones

We are making significant progress building HS2 with key railway structures under construction between the West Midlands and London. The next three years will see us pass major project milestones as our main works hit peak construction on Phase One.

The first tunnelling works in London are due to start this summer and three tunnel boring machines are already in the ground under the Chiltern Hills in Buckinghamshire and Long Itchington Wood, Warwickshire. Cut-and-cover or ‘green’ tunnels, which are shallower, and the viaducts that will carry our high-speed trains are beginning to take shape. A giant launching girder has started building the deck for the UK’s longest railway bridge, the Colne Valley viaduct, which is due to be completed in mid-2025.

We are seeking partners to provide the track and systems for HS2 and to design and build the Phase 2a section of route, linking the West Midlands and Crewe.

The two joint ventures building the central section of Phase One are aiming to complete work in 2025. Construction will continue on the route and the HS2 stations in London and Birmingham, supporting major urban regeneration projects. By then, main works will begin on Phase Two, taking the benefits of HS2 further north.





Our strategic goals

Our seven strategic goals inform our daily work and long-term planning as we design and build Britain's new high-speed rail network.

They highlight the benefits HS2 will bring to people and places throughout the UK: rebalancing the economy, boosting rail capacity and connections, providing new jobs and combatting climate change.

Our goals also underline our responsibilities – to taxpayers, the Government and the people most directly affected by our works – as we build HS2.



Strategic goal 1:

We will be a catalyst for economic growth.



Strategic goal 2:

We will create a step change for rail capacity and connectivity.



Strategic goal 3:

We will be good neighbours and protect the natural environment.



Strategic goal 4:

We will foster skills and create and sustain employment opportunities.



Strategic goal 5:

We will set new standards for health, safety and security for the construction and operation of the railway.



Strategic goal 6:

We will deliver value for money to the taxpayer.



Strategic goal 7:

We will set new standards for customer experience.



Part Two

Our progress in 2021 – 2022

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Image: The giant launching girder for the Colne Valley viaduct.



Phase One early works update

London: Costain Skanska JV

Early works contractor Costain Skanska Joint Venture (CSJV) has spent five years preparing the ground for main works construction of HS2 in London. The JV has completed a huge programme of demolition work, utilities diversions and a complex archaeological dig, allowing our station construction partners for Euston and Old Oak Common and our main civils London contractor to start on schedule.

CSJV's works have included demolishing two 1970s towers in Euston, clearing vast railway sheds at Old Oak Common and preparing the 42,000 square metre Victoria Road crossover box site. In all, 44 acres of land were cleared and 82 buildings demolished including two 72ft cranes at the former Willesden Euro Terminal site.

More than 11,000 utilities were crossed with no impact on services and secondary glazing was installed at more than 800 properties to reduce noise disruption to people living and working near the key sites. A total of 163,000 tonnes of demolition material were reused onsite, avoiding 41,500 lorry movements in the capital and cutting carbon emissions.

At the peak of operations, CSJV and its subcontractors employed 2,300 people, including 87 apprentices and 215 people who were previously out of work.

The JV led several improvements to best practice, such as using mobile demolition curtains and shipping container screens in place of scaffolding, speeding up demolition work and improving safety. The team helped EAVE, a start-up, to develop its active hearing protection headsets. The devices are a significant step forward in protecting construction workers from hearing loss as they protect the worker's ears from noise and measure exposure. CSJV used the data to introduce a new noise-control standard across its early works. The trial has been replicated by other major projects.

The joint venture is running a campaign called 'Finish Well' to promote wellbeing as its work on HS2 ends and is one of the first construction organisations to monitor psychological safety. It worked with 80 local schools and donated a refurbished bus as an overflow classroom for Old Oak Primary School. The JV's legacy to London includes £115 million of social value provided to local communities, as verified by the Social Value Portal. Its industry legacy includes training and the innovations passed on through HS2's Learning Legacy and Safe at Heart projects.



Construction work in progress at Euston.



Preparing for a crane lift in Euston.

Phase One early works update continued

Buckinghamshire to Warwickshire: Fusion JV

Fusion JV's scope of works covered 66 miles along Phase One, stretching from the Colne Valley in Buckinghamshire to Southam, Warwickshire. Its work involved continuous engagement with stakeholders across 78 local authorities.

The joint venture, made up of Morgan Sindall, BAM and Ferrovial, completed a vast ecological programme, obtaining 2,469 environmental consents to make sure HS2 works have legal approval.

In total, Fusion carried out 20,658 ecological surveys across 3,214 hectares. The environmental mitigation work included relocating more than 16,300 newts, closing 495 badger setts and building new homes, creating 104 ponds and translocating, or moving, 102,738 square metres of habitat.

Fusion conducted more than 53,433 bat surveys, carried out bat mitigation on over 5,590 trees and installed 676 bat boxes. Working closely with Natural England helped to secure 122 bat licences quicker than the statutory period.

The JV also undertook a huge archaeology programme, uncovering rare finds that received international attention and featured on the BBC Two documentary 'Digging for Britain'. The discovery of three life-size busts and a glass vessel at St Mary's Church, Stoke Mandeville, Buckinghamshire, are among the most significant finds from Roman Britain in years. In total, there were 5,593 archaeological trial trench investigations.

Environmental innovations included replacing more than 118,000 plastic tree guards with biodegradable ones – and building 24 artificial badger setts with cardboard. More than 120,000 trees have been planted at woodlands in Hertfordshire, Buckinghamshire and Northamptonshire.

Measures to cut carbon emissions included reducing the depth of asphalt for haul roads, replacing conventional hoarding with green fencing, using hybrid generators and powering 'eco cabins' and CCTV cameras with solar energy.

The JV handed over more than 96 work packages to HS2 Ltd and produced more than 160 assurance documents.

During the pandemic, all 90 sites continued operating with a peak staff of 2,000 people and support for 55 apprentices.

Fusion achieved an outstanding safety record of 11 million hours worked without a reportable incident and promoted a change in mental health culture through its 'Positive Mental Health' programme. Training allowed line managers to spot the warning signs that someone is struggling and wellness action plans were put in place for people needing support.

A work experience programme engaged with 1,680 young people and archaeological discoveries were shared at open days at St Mary's Church and a community event at Chipping Warden, Northamptonshire, where visitors got up close to artefacts unearthed at a 2,000-year-old Iron Age site called Blackgrounds.



St Mary's archaeological site.

Phase One early works update continued

West Midlands: Laing O'Rourke and J Murphy & Sons JV

A huge programme of work has been completed by Laing O'Rourke and J Murphy & Sons (LMJV) along the 50-mile section of HS2 running through Warwickshire, Solihull and Birmingham and extending into Staffordshire. LMJV has handed over more than 27 million square metres of land to main works contractor Balfour Beatty VINCI.

Early works highlights included planting more than 223,000 trees, creating 53 ecological habitats and building seven bridges, including four at Interchange station in Solihull. The first bridge installed over the M42 in Warwickshire in August 2020 used a new modular construction technique to save time on site and reduce disruption to motorists. History will record the 213ft bridge was the first permanent structure for Britain's high-speed rail network.

The JV's wide-ranging work also uncovered the past: in Warwickshire, archaeologists revealed the remains of Coleshill Manor, an octagonal moat and an impressive formal garden likened to Hampton Court Palace.

One of the key projects for LMJV was preparing a 25-acre site for the flagship HS2 station at Curzon Street in Birmingham. Archaeologists spent two years excavating a 19th-century burial ground and sensitively exhuming 10,400 human remains. The world's oldest locomotive roundhouse, designed by railway pioneer Robert Stephenson, was uncovered in the south-east corner of the site.

The utilities programme required diverting and installing 12,350 metres of pipes and 56,240 metres of cables. LMJV used innovative augmented reality technology to map existing underground services and plot where new ones would go, minimising risk, improving safety and cutting disruption.

Safety was a top priority and LMJV was the first joint venture on HS2 to use an online platform for the efficient reporting and managing of safety issues. Intelx, a web-based assurance system, helped contractors achieve compliance, reduce risk and improve performance by reporting incidents via a smartphone or tablet. In addition, it ran workshops attended by 127 frontline supervisors to improve leadership skills.

The work on HS2 led to recruiting 92 people previously out of work and giving opportunities to 104 apprentices and 95 graduates.

The JV's environmental legacy included harvesting acorns which were grown into 400 oak tree saplings and donated to community groups. It engaged with more than 5,000 people through its archaeology webinars and events and helped to set up a new branch of the Young Archaeologists Club in Solihull. Staff raised more than £10,000 for Birmingham Children's Hospital and supported Suited for Success, a local charity running coaching sessions for unemployed people.



The world's oldest railway roundhouse was uncovered during early works at Curzon Street in Birmingham.

Main works civils contractors

Our main works construction partners play a vital role in the integrated project teams (IPTs) we have set up to build the high-speed rail network. Four IPTs are building the Phase One route between London and the West Midlands. Each IPT is responsible for all the main civils works along a set geographic section of the railway, building on the progress of our early works contractors.

Separate IPTs will construct the four HS2 stations on Phase One at Euston, Old Oak Common in west London, Interchange in Solihull and Curzon Street in Birmingham. These IPTs are at varying stages of procurement and delivery.

The IPTs include our design joint ventures with HS2 Ltd acting as the client organisation. The model allows our construction partners to work efficiently and provides clear lines of accountability, helping us to manage costs and share innovative ways of working and techniques.



Phase One main works update

Euston to West Ruislip: Skanska Costain STRABAG

Skanska Costain STRABAG (SCS JV) took delivery of two tunnel boring machines (TBMs) at the end of 2021, signalling the start of several years of major tunnelling works in London.

The joint venture is building the railway from Euston, HS2's southern terminus, to West Ruislip. Its work involves a total of 13 miles (21 kilometres) of tunnels in the capital, which will require a total of six TBMs. The first machines, supplied by specialist German manufacturer Herrenknecht, are being assembled at West Ruislip.

The machines will bore the western end of the Northolt tunnel, from West Ruislip to Greenpark Way, covering five miles (eight kilometres). On arrival, they will be extracted from the ground and the site will become a ventilation and access shaft for the tunnels.

SCS JV undertook HS2's first permanent works in London in April, pouring a 160 cubic metre concrete collar around an ancillary shaft at its Victoria Road site in North Acton. The team built the middle section of the 30-metre shaft using precast concrete segments and a technique called sprayed concrete lining on the final 19 metres, completing works in 2021.



SCS JV's logistics hub in Willesden, London.

Phase One main works update continued

Euston to West Ruislip: Skanska Costain STRABAG

The site is critical for the railway. As well as the shaft, which will provide ventilation and emergency access to the Northolt tunnels, SCS JV is building a 'crossover box' that will let trains switch tracks on the way in and out of Old Oak Common station in west London.

Given the constrained space in London, Victoria Road also has an important role to play in construction. SCS will use it to assemble and launch two TBMs that will dig the 3.4-mile eastern section of the Northolt tunnels.

SCS's next milestone – and its most important accomplishment to date – was the opening of Willesden Logistics Hub in September 2021. The former freight terminal will act as the beating heart of HS2 in London, housing high-tech facilities such as a logistics control centre and an incident control room that can oversee SCS's 22 operational sites in London.

Willessden Logistics Hub will also receive key deliveries and process materials excavated from tunnels and sites. Moving materials by rail will keep works moving reliably and take an estimated one million lorries off London roads, cutting carbon emissions by 40% while protecting air quality and road safety.

As part of its clean construction operation, SCS has assembled a conveyor system to move tunnelling spoil from sites in Old Oak Common to the Willessden

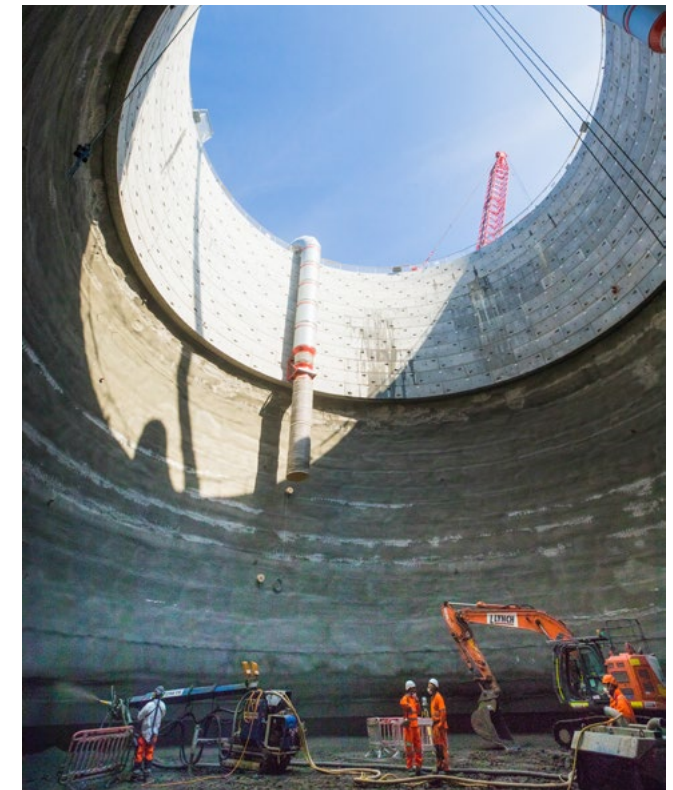
Logistics Hub. From here, the material will be sent by rail for reuse at sites in Cambridgeshire, Kent and Warwickshire.

SCS JV put in the first foundations for the conveyor last summer before the team began assembling the superstructure, moving 12-metre modular sections in place by crane and bolting them together. A local artist created artwork for the side of the conveyor where it crosses the Grand Union Canal. The conveyor will also span local roads and a Network Rail line, transporting about 4 million tonnes of material in total.

In addition to major tunnelling, SCS JV is engaged in extensive 'above ground' work. In the Euston area, it will install more than 1,000 concrete piles and is using an innovative approach called zero-trim piling. The method uses a vacuum excavator to remove excess concrete from each pile, rather than drilling it out. It will save an estimated 60,000 hours of work and £350,000, eliminating the risk of hearing loss and hand-arm vibration for workers and reducing the works' impact on local people.

Like all our construction partners, SCS JV is cutting carbon emissions, making a commitment to go diesel-free by 2023. Its Canterbury Road vent shaft became the first diesel-free construction site on HS2, and all SCS staff now treat red diesel as the fuel of last resort, increasing the use of hydro-treated vegetable oil (HVO) from 20% to more than 80%.

With more than 7,000 people completing an SCS JV induction in 2021, either as a direct employee or through a subcontractor, the joint venture aims to spread its clean and safe construction practices throughout the construction industry.



The vent shaft at the Victoria Road site in west London.

Phase One main works update continued

West Ruislip to South Heath: Align

On a typical day, more than 2,000 people are working on the 13.4-mile section of HS2 that is being built by Align between West Ruislip and South Heath in Buckinghamshire. Highlights of the year included the launch of the programme's first TBMs, which have started clearing a path for the railway under the Chiltern Hills.

Named Florence and Cecilia by local schoolchildren, the TBMs are building a 10-mile twin-bore tunnel, the longest and deepest on the route, to reduce the impact of HS2 in this Area of Outstanding Natural Beauty. Measuring 170 metres long and weighing 2,000 tonnes, the parts for the machines arrived from specialist supplier Herrenknecht in Germany and were assembled over several months by Align, a joint venture between Robert McAlpine, VolkerFitzpatrick and Bouygues Travaux Publics, at its south portal site at West Hyde, Hertfordshire.

Florence was launched in May 2021, starting work on the southbound tunnel. Cecilia followed in June for the northbound tunnel.

Both machines have progressed more than two miles through chalk and flint terrain, passing the first ventilation and access shaft at Chalfont St Peter in February 2022. Their journey will continue for a further two years until the tunnels are complete.

The rapid rate of work is possible because the machines and crews are working round the clock using the latest advances in tunnelling technology.

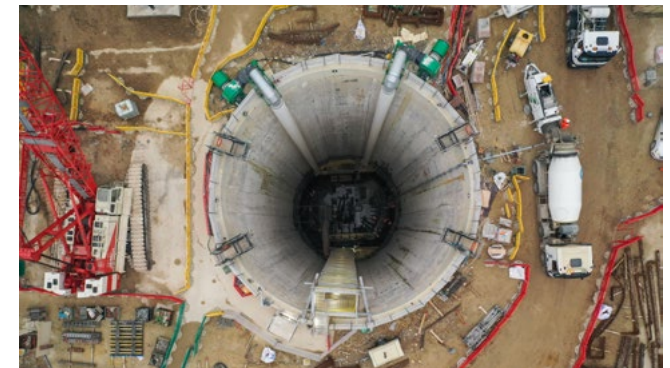
Several innovations on the TBMs are world firsts, including a robot called the Krokodyl, which removes the wooden spacers between the concrete segments lining the tunnel. This removes the need for people to work in a potentially hazardous area.

Align has taken significant measures to reduce the environmental impact of the works such as replacing diesel with hydrogenated vegetable oil in all its vehicles and plant and encouraging its supply chain to follow its example.

The joint venture is further cutting carbon emissions – as well as creating local jobs and keeping construction traffic off roads – by casting the tunnel's concrete segments at a purpose-built factory at the south portal. The factory has set impressive records for the number of segments produced on a shift and high rates of production will continue as a total of 112,000 segments will be needed for the 'up' and 'down' tunnels.



Progress on the Chiltern tunnel.



The vent shaft at Chalfont St Peter, Buckinghamshire.

Phase One main works update continued

West Ruislip to South Heath: Align

As the chalk is excavated by the TBMs, it is mixed with water to create slurry that is pumped back to a slurry treatment plant at the south portal. The facility, completed in May 2021, has the largest number of co-located filter presses of any similar facility in the world. The filter presses remove water, which is recycled, leaving behind the dry, chalky 'cake'.

The material is being used to fill in a former quarry at the south portal and the site will be transformed into a vast area of chalk grassland, boosting biodiversity in the area in line with our commitment to support nature recovery. More than 300,000 cubic metres of material were placed in the quarry this year and Align will create 127 hectares of new habitats by the end of the project.

Align has also started building the UK's longest rail bridge. The Colne Valley viaduct will be 2.1 miles long, carrying high-speed trains over the Grand Union Canal and several lakes at speeds up to 220mph.

Four jetties are being built to support the works. These act as temporary haul roads over the water, keeping trucks off local roads and helping to cut carbon emissions.

A team of 50 people began building the viaduct's foundations, or piles, in March 2021 and expect to finish by the end of 2022. The work involves boring holes into the ground and then backfilling them with concrete to create piles. To build over the lakes, the team uses a 'cofferdam', an enclosure that keeps the water out. Each set of piles is topped by a concrete cap that supports a pier for the viaduct.

The first pier was poured in December 2021 and the first of 1,000 unique deck segments was cast in a dedicated factory on the south portal in January 2021. The segments will be put in place by an enormous launching girder.

Align has opened a visitor centre that uses interactive technology to show stakeholders the scale of its operation and the innovative construction processes being used. More than 200 groups have visited the centre and the joint venture hopes to welcome many more following the lifting of pandemic restrictions.



The south portal of the Chiltern tunnel.



The launching girder for the Colne Valley viaduct.

Phase One main works update continued

Chiltern tunnel to Long Itchington Wood: EKFB

HS2 contractors are building 15 viaducts on the 50-mile (80 kilometre) section of HS2 between the Chiltern tunnel and Long Itchington Wood in Warwickshire. The 450-metre **Wendover Dean viaduct** in Buckinghamshire will be one of the railway's iconic structures and is being built in an Area of Outstanding Natural Beauty.

Sheet piling for the viaduct started in February to allow the start of permanent works. Main works contractor EKFB, a joint venture comprising Eiffage, Kier, Ferrovial Construction and BAM Nuttall, is using an innovative design to reduce the amounts of concrete and steel that will be needed, significantly cutting carbon emissions in line with our overarching commitments to clean construction across the programme.

Set low in the landscape, the Oxford Canal viaduct, between Banbury and Daventry, is made up of three pre-stressed concrete spans which will take HS2 62.5 metres across the canal, towpath and a country lane near the village of Wormleighton. The viaduct is designed to be as 'open' as possible to improve the environment for boaters and walkers.



The Chipping Warden 'green' tunnel site in Northamptonshire.



Phase One main works update continued

Chiltern tunnel to Long Itchington Wood: EKFB

Work is underway casting the 5,000 tunnel segments for the first of the 'green' tunnels at Chipping Warden, Northamptonshire. The tunnel segments are being prefabricated in a factory rather than onsite to reduce disruption to local people and improve efficiency. The precast design uses less concrete, halving carbon emissions. It is also less labour intensive, reduces risk to workers and takes lorries off local roads.

Designed as a double arch, the one-and-a-half mile (2.5-kilometre) tunnel will have two separate halves for southbound and northbound trains. Five different concrete precast units will be slotted together to achieve the twin arch – one central pier, two side walls and two roof slabs. Each one will be steel reinforced, with the largest weighing up to 43 tonnes.

Stanton Precast in Derbyshire is expected to almost double its 180-strong workforce after securing the contract to build the tunnel, along with green tunnels at Greatworth, Northamptonshire and Wendover, Buckinghamshire. Once complete, the tunnels will be covered with earth and landscaped to blend in with the surrounding countryside.

Construction has also started on a key bridge in Buckinghamshire, where East West Rail crosses the HS2 line. The East West Rail Project will allow local trains to run from Oxford to Cambridge for the first time in 50 years. To coordinate delivery of both projects and reduce disruption, EKFB is carrying out nearly two miles (3.5 kilometres) of earthworks and bridges.

To reduce the railway's impact on the community and views across the landscape, HS2 will be in a 2.5-mile (4-kilometre) cutting – the longest on the project – where it crosses under the East West line near Calvert, Buckinghamshire. A second railhead was opened near the village in August 2021 to continue delivering construction materials by rail to our biggest site in the county.

The railhead at Aylesbury opened in January to transport materials during the night and the equivalent of 28,500 lorry movements is expected to be removed from local roads. The first phase of excavation of the Aylesbury South cutting started in November and earthworks were carried out at Waddesdon South cutting. During the winter, piling was completed before construction of the bridge that will carry traffic on the A418 over the railway line.

Progress has been made setting up five concrete batching plants. They are strategically located so the concrete travels the shortest distance. Each plant has the capacity to produce 600 cubic metres per day and, at peak, total monthly production will exceed 20,000 cubic metres.

To help recruit 2,500 skilled workers for this route section between now and 2024, contracts were awarded to six specialist labour-only subcontractors. Priority is given to people living near the route, under-represented groups and new entrants to the industry.

Innovation remains key to the programme and EKFB won the global award for Project Controls Innovation at the Project Controls Expo Awards. The award was for SmartCOST technology, to provide a single system for cost reporting, saving time and improving efficiency.

Phase One main works update continued

Long Itchington Wood to Fradley: Balfour Beatty VINCI

Following months of preparation, Balfour Beatty VINCI launched the project's third TBM and the start of our tunnelling operations in the Midlands.

The 125-metre TBM, named Dorothy, was assembled by 170 engineers and set off from the north portal at Long Itchington Wood, Warwickshire in December 2021. By the end of March, Dorothy was nearing halfway on the first bore of the one-mile, twin-bore tunnel that will take HS2 under an ancient woodland. The tunnel is an example of the way we are managing the environmental impact of HS2 through the design of the railway and doing everything we can to protect the countryside.

Building the tunnel's diaphragm walls (D-walls) at the south portal involved excavating 12,500 cubic metres of spoil, casting 10,500 cubic metres of concrete and installing 1,900 tonnes of reinforcement onsite. The D-walls serve as a retaining structure for the tunnel 'reception' box and 'green' tunnel, which forms the final section of the BBV route heading south.

The south portal team also hit a local project milestone with the temporary reopening of the A425 Leamington Road, near Southam, in July 2021. The road had to be closed for nine months to build the D-wall and carry out utility diversions.

A viewing platform and interactive visitor centre was launched at the north portal for stakeholders, allowing them to learn more about how a TBM works and why tunnelling is taking place at this location.

Earthworks started increasing across this 56-mile (90-kilometre) route section last summer. Ground improvement works got underway at Beechwood embankment at Balsall Common, Solihull and the Grand Union canal embankment near Long Itchington. By the end of December, 100,000 cubic metres of earth had been moved at this site.

Ground improvements were started at Pool Wood embankment, which is about 12 metres high, and the team will need to carry out nearly one million cubic metres of earthworks. The presence of soft glacial deposits means rigid inclusions needed to be installed to strengthen the ground and minimise settlement. The process involves a hollow tool being driven into the soil and filled with concrete. Over 48,000 tonnes of material were used to build the platform.

By mid-August, 15 panels of D-wall construction were completed at the Bromford tunnel east portal, near Birmingham. The portal will form the launch site for the second of our TBMs in the Midlands.



A tunnel boring machine operator at Long Itchington Wood.



Dorothy, the tunnel boring machine at Long Itchington Wood.

Phase One main works update continued

Long Itchington Wood to Fradley: Balfour Beatty VINCI

In the autumn, contractors demolished a disused bridge in Saltley, near Birmingham. Demolition of the A47 Heartlands Parkway bridge took place over four consecutive weekends. It had to be removed because it was in the path of the HS2 line into Birmingham city centre. Once the bridge was demolished, it cleared the way to build the Washwood Heath retained cut.

Three viaducts will take the high-speed line into Curzon Street station. Final detailed designs for the Curzon Street No 3 viaduct were approved in September, paving the way for the start of piling.

In October, piling platforms and the batching plant for the 400-metre 'green' tunnel at Burton Green in Warwickshire, the shortest on the Phase One route, were set up. Permanent piling works got underway in February. In response to public feedback, we proposed new landscape plans for the tunnel which showed how the roof of the tunnel will blend into the landscape.

By the autumn, 10 major construction compounds had been set up. The largest, at Kingsbury near the M42, houses our training facility, which opened in February. The compounds provide offices and welfare facilities for contractors.

To reduce disruption to motorists, 100 people worked over the festive period to carry out the first phase of works for the Marston box. This bridge will carry HS2 over the M42, near junction nine, north of Lea Marston and Curdworth in north Warwickshire.

The ground has been prepared ahead of the winter 2022 box 'slide' when we will push the 14,000-tonne box 145 metres across the motorway. We are using the same method of bridge-building for the A46 structure at Kenilworth, which will weigh 2,000 tonnes.

As part of our commitments on jobs, skills and training, we partnered with South and City College, Birmingham, and opened a new training academy in September. We are delivering hands-on training and classroom-based learning from the college's Bordesley Green campus. By February 2022, 63 people had completed training at the Skills Academy and nearly three-quarters went on to secure jobs with BBV and our supply chain.

A major recruitment campaign was launched at the start of the year to support the huge scope of work along this route section. By the end of March, 2,000 people were working on the project in Warwickshire and the West Midlands. In total, this section of the route is expected to support about 7,000 jobs.



Girder gantry crane at Long Itchington Wood.



Long Itchington Wood north portal.

Completing Phase One land acquisition

We have completed a five-year programme to secure all the land we will need to build and operate Phase One of HS2. Taking possession of more than 22 square miles (58 square kilometres) of land represents the UK's largest acquisition scheme since the Second World War.

The work has been ongoing since the High Speed Rail (London – West Midlands) Act 2017 was granted Royal Assent and has involved more than 123,000 property notices including 30,000 compulsory acquisition notices.

We have taken possession of office blocks, hotels and student accommodation and, when there has been no other option, people's homes. We have also acquired golf courses, fisheries and a rifle range, working with property owners as far afield as Malaysia, Nepal and Australia.

This has taken an intense focus and detailed, proactive planning over several years, with our Land and Property team running an 'end of powers' programme to identify and secure all the remaining land that we need for HS2's track, tunnels, bridges, stations and depots. We completed the work by the deadline on 23 February 2022.

We have faced significant challenges throughout the programme. For example, land for Phase One was acquired in a piecemeal way due to changing construction requirements. This led to delays and frustrations for people through no fault of their own. We have learned lessons that will help us to improve the way we acquire land for Phase Two.

The HS2 Minister's Land and Property Review in November 2020 put a renewed focus on placing the people affected by the railway at the heart of everything we do. The review put forward 36 recommendations to improve how we work, which varied from changes in communicating with stakeholders to new IT-led initiatives. We plan to conclude work on the recommendations by mid-2022.

Two innovations have helped us to make significant progress in the past year. The Deliver Land programme allows us to be more proactive in how we acquire property and uses new systems to manage our assurance processes. Using a single set of master data, rather than multiple systems, makes planning simpler and streamlines our work. A 'licence back' policy means affected parties can continue using land if we are not ready to start construction.

A new claimant portal, called **Track My Property Case**, provides a self-service option for people to follow the progress of notices, claims and applications.

We are moving into a new stage of our Phase One work, focusing on taking possession of land where notices have been served and agreeing final compensation settlements. The Land and Property team forecasts £969 million in capital expenditure over the Spending Review period – much of which will be made up of smaller, incremental and final compensation payments.

We are progressing with Phase Two, using the Deliver Land strategy to fulfil the Ministerial Review recommendations. On Phase 2a, our priority is to carry out the main land possession programme for the route between the West Midlands and Crewe. We are processing requirements and will start possessions in January 2023, aiming to acquire about 80 per cent of the 'footprint' by mid-2024.

In preparing for the petitioning stage of the Phase 2b hybrid Bill, we are also beginning a programme of engagement on the route between Crewe to Manchester.

Community engagement

The increase in our main works activity between London and the West Midlands is having a major impact on the lives of local communities. There are more than 350 active sites across Phase One and noise from equipment and traffic and disruption is a daily reality for many people as we move into peak construction. We also recognise that communities along the Phase 2a route, linking the West Midlands and Crewe, are concerned about the start of construction work. Additionally, people living and working close to the Phase 2b route to Manchester may be uncertain how, and when, HS2 will affect them.

To address these challenges, we are working to improve the support we offer residents and businesses, the speed we take to respond to their concerns and complaints, and the way we resolve them.

Respecting people, respecting places

We refreshed our community engagement strategy in 2021 to make sure respecting people and respecting places is at the heart of the project. We have listened to concerns and feedback and introduced several developments during 2021 – 2022 including faster response times for urgent queries.

We have published improvements to our **complaints procedure** and the accompanying Plain English Campaign accredited booklet. We have also introduced a single management system for community engagement and complaints handling across both HS2 Ltd and our supply chain. This means there is a consistent record for all organisations working in a location, which allows us to respond more effectively.

HS2's 'In your area' websites help us to keep people up to date with developments in their neighbourhoods and we send regular email updates to more than 14,500 subscribers complemented by newsletters and maildrops. In the last year, we carried out over 2,670 engagement activities, reaching more than 19,500 people. Since 2018, we have engaged with more than 92,000 people at 8,390 engagement activities and there have been over 703,000 visits to 18 local community websites across the route.

We extended our webinar programmes to share our archaeology findings and encourage local companies to get involved in the opportunities being created by our supply chain. There are huge opportunities for local people to share the benefits that HS2 is creating including new jobs and apprenticeships and funding for environmental projects and community regeneration schemes.



An HS2 roadshow in Stafford.



Nathan Dennis supporting the HS2 'Respecting people, respecting places' community strategy.

Community engagement continued

The pandemic has affected all our lives and we have found new ways of working with communities while keeping everyone safe. We remain respectful of concerns around face-to-face meetings and offer different ways to stay in contact with people, listen to their concerns and make sure they get the right information and support in a manner they are comfortable with.

We are receiving more calls about construction-related issues that are having an immediate effect on people. These concerns need to be resolved quicker than our standard target of 20 working days. We are now committed to resolving all urgent construction enquiries and complaints in two working days. We received 324 urgent construction enquiries and complaints last year and responded in two working days in 94% of cases.

We received 1,637 total complaints in 2021 – 2022. This compares with 1,877 for the same period the previous year, a decrease of 13%. We resolved 97% of complaints in 20 working days or fewer – and 99% were concluded at the first stage of the complaints process. No complaints were escalated to the Parliamentary and Health Service Ombudsman.

The independent Residents' Commissioner and Construction Commissioner challenge us in positive ways and have continued to hold us to account. There will always be areas where we can do more and we are learning important lessons as we put people at the centre of everything we do.



An HS2 roadshow in Birmingham.

🔍 Case study

HS2 Helpdesk

The HS2 Helpdesk is available 24 hours a day, every day of the year, to assist people across the route with enquiries and complaints. It is the first point of contact for anyone seeking information or needing assistance. The Helpdesk works with teams across the project and all our construction sites.

We received 41,760 Helpdesk enquiries between April 2021 to February 2022. This compares with 42,964 for the same period the previous year, a decrease of 3%. Of these enquiries, 62% were resolved at the first point of contact and 38% were referred to technical specialists or the supply chain when we required more information. Of these referrals, 69% were resolved in two working days.

Since 2018, the HS2 Helpdesk has answered a total of 162,301 enquiries. Our land and property programme and construction activity are the reasons for most contacts to the Helpdesk.



Boosting skills, employment and education

HS2 is the UK's most important economic regeneration project in decades, helping to boost growth, support new jobs and level up.

At peak construction, the high-speed railway is expected to support over 34,000 jobs but the benefits for the labour market – and for training the infrastructure sector's next-generation workforce – are being realised today. Over the next few years until 2026, HS2 will generate a constant labour demand for up to 26,500 people and is acting as a catalyst to upskill Britain.

We are attracting people who might never have considered careers in construction or transport including people from BAME backgrounds, women and people with disabilities. Through our outreach work in schools, we are encouraging science, technology, engineering and maths subjects and inspiring young people to explore rewarding careers in industry.

HS2 is playing an important role in the Government's levelling up agenda, both along the railway's route and more widely throughout the geographically spread supply chain. Not only is HS2 boosting skills in engineering and construction but it is also promoting the careers of supporting professionals like specialists in IT, project management, credit control, health and safety, and conservation. Our construction sites are also creating demand for transport managers, planning experts, architects, surveyors, telecoms engineers and security guards.

We continue to update our labour and skills demand and supply forecasting to make sure HS2 leaves a skills legacy for the UK. Our report, **Building Skills to Deliver HS2**, sets out the measures we have put in place.

In its first year, our new online jobs board posted more than 2,000 work opportunities being offered by our construction partners on the Phase One route between the West Midlands and London. The online platform, launched in January 2021, allows people to search for vacancies by region or specialism. There were more than 700 roles offered in both the West Midlands and Greater London, almost 600 in Northamptonshire, Buckinghamshire and Oxfordshire and several in the North West and South West.

Our Skills, Employment and Education team is now working with the supply chain to improve the jobs board so Tier Two contractors can also upload their latest job vacancies.

We have also launched an HS2 brokerage partnership, which brings together local authorities, enterprise partnerships, charities and employment support services to support people living along the route, including those from disadvantaged and under-represented groups, to find jobs on HS2. Up to 31 March 2022, there have been 1,951 workless job starts across the project.

Nearly half of the construction workforce is aged over 45 and we face challenges bridging the skills gap. We must attract thousands of new people every year to support Britain to build world-class infrastructure. For HS2, we are working with the supply chain using data visualisation tools to develop dashboards that will give us an evidence-based overview of areas facing labour shortages.

Boosting skills, employment and education continued

🔍 Case study

Building for the future by investing in apprentices

When we launched our apprenticeship scheme in 2017, we initially looked to fill 26 positions. Five years later, we have so far taken on 923 apprentices in diverse areas in the supply chain and with HS2 Ltd. In February 2022 alone, we showcased 80 new roles during National Apprentice Week (NAW).

Of these, our organisation offered 22 apprenticeships at Level 3 and 4 in Warwickshire, Birmingham, Milton Keynes and London. They cover a broad range of roles including surveying technician, cyber security technologist, commercial procurement and supply.

All our construction partners joined the drive for new industry talent. Balfour Beatty VINCI will recruit 25 apprentices this year in subjects including information technology, design, civil engineering and quantity surveying.

Joint ventures EKFB and Align have also taken on new apprentices. Together with our main works contractors, we supported 40 careers events during NAW.

HS2 Ltd chief executive Mark Thurston, who started his career as a Transport for London apprentice, said: "Our investment in future talent is helping to address the UK's skills gap."



More than 900 apprentices are helping to build the high-speed rail network.



Building equal, inclusive, diverse teams

We are working hard to remove the barriers to equality, diversity and inclusion (EDI) and are working towards setting new standards for major infrastructure projects. We are the first UK organisation to achieve platinum accreditation, the highest level possible, under the flagship Clear Assured framework and we have renewed our commitment to being Disability Confident Leaders, a programme run by the Department for Work and Pensions.

EDI runs through everything we do from the way we recruit people, identify talent, provide opportunities and monitor career progression. We are also using our position to set an example for the railway's supply chain and the wider construction industry.

We are making good progress towards our corporate workforce target of 40% women employees and employing 23% from BAME communities. To date, we have achieved 37% women and 22% BAME, which is above supply chain and industry averages. However, we are not complacent about the challenges around EDI as our main works activity enters a period of rapid expansion and we must deliver on maintaining and improving gender balance across HS2 in the years ahead.

Eight staff networks, working through the Allies programme, aim to support an inclusive workplace.

- **Onboard** – Increase awareness and promote inclusion of LGBT people, challenging homophobia, biphobia and transphobia.
- **Gender Balance Network** – support activities to encourage gender balance in our industries and encourage awareness of inclusive behaviours for all genders.
- **HS2 2gether** – promote inclusion of disabled people and those experiencing barriers in relation to long term conditions or disability through accessibility and awareness.
- **REACH Network** – support the inclusion of ethnic minority staff through awareness-raising activities and initiatives.
- **Future Talent Network** – promote activities geared towards the inclusion of all our people regardless of age, and support graduates and apprentices.
- **Armed Forces Support Network** – support and provide opportunities for veterans and forces' volunteers.
- **Personal Development Network** – dedicated to continued development for all staff.
- **Green Network** – build understanding and confidence around HS2's environmental sustainability vision and action plans, through an integrated campaign of stories and advocacy.

In line with best practice and our status as a leader in disability confidence, we measure the proportion of staff with disabilities by the number of moderate to substantial workplace adjustments we make for employees and not by any impairment or long-term illness. The proportion of HS2 Ltd employees needing adjustments to their working environment or equipment continues to increase, from 17% in 2019 to 34% in 2022.

Staff networks, supply chain and best practice

Our staff diversity networks allow colleagues to contribute to the progress we are making on EDI. Eight networks help us to increase awareness and knowledge of LGBT identities, gender, race and age. They also champion disability inclusion in the workplace, support graduates and apprentices, provide opportunities for veterans and encourage personal development.

Building equal, inclusive, diverse teams continued

We have developed sector-wide inclusive procurement standards for our supply chain.

In 2021 – 2022, all integrated project teams achieved external EDI accreditation and the HS2 supply chain exceeds the industry's diversity workforce average with 20% BAME, 25% women and 6% disability.

As an exemplar on EDI, we share best practice by collaborating with sector partners including Network Rail, National Highways, and Transport for London. We work with the Sustainability School by attending the cross-client data benchmarking group, the Joint Learning pathway and the Infrastructure Client Group.

Our work in this area is helping our partners to raise their EDI standards using an inclusive procurement model and promoting diversity.

🔍 Case study

Helping people to be 'true and authentic'

The 'Make It Stick' campaign encourages HS2 construction workers to embrace diversity and talk about issues around mental health and sexuality.

Staff at HS2 Euston wear a sticker on their hard-hat to show they have undertaken training in mental health first aid, mental health awareness, fairness, inclusion and respect, or as an LGBTQ+ ally.

Mace Dragados became our first main works construction partner to back the campaign which provides a safe space for people to have open and honest conversations while promoting more inclusive, fairer working environments.

Pamela McNroy, HS2 Ltd equality, diversity and inclusion manager, said: "The 'Make It Stick' campaign highlights the fundamentals of inclusion on our construction sites. Inclusive sites are safer sites as staff can feel safe and turn up to work being their true and authentic self."



HS2 Onboard Network members at Birmingham Pride.



Supporting local communities: HS2 funds

HS2's Phase One community funds have awarded more than £11 million to 193 projects since we opened applications in March 2017. The Community and Environment Fund (CEF) and the Business and Local Economy Fund (BLEF) continue to provide benefits in addition to our work reducing the impact of HS2 on local people and our statutory compensation payments.

We have awarded funds to a diverse range of grassroots projects in rural and urban areas, helping to refurbish village halls in Warwickshire, upgrade children's play areas in Northamptonshire and fund sports activities like basketball in Birmingham. The average award is £50,000 but values range from £1,000 to significantly larger allocations such as £250,000 to The National Paralympic Heritage Trust.

The CEF and BLEF schemes, which together total £45 million for Phase One and Phase 2a, benefit communities disrupted by our construction and are helping to support local businesses, environmental improvements and boost people's health and wellbeing, including awards to 29 sports facilities. We make sure that funds are awarded fairly.

On the Phase One route to date, we have made awards in 16 of 17 local authority areas and in 28 of 34 constituencies.

During 2021–2022, we awarded £2,426,159 to a total of 51 projects including 13 in priority areas. These are areas which have so far received a lower-than-average level of funding. The first award in Westminster North was made this year, supporting The Avenues organisation to provide holiday clubs for young people, boosting physical activity and sport, education and creative work. Two projects in Hillingdon, north-west London, have also been allocated funds.

The impact of our work continues to grow as the HS2 network develops. In April 2021, we extended the CEF and BLEF schemes to the Phase 2a route between Crewe and the West Midlands. A total of £5 million is available to projects that enhance the quality of life for local people and help employment across business sectors. We funded our first Phase 2a project in November 2021, allocating £9,735 to Manor Park Sailing Club in King's Bromley, Staffordshire, and in total we have made four awards totalling just under £120,000.

We have overcome difficulties engaging face-to-face with award recipients due to the pandemic by making socially distanced, outdoor visits to record inspiring community stories. Project representatives joined HS2 Ltd senior leaders and members of our CEF and BLEF Independent Panel to share their experiences. We produced new guidance for BLEF applicants and revised guidance for applicants seeking support for health and wellbeing projects to improve understanding of our funds and make them as accessible as possible. We are looking forward to increasing the reach and impact of BLEF over the next 12 months, working closely with Groundwork UK and HS2's business engagement team.

By the start of the next financial year, we aim to have 200 successful projects published on the online interactive map and we will announce the CEF and BLEF funding allocation for the Phase 2b route to Manchester at the appropriate time.

Supporting local communities: HS2 funds continued

Case study

Growing greener communities

We awarded £74,615 to the Community Environmental Trust, a registered charity in Castle Vale, Birmingham, to support its work protecting and enhancing urban green spaces.

The project encourages local people to get involved with nature recovery through a range of activities and boosts work in the Castle Vale Conservation Area, a large section of public land consisting of meadows, mixed grassland, woodland and a wildlife pond.

HS2 funding is helping the trust to run a range of activities and events for all groups in the community. Activities include practical conservation and gardening, nature surveys, activities for young people and families and walks promoting healthy living.



Volunteers at the Community Environmental Trust.

Key

- HS2 Phase One
- HS2 Phase 2a
- HS2 Phase 2b Crewe – Manchester
- HS2 East
- ● ● Stations



Some of the projects awarded HS2 funds – details on the next page.

Supporting local communities: HS2 funds continued

How HS2 funds make a difference

1. Place 2 Work

Total awarded: £74,368

The project supports people who lost their jobs during the pandemic. Place 2 Work connects residents of Castle Vale and Hodge Hill in Birmingham with employers including the NHS and the police.

2. St Peter's memorial garden

Total awarded: £75,000

A new memorial garden was built in the village of Chalfont St Peter, Buckinghamshire. A place to reconnect with nature, the garden has a public amphitheatre and a formal memorial for First World War servicemen.

3. Songs & Smiles

Total awarded: £22,150

Delivering a weekly music group for young children, their parents and guardians and older adults in Camden. The sessions are held in care homes and community spaces, supporting children's development and reducing isolation among adults.

4. Northend play area

Total awarded: £49,904

Broken playground equipment in the village of Northend, Warwickshire, was replaced with a new, inclusive multi-play unit.

5. Shenstone library

Total awarded: £9,800

Extending the Staffordshire library to add a dedicated community space. The new room is being used to offer IT facilities and a range of activities for local people.

6. Banbury & District Canoe Club

Total awarded: £7,586

Creating a more pleasant environment at an amateur sports club in Cropredy, Oxfordshire, by adding Velux windows to the gym and changing rooms.

7. Crown Wharf Theatre

Total awarded: £74,999

Fitting a new theatre and community space in Stone, Staffordshire, with sound and lighting systems and fire protection, turning it into a safe space. The theatre will provide educational and training opportunities.

8. Records of Buckinghamshire

Total awarded: £6,801

Making local history more accessible by enabling Buckinghamshire Archaeological Society to put content from its annual journal online. Records of Buckinghamshire has been published since 1854.

9. Chorleywood Cricket Club

Total awarded: £75,000

Chorleywood Cricket Club in Hertfordshire is replacing its wooden pavilion with a new training facility. A local charity called Mission EmployAble will use the building's café and kitchen to offer internships to young adults with learning disabilities.

10. Eastcote community allotments

Total awarded: £16,707

There is a waiting list for allotments in Hampton in Arden, Solihull. To meet rising demand, the George Fentham Trust is converting a plot of land into 24 new allotments for local people.

11. St Giles Hospice

Total awarded: £75,000

Fixing leaking roofs on two buildings at a hospice in Lichfield, Staffordshire, that cares for patients living with a terminal or incurable illness. The works will make much-needed space available to patients, families and carers.

12. Camden Town Shed

Total awarded: £28,800

Funding a special needs programme supervisor to support adults with additional needs to access the woodworking and clay sessions run by the Camden Town Shed.



Part Three

Our plans for 2022 – 2025

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Image: Visualisation of HS2 train travelling over viaduct.



Building Britain's high-speed trains

We are now designing HS2's new generation of British-built, bullet-style trains, boosting jobs and putting us on track for a cleaner, greener future.

Running on zero carbon electricity, the fleet of 54 trains is being built by Hitachi-Alstom JV and will offer unmatched levels of reliability, comfort and speed, capable of operating at 225mph. Our rolling stock will be an integral part of our fully accessible network, offering step-free access from street to seat. HS2 will be the first mainline railway in Europe to achieve this.

The £2 billion contract is one of the most important we will make as we build the high-speed network and it was awarded to Hitachi-Alstom JV in December 2021.

The deal will see HS2 trains being built at factories in Derby, Crewe and County Durham, supporting more than 2,500 jobs and injecting £157 million a year into the economy through the supply chain.



Visualisation of HS2 train.

Building Britain's high-speed trains continued

Hitachi-Alstom will also maintain the Phase One and Phase 2a trains over an initial 12-year period. The work will be carried out at our new maintenance depot at Washwood Heath, Birmingham in a move that will create further jobs and apprenticeships.

Cutting-edge design

Building on the design of Japan's Shinkansen 'bullet' trains and Europe's high-speed rolling stock, HS2's trains will be some of the fastest, quietest and most energy-efficient of their type in the world.

A key challenge is for HS2's trains to run on Britain's existing rail network. Conventional lines are built to a narrower gauge than is used in Europe and it means there is less space for the equipment we need to power and operate the units. Hitachi-Alstom's innovative design deals with this by putting most of the equipment under the train, maximising the area above the floor for passengers, luggage and catering.

At more than 650 feet long (200 metres), the trains will offer about 130 more seats than comparable intercity trains. Passengers will be guaranteed a seat, allowing for faster turnaround times at stations. At peak times, two units can be coupled together, creating a train over 1,300 feet (400 metres) long with up to 1,100 seats.

Hitachi-Alstom has paid close attention to accessibility, for example, by working with the Inclusive Design Group at the University of

Cambridge's Engineering Design Centre to make sure the design of the saloon, vestibule and toilets meets the needs of as many passengers as possible.

HS2 trains will be about 15% lighter than comparable high-speed trains in Europe, reducing wear and tear on the tracks. They will incorporate the world's most advanced low noise pantograph – the arm that collects power from overhead wires – to keep noise to a minimum.

A total of 432 bodyshells will be manufactured for the fleet with the build and assembly split across Hitachi and Alstom sites. The vehicle body assembly and initial fit-out will be completed by Hitachi Rail in County Durham, with Alstom connecting the vehicles together and completing the final fit-out and testing at its Derby factory. The bogies, which sit under the vehicles and house the wheelsets, will be built and maintained at an Alstom facility in Crewe.

The joint venture expects to complete the first train around 2027. This will be followed by testing and commissioning before Phase One services are launched between 2029 and 2033.

We are working with Hitachi-Alstom to develop the design of the trains, with a focus on the interior design and the passenger experience. To support this, Hitachi-Alstom is setting up a project office and collaboration zone in Birmingham that will include virtual reality facilities and areas for physical mock-ups. The space will also be used to consult with design stakeholders and user groups.



Preparing wiring inside the nose cone of a train at the Hitachi factory where some of the HS2 trains will be manufactured.



Fitting out the inside of a train in the Hitachi factory where some of the HS2 trains will be manufactured.

Awarding HS2 major contracts

We have awarded contracts valued at £23 billion on Phase One and a total of 325 procured contracts are under management, covering everything from the construction of the railway to signs and first aid equipment. Of the contracts, 55 are high-value and are worth over £10 million. Contracts are actively managed and assured, and we are continuing to work closely with our construction partners to mitigate industry-wide cost pressures.

More than 2,500 businesses have carried out work on HS2 to date, of which 97% are British-based and 70% are small and medium-sized enterprises (SMEs). The contracts are supporting thousands of jobs across the UK with many more opportunities in the pipeline.

Of the highest value 'active' procurements (over £25 million), we expect nine to be awarded in the remainder of 2022, 12 in 2023 and four in 2024.

Our most high-profile award last year was the £2 billion contract with Hitachi-Alstom joint venture (JV) to build HS2 trains in the UK. Another major deal involved Mace Dragados JV being appointed to build HS2's Birmingham station. The JV is already working on HS2's Euston station.

Following Royal Assent for the High Speed Rail (West Midlands – Crewe) Act for Phase 2a, we awarded the first stage of a £50 million package to Kier for early works. The contractor is preparing the ground for main works, conducting surveys, utilities diversions and major highways work along the 36-mile route. The second stage of the work will be awarded this year.

In January 2022, we announced that TK Elevator, with about 400 employees in the UK, will build and install around 300 lifts and escalators at our four Phase One stations between London and Birmingham. The contract will be worth between £207 million and £316 million, depending on the exact number of lifts and escalators needed as the designs are finalised. It also includes maintenance for up to 20 years.

There are several more key contracts in our procurement pipeline, including railway systems packages, the design and delivery of Phase 2a and HS2 Interchange station.

We have also issued an invitation to tender for more 'common components' for our stations including fire detection and customer information systems. Buying the same systems for all the stations will save money on initial spend and maintenance.

To make sure HS2 contract opportunities reach a wide range of suppliers, we post them on the UK supply chain portal CompeteFor. This has produced more than 12,000 expressions of interest.



Artist's impression of the Thame Valley viaduct.



Construction of a retaining wall at Kenilworth cutting, Warwickshire.

Phase One route construction 2022 – 2025

Euston to West Ruislip: Skanska Costain STRABAG

The next few years will see heightened activity on one of HS2's major logistical and civil engineering challenges – building 13 miles of twin-bore tunnels to take high-speed trains under London.

Skanska Costain STRABAG (SCS JV) has spent several months assembling two TBMs – the first of six needed for the route in the capital – and building a tunnel portal and launch chamber in West Ruislip. It will launch the 1,900-tonne Herrenknecht machines in summer 2022, tunnelling five miles east and emerging at Greenpark Way ventilation and access shaft in Greenford in 2024.

Work is well underway on the route section's eight shafts, which will ventilate the London tunnels and provide access in an emergency. Excavation at Greenpark Way began in spring 2022.

SCS JV, which has a workforce of about 4,500, is beginning work on the Euston approach box, a large underground structure that will allow trains to access the tunnels from a range of platforms, and also provide emergency access.

Later in 2022, the joint venture will begin building complex structures around the Euston cavern, including sinking a shaft and extending existing road bridges to form the approach to Euston station.

Work to excavate the Victoria Road crossover box began in spring 2022 and the box, which will allow trains to change tracks coming in and out of Old Oak Common station in west London, is expected to be completed in early 2023.

In early 2023, SCS will also launch a special logistics TBM from Atlas Road in Ealing to Old Oak Common station. It will take about four months to complete an 850-metre tunnel that will be used to keep construction traffic off local roads.

SCS will launch two TBMs from the Victoria Road site in mid-2023, heading 3.4 miles west to join up with the first set of twin-bore tunnels at Greenpark Way. This will complete the 8.4-mile Northolt tunnel. Two TBMs will then launch from Old Oak Common in 2024, tunnelling east. They will build the 4.5-mile Euston tunnel, arriving at the Euston station approaches in 2025.

With a huge volume of materials to move around London, our contractors are doing everything possible to maintain the highest levels of safety, keep construction traffic to a minimum and reduce carbon emissions. SCS JV is aiming for all site operations to be diesel-free by 2023.

A conveyor system will be up and running from summer 2022, carrying tunnelling 'spoil' to a logistics hub in Willesden where it can be moved onwards by rail. This will remove a million lorry movements from London's roads.

This year, SCS JV expects to hire 47 new apprentices and 135 previously unemployed people – supported by dedicated training facilities for general construction, engineering skills and tunnelling operations.



Making checks on a tunnel boring machine.

Phase One route construction 2022 – 2025 continued

West Ruislip to South Heath: Align

Align's works include two of HS2's iconic civil engineering feats – the UK's longest railway bridge and the network's longest tunnel, running for 10 miles under the Chiltern Hills in Buckinghamshire.

The joint venture, comprising Bouygues Travaux Publics, Sir Robert McAlpine and VolkerFitzpatrick, hit its first major milestone for 2022 – 2023 when it installed the first segment for the deck of the 2.1-mile Colne Valley viaduct. The viaduct's design is inspired by the trajectory of a stone skipping over water, with a series of spans carrying HS2 about 10 metres above the water.

By mid-2022, four jetties will be completed to support the works, keeping construction traffic off local roads. Piling specialists are building the viaduct's foundations on land and, using the jetties, over lakes. They are expecting to complete their work at the end of the year.

Over the piles, 58 concrete piers will be built to support the viaduct. These are being constructed from north to south and work is well underway. The first more complex, V-shaped piers that will go across water are due to be completed in February 2023.

Align is precasting concrete segments for the bridge deck at a factory on its south portal site. These are 'match cast', with each new segment poured against the previous one to ensure a perfect fit. At peak, the factory will produce 12 segments a week, each one weighing up to 140 tonnes.

The segments will be put in place by a giant launching girder, using a method known as balanced cantilever construction. Over the next two years, the 700-tonne girder will place 1,000 deck segments, moving from north to south across the Colne Valley.

Meanwhile, teams operating two TBMs are working around the clock to build the twin-bore tunnels underneath an Area of Outstanding Natural Beauty in the Chilterns. The TBMs, named Florence and Cecilia, have passed the first ventilation and access shaft, about two miles into the tunnel, near the village of Chalfont St Peter. It took two years to prepare the 255-foot (78-metre) shaft, the deepest on the Align section of route.

The next step is to build access and install the equipment needed to ventilate the tunnels. Align and its supply chain partners have also started building the first of 38 cross-passages between the two tunnels for use in an emergency.

Florence and Cecilia will pass five shafts in total, arriving next at Chalfont St Giles, followed by Amersham, Little Missenden and finally Chesham. They are expected to break through at the north portal in 2024.



Four jetties have been built to support construction of the Colne Valley viaduct.



Colne Valley viaduct launching girder.

Phase One route construction 2022 – 2025 continued

Chiltern tunnel to Long Itchington Wood: EKFB

We are undertaking an unprecedented programme of earthworks across the 50-mile (80 kilometre) stretch of Phase One being built by joint venture Eiffage, Kier, Ferrovial Construction and BAM Nuttall (EKFB). In total, 40 million cubic metres of materials will be moved and we are on target to achieve 40% of this work by the end of the year.

The earthworks programme includes building 47 embankments and 28 cuttings to minimise noise and HS2's visual impact on the countryside. Excavation of the largest cutting is underway near Turweston, Buckinghamshire. It is about 20 metres deep and involves two million cubic metres of earthworks. Work will finish by summer 2024.

The team has a target of moving 683,500 cubic metres of spoil by September at the north portal site at South Heath in preparation for the arrival of the tunnel boring machines that are progressing under the Chilterns.

North of the Chilterns, EKFB will shift 1.4 million cubic metres of earthworks for HS2's infrastructure maintenance depot on a 37-hectare site at Calvert, Buckinghamshire. The earthworks are due to be finished by September 2023 and the depot is planned for completion by May 2024.



Visualisation of the Wendover Dean viaduct.

Phase One route construction 2022–2025 continued

Chiltern tunnel to Long Itchington Wood: EKFB

Along the route, EKFB will construct 81 bridges and 15 viaducts including Wendover Dean in Buckinghamshire. The 450-metre-long viaduct features a slender design and consists of two abutments and nine Y-shaped piers between 9 metres and 15 metres high. The frame is being built onsite in 85-metre sections, which are launched over the abutment and piers. The first section of steelwork construction is about to start and the viaduct will be completed in 2024.

At Small Dean, a 346-metre viaduct will take HS2 over the A413 and the Aylesbury to London railway line. Construction is due to start in the autumn. The steel deck is scheduled for launch in August 2024. Unlike Wendover Dean, the bridge deck is being constructed on a launch embankment and will be continuously launched into position over the road and railway. Materials will be transported for reuse north of the route using an electric 600-metre conveyor system, saving 78,000 lorry trips.

The low-lying Thame Valley viaduct will span 880 metres across wetland. In advance of the piling works, the causeway is under construction and the viaduct is due to be completed in spring 2025.

HS2 will run through 'green' tunnels near Wendover, Greatworth and Chipping Warden, with a total length of 4.3 miles (6.9 kilometres). Once complete, they will be covered and landscaped to blend into their surroundings. The tunnels are being manufactured offsite in a factory using precast concrete segments.

The segments for Chipping Warden are being delivered and the team expects to install a 500-metre section by the end of the year. Completion of the tunnel is scheduled for spring 2025. Excavation of Greatworth tunnel starts in the autumn and construction of Wendover tunnel follows in August 2023, with a predicted completion date of summer 2025.

The joint venture's environmental work includes constructing a 900-metre-long structure to protect rare Bechstein's bat species at Sheephouse Wood, Buckinghamshire. Work will start in summer 2023.



Visualisation of the Small Dean viaduct.



Building the 'green' tunnel in Chipping Warden.

Phase One route construction 2022 – 2025 continued

Long Itchington Wood to Fradley: Balfour Beatty VINCI

Tunnelling is a major focus for Balfour Beatty VINCI joint venture as it builds the longest section of Phase One, stretching for 56 miles (90 kilometres) from rural Warwickshire into Birmingham and on into Staffordshire.

A TBM, named Dorothy, is set to start the second bore of HS2's one-mile tunnel under Long Itchington Wood, Warwickshire with the TBM breakthrough expected towards November. Over two million tonnes of excavated materials will be transported from the slurry treatment plant at the north portal over the Grand Union canal via a 250-metre long conveyor, taking about 200,000 lorries off local roads. The materials will be reused for landscaping.

Preparations are underway to launch a second TBM to dig the 3.5-mile (5.6-kilometre) Bromford tunnel near Birmingham. The tunnel will run next to the M6 between Water Orton and Washwood Heath. The former Hinkley Point C tunnel precast segment factory is being reused to cast about 40,000 concrete segments.

Pre-assembly of the TBM, which measures 125 metres and weighs about 1,600 tonnes, is due to start in late summer and BBV hopes to launch it from the east portal, at Water Orton, in spring 2023. It will take more than a year to complete the first bore.



Artist's impression of the Birmingham and Fazeley Canal viaduct.

Phase One route construction 2022 – 2025 continued

Long Itchington Wood to Fradley: Balfour Beatty VINCI

A slurry treatment plant has been built at the east portal to process the spoil. The diaphragm walls, supporting the excavation of the cuttings for the portal, are also complete. Work on excavating a 40-metre-deep ventilation shaft halfway along the tunnel, at Castle Bromwich, will start by the end of the year.

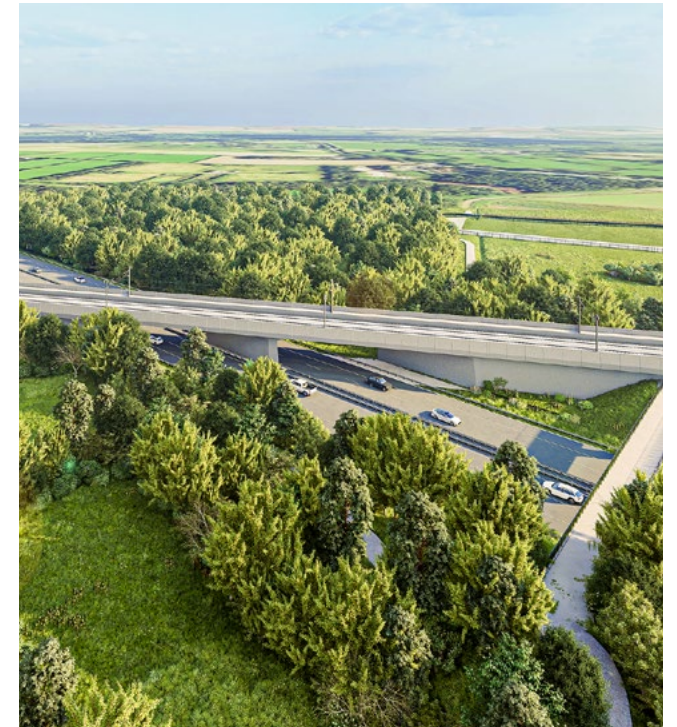
Work is progressing on a bridge that will carry HS2 over the M42 at Kingsbury, Warwickshire. The Marston box bridge is being built at the side of the motorway to reduce traffic disruption. Weighing 14,000 tonnes, it will be moved into place – a distance of 145 metres over Christmas – making it the longest bridge ‘slide’ in the UK. Works will be complete by summer 2023.

BBV will build 72 bridges on this section of the route. Two existing bridges need to be rebuilt to make space for HS2 trains to pass underneath. They cross existing rail lines and the works will be coordinated with Network Rail and Birmingham City Council. Work starts in summer 2023 for Aston Church Road overbridge and summer 2024 for Saltley viaduct.

Work that involves key road closures is always challenging. In summer 2023, we will start building a bridge to take HS2 over the A453 Sutton Road, near Bassets Pole, which requires realigning Drayton Lane. Preparatory work is underway with a planned completion date of early 2025.

Hams Hall business park in Birmingham will also be affected by our works. We need to build a temporary road to make sure businesses can continue operating as we construct the Faraday Avenue underbridge. Completion is scheduled for summer 2025.

BBV will build 37 viaducts and piling for the Curzon Street station viaducts gets underway next year. Piling for a viaduct crossing the M42/M6 link road, near Water Orton, is also taking place.



Visualisation of the Marston box, carrying HS2 over the M42.

Phase One stations construction 2022 – 2025

Euston station



Visualisation of Euston station.

“
The Euston station project is expected to create about 3,000 jobs when construction begins in 2025.”

New designs for Euston station bring to life how HS2 will provide the best experience for customers and revitalise the area around our southern terminus in central London.

An integrated project team (IPT) made up of our construction partner Mace Dragados Joint Venture (MDJV) and its design contractors Arup, WSP and Grimshaw submitted the HS2 station concept design in November 2021. This milestone followed several key decisions, in particular the shift from 11 to 10 platforms for high-speed trains, which provides a more efficient, single-phase construction approach.

The HS2 station will be set across three levels, with 10 subsurface platforms, each 450 metres long, serving destinations in the Midlands and the North. It will be used by up to 17 trains per hour, providing 50,000 seats on high-speed trains during the morning peak period.

The ground-level concourse will be bigger than Trafalgar Square, making it the largest station hall in the UK. Passengers and visitors will be able to move freely around the station and new public spaces at the north and south. Retail outlets and station facilities will be available on the ground and first floors.

A bold, geometric roof will define the station design and allow natural light to flood into the station concourse. Elements of the innovative shape can be prefabricated offsite and installed using modular construction techniques. This will reduce costs, carbon emissions and disruption.

The Euston IPT shared the design with the public in March 2022, starting an engagement process lasting several months. The feedback will help us shape the detailed scheme design, which will be submitted for planning approval by the end of 2022.

With plans taking shape, MDJV issued tenders for the major procurement packages on the project in February 2022, with UK firms encouraged to bid for up to £500 million worth of contracts. These are expected to create about 3,000 jobs when construction of the station begins in 2025.

Key elements of early works at Euston include creating a new traction substation to provide power for the London Underground. The team has made substantial progress in the past year, excavating a 20-metre shaft and 66-metre-long, 6.5-metre diameter tunnel. This will be used to divert services and provide ventilation.

Phase One stations construction 2022 – 2025 continued

Euston station

Through design refinements and reusing materials, we have saved a significant amount of carbon emissions (140 tonnes) during the works at the traction substation so far.

Piling has been completed for the new substation building. The structure itself will be completed in early 2023 and commissioned in 2024, once the high-voltage power equipment has been installed and tested. Works are now progressing at the station site itself. The western boundary wall was completed in October 2021 and we will begin a programme of utilities diversions to make way for the HS2 station this year. Piling for the high-speed station building will begin in early 2023.

We are building a new interim taxi rank, at the former Euston Square Gardens East site. This will allow the existing taxi rank to be removed to make way for construction of the new London Underground station. It is expected to be operational in the first half of 2023.

In November 2021, we received planning permission from Camden Council for a new site office and welfare facility at the former Maria Fidelis school site, which will open in early 2023. We are also building a new Construction Skills Centre at the site. Run by the council, the centre will accommodate up to 150 students and 30 staff, providing career opportunities for local people.



The Euston throat site on the approaches to the new station.

Phase One stations construction 2022 – 2025 continued

Old Oak Common station



Visualisation of Old Oak Common station.

“**Old Oak Common will play a central role in the UK’s largest regeneration scheme, supporting up to 65,000 jobs and 25,500 new homes.**”

Old Oak Common in west London will be the UK’s largest ever station built as a single project, with six platforms for HS2 services and eight for conventional trains.

The station will be HS2’s temporary terminus in the capital while we complete Euston and will allow us to launch high-speed services to the West Midlands without delay. The journey to Birmingham will take just 38 minutes.

Balfour Beatty Vinci SYSTRA joint venture (BBVS) has started permanent works on the rail superhub, which will play a central role in the UK’s largest regeneration scheme, supporting up to 65,000 jobs and 25,500 new homes.

Our first task at the site, a former rail depot three miles west of Paddington, is to build the station box, an 850-metre-long structure that will sit 20 metres underground and house the HS2 platforms. The team began by building a mile-long (1.8 kilometre) diaphragm wall that surrounds the box. Shortly afterwards, they installed the first of 161 concrete piles that will support it. These major foundation works will be finished in the second half of 2022.

In October 2021, work began on the station box itself. Specialist subcontractor Expanded is carrying out the works on BBVS’s behalf, excavating 690,000 cubic metres of London clay, placing 32,000 tonnes of steel and pouring 190,000 cubic metres of concrete.

They are using a ‘top down’ method of construction, creating a concrete base slab that will form the ground floor of the station and making a series of holes which excavators will use to remove the soil.

The HS2 station box will be completed in 2026. BBVS and its subcontractors will then begin work on the station superstructure and the platforms for the conventional railway. More than 1,600 concrete piles will be needed to support the station and platforms.

One challenge facing the team is that the site is constrained, with only one entrance and exit. To keep the works running smoothly and take traffic off local roads, BBVS and SCS JV are building a one-mile conveyor to carry excavated material to the logistics hub in Willesden for processing.

Phase One stations construction 2022 – 2025 continued

Old Oak Common station

At the peak of operations, the conveyor will export 800 tonnes each hour, equivalent to taking 44 lorries off the road every hour. This equates to cutting 83,333 lorry movements over the lifetime of the project. The works are progressing well, with a 60-metre gantry lifted over Old Oak Common Lane in January 2022. The conveyor is set to be operational in July 2022.

BBVS has been engaging with the local community and has unveiled plans for a new green space outside the station. Residents, workers and rail passengers will be able to enjoy four hectares of lawns, wildlife areas and ponds, as well as natural play areas and a venue for events and pop-up markets.

The park will create a calm new centre for the Old Oak and Park Royal area, which has been divided over many years by roads, railways and the Grand Union Canal.

The community will also benefit from improved transport links when HS2 services start running between 2029 and 2033. In the meantime, the project exemplifies how HS2 is helping the UK to 'build back better', creating 2,300 jobs and 250 apprenticeships during construction.



The proposed green space outside the station.

Phase One stations construction 2022–2025 continued

Interchange station



Visualisation of Interchange station.

“
Interchange is the first railway station globally to achieve the BREEAM ‘Outstanding’ certification.”

The £370 million construction contract for Interchange station in Solihull will support 1,000 jobs as we build one of the most sustainable rail hubs in the world.

The contract is due to be awarded this summer and will kickstart a two-stage design and build process. First, we will agree a target price and programme for the station, which we plan to complete by the end of 2023. Next, we will move to site works to start construction in early 2024.

Interchange will be the catalyst for one of the UK’s largest regeneration schemes as part of plans by the Urban Growth Company (UGC) for the UK Central Hub, supporting 70,000 jobs and thousands of new homes.

We have submitted new plans to Solihull Council for the automated people mover (APM) that will link Interchange with the NEC, Birmingham International rail station and Birmingham Airport. We have worked with UGC to include extra design elements to support wider regional economic growth plans. The design features an option to modify the APM’s alignment to dovetail with plans to transform Birmingham International. It also supports proposals for new commercial developments and public spaces.

The APM will carry up to 2,100 passengers per hour in each direction on a six-minute journey along the 1.4 mile route. The system contract is due to go out to tender in 2023 followed by the infrastructure contract in 2024. We have also been working with UGC to develop proposals for a multi-storey car park, which will unlock more land for future development. A planning application will shortly be submitted by UGC and a decision is due next summer.

Interchange will serve 21,000 passengers a day, rising to 38,000 when Phase Two is fully operational. It will be just 38 minutes from London and 37 minutes from Manchester. The station will be the first point on the journey from London that HS2 passengers will arrive at open-air, above ground platforms, of which there will be four.

Interchange is already setting new standards for eco-friendly construction having become the first railway station globally to achieve the BREEAM ‘Outstanding’ certification, putting it in the top 1% of buildings in the UK for sustainability. The roof design comprises a series of interlocked, diamond-shaped ‘petals’ to allow rainwater to be reused. Rooflights will be positioned to maximise natural light for the station concourse.

The design includes three plazas, designed with safety in mind, to encourage passengers and visitors to take time out before continuing to their destination.

Phase One stations construction 2022 – 2025 continued

Curzon Street station



Visualisation of Curzon Street station.

“
Curzon Street is set to be an iconic symbol for Birmingham's modern regeneration.”

We are working with Mace Dragados Joint Venture (JV), our Curzon Street station contractor, to develop a target price and delivery schedule as we prepare to lay the foundations for HS2's Birmingham terminus next year.

Additional ground investigations and earthworks have been undertaken to prepare the site and we are continuing to engage with key stakeholders including Midland Metro Alliance, who will build a tramline crossing the station footprint. The Midland Metro will call at Curzon Street as part of the Birmingham Eastside extension, taking the line to the Creative Quarter in Digbeth.

The station will have seven platforms and serve 25,000 passengers a day, increasing to 66,000 when Phase Two to the North opens. Main works will create hundreds of jobs and help the region's economic recovery from the pandemic. The Curzon Street Masterplan predicts 43,600 jobs will be supported in the area surrounding the eco-friendly station.

We are due to start foundation works in spring 2023 and this will continue into 2024. In total, we will sink about 2,000 piles to support construction. Surplus material will be transported to HS2's Interchange station in Solihull to be reused.

Next year, we will also start building the three viaducts that will carry HS2 into Curzon Street station. This includes building the buttress columns and installing the precast concrete planks which form the decks. Installation of the ground floor slab for the station concourses is set to take place in January 2025.

The design for the station is inspired by the great arched roofs of the Victorian rail era. Curzon Street will be net zero in operation and we are adopting the latest sustainable technologies, including capturing rainwater and using 'clean' energy, with over 2,800 square metres of solar panels located on platform canopies. We aim to cut the station's emissions by more than 87,000 tonnes of CO₂ equivalent – similar to removing the emissions from over 10,000 homes.

The station is scheduled for completion in 2028 ahead of Phase One services starting in the range 2029 to 2033.

Curzon Street is set to be an iconic symbol for Birmingham's modern regeneration and provides a shining example of the way we are building for the future while preserving the past.

Clearing the 25-acre site involved a huge archaeological programme and unearthed the world's oldest railway roundhouse. Plans to incorporate the roundhouse in the station's new public spaces are being explored.

How HS2 stations will boost regeneration

HS2 stations will be catalysts for growth and we are focused on making sure they benefit the people and places served by the network. Our commercial development team is collaborating with stakeholders including local councils and community groups to maximise regeneration opportunities and we have asked retail experts to research what passengers will expect and want from HS2.

In Euston, we are helping to drive a huge regeneration project across a site spanning more than 60 acres. We are working with partners to create a new piece of the city that will bring thousands of jobs to Euston. The masterplan includes new homes, including affordable and social housing, businesses, shops and improved green spaces.

A few miles to the west, Old Oak Common station will be the centre of the UK's largest regeneration project. Linking HS2, National Rail and Crossrail lines, this transport superhub will serve an estimated 250,000 passengers a day, with an extensive retail offering inside the building and potential for pop-up markets and events in the green space outside. We have identified an area of the construction site that will be used for commercial development once the station is built.

Interchange station in Solihull sits at the centre of a new mixed-use development known as Arden Cross, which will support up to 27,000 new jobs, 6 million square feet of employment space and 3,000 new homes. Arden Cross is part of the UK Central Hub scheme and we are working with local stakeholders including the Urban Growth Company and the West Midlands Combined Authority to define our commercial offering for business, leisure and residents.

Our control centre and maintenance depot at Washwood Heath, Birmingham provides another opportunity for development. When construction is complete, we expect the site to release around 24 hectares of surplus land for industrial development, which could accommodate about 800,000 square feet of employment space a few miles from Birmingham city centre.

In Birmingham, the redevelopment of the historic Curzon Street site for our HS2 station is stimulating urban investment and we are working to maximise commercial opportunities in the station design. The arrival of high-speed rail services is poised to add £1.6 billion of economic benefit to the area, support 43,600 jobs and 4,400 new homes.



Visualisation of the interior of Curzon Street station.



Visualisation of Old Oak Common station.

Environment

Building a cleaner, greener future

Our vision is to build a high-speed rail network that provides zero carbon travel for a cleaner, greener future. Reducing our environmental impact as we build HS2 and operate services is fundamental to the project. We are rigorously assessing the construction of the railway – and the design and manufacture of our trains – to make sure we do everything we can to protect and, where possible, enhance the natural world and minimise our carbon footprint.

HS2 is one of the most environmentally responsible infrastructure projects in the UK and is in line with the Government's 'nature positive' commitment, which aims to leave the environment in a better condition than before we started building the network. The project's status as Europe's biggest construction programme, employing more than 34,000 people at peak activity, means our environmental programme is unprecedented in size and scope, and in the challenges it presents us.

We need to balance the demands of this complex construction scheme – how we source and transport materials, build major structures, like tunnels and bridges, and remove waste – with our overarching environmental responsibilities. We are doing this through our pioneering work in cutting carbon emissions, the actions we are taking to reduce our impact on local communities and our plans to develop a green corridor of new wildlife habitats to allow nature to flourish along the railway.

Our ambition is to build the most sustainable high-speed railway in the world and make HS2 resilient to extreme weather conditions for the next 120 years.

Working towards 'destination net zero'

Transport is the biggest emitter of greenhouse gases, producing 24% of the UK's total emissions. HS2 will be part of the solution in cutting emissions as the UK moves to a net zero carbon economy in 2050.

We unveiled ambitious targets to reduce emissions and boost nature recovery in our **Environmental Sustainability Vision** in January 2022. Our Vision was published with our **Net Zero Carbon Plan**, which set out how we will work with our supply chain partners and industry peers to set new science-based targets in 2022. These will tackle emission 'hotspots' year-on-year as we build HS2.

We will continue to develop industry best practice and set new standards for major infrastructure projects on HS2's journey to 'destination net zero'. From 2035, we will either reduce the emissions we produce to 'zero' or make those we cannot eliminate 'net zero' using natural or technological methods, known as carbon offsetting. Our net zero target covers the way the rail network is being built and how it will be operated and maintained.

As we progress towards net zero construction, we will monitor our performance. We launched our first diesel-free construction site in May 2022 and we will stop using diesel on all HS2 sites from 2029. We are aiming to cut carbon emissions from concrete and steel by 50% by 2030. This target is set out in main works contracts and applies to stations, relevant rail systems contracts and Phase 2a contracts such as early civils works package 2. Our work in this area will leave a legacy of low carbon construction for the industry. The **clean construction** section of this Corporate Plan looks at the ways we are reducing emissions.

We are making good progress towards our 2035 net zero target and we have cut emissions against our Phase One baseline by 24.8%.



Environmental work for HS2 at Cubbington Wood, Warwickshire.

Environment continued

Building a cleaner, greener future

In operation, our modern trains, serving millions of customers, will use zero carbon electricity, provide a cleaner alternative to long-distance car journeys and flights and take heavy-emitting traffic off the roads. The energy powering our stations, depots and associated infrastructure will also be zero carbon.

We are keen to engage as many people as possible in our environmental work and launched a Green Network for our staff in 2022, encouraging employees to share ideas and encourage changes in behaviour to cut emissions and help us reach net zero.

Making HS2 Ltd net zero for corporate emissions

We have set a target to make our organisation net zero from 2025, in the final year covered by this Corporate Plan. The target covers the gas and electricity we use to heat and power our offices. Our corporate utilities are provided by the landlords at our sites. HS2 Ltd has several offices in buildings with multiple tenants and we regularly evaluate the environmental impact of emissions from these sites in line with our Government Greening Commitments. Key ways to reduce energy consumption include:

- using building management systems to make sure air conditioning and lighting are only used when needed;

- ongoing reviews of our estates strategy so accommodation meets the needs of the project and is not bigger than we need; and
- educating people to save energy, such as turning off computer monitors.

The energy at our head office in Snowhill, Birmingham is from 100% renewable sources. At our smaller London office, 50% of energy is from renewable sources. The utilities contract is on a fixed term until September 2022 and we will liaise with the landlord to move to 100% energy from renewable sources.

Boosting nature recovery

We are helping to create a richer, more biodiverse environment for future generations, protecting and enhancing natural habitats wherever we can and promoting green spaces that people can enjoy. We have a clear plan for action and our targets, as set out in our Environmental Sustainability Vision, are to:

- seek to achieve a 10% net gain in biodiversity on the Phase 2b route between Crewe and Manchester; and
- secure gains in biodiversity for Phase One and Phase 2a, moving beyond our previous position of no net loss.



Finemere Wood site in Buckinghamshire.



Environmental works around Kenilworth in Warwickshire.



Environment continued

Building a cleaner, greener future

We will launch HS2's Biodiversity Action Plan later this year to complement our Net Zero Carbon Plan. It will set out how we will maximise the creation and restoration of natural habitats, working with our partners and moving towards a position of biodiversity gain for replaceable habitats across the project. The action plan will build on our existing environmental commitments and the wide-ranging nature-based work that is already progressing as part of the wider HS2 **Green Corridor**.

Our teams have already successfully planted more than 800,000 trees and shrubs out of a total of seven million we will plant along Phase One. When fully grown, native species such as hazel, hawthorn and oak will help to create an ecologically diverse network of woodlands, grasslands, meadows and wetlands. We are protecting and promoting habitats to boost local nature recovery and doing all we can to blend HS2 into the unique character of the English landscape and reduce its visual impact.

We are using the latest ecological innovations to improve the way we work. Drone technology is helping us to map habitats and monitor the success of rare nesting birds. Environmental DNA is allowing us to gauge the success of ancient woodland translocations, in which materials and species are moved to new sites.

Reducing our impact on ancient woodlands is one of our highest priorities and we regret the loss of any of these irreplaceable habitats. There are more than 52,000 ancient woodlands in England and, following work on design refinement, to date we have been able to reduce the number of ancient woodlands that will be directly affected by construction of Phase One from 32 to 25. In February 2022, we published an **Ancient Woodland Summary Report**, setting out that the total area of ancient woodlands we expect to be affected by Phase One has been reduced by 5.7 hectares since the Environmental Statement was published. This takes the area from 29.4 hectares to 23.7 hectares, representing a reduction of 19.25%.

Where losses of ancient woodland are expected to occur, a range of compensatory measures are being put in place. We are translocating, or reusing, soils from ancient woodlands to plant trees in new sites and help us to preserve the special value of soils which have developed over hundreds of years. We will manage and monitor the new locations of these soils for at least 50 years.

A new online mapping tool, being launched in the summer, will allow local people to see how the construction of HS2 is affecting ancient woodlands and the planting we are carrying out to compensate for the loss of trees. We have developed the tool with our stakeholders including the Woodland Trust, Natural England and the Forestry Commission and plan to update it each year.

We encourage people to maximise the opportunities offered by several HS2 funds to promote biodiversity and local environmental projects. Through the £7 million HS2 Woodland Fund, 123 hectares of new woodland have already been created to date and 72 hectares of ancient woodland have been restored for future generations to enjoy along the route between London and Crewe. We expect several hundred more hectares of woodlands to be created or restored in the coming years as all the funding is committed.

We have launched a £2 million Biodiversity Investment Fund to help create or enhance wildlife habitats along Phase 2a. The individual habitat creation projects being delivered through this fund are additional to the core environmental mitigation and compensation for habitats affected by HS2 and will support our aim to improve biodiversity along the route between the West Midlands and Crewe.

Environment continued

Building a cleaner, greener future

Reporting on our progress

We now provide a detailed breakdown of our progress reducing carbon emissions, promoting nature recovery and other environmental topics in our **Environmental Sustainability Progress Report** (ESPR).

We published our first report in January 2022 and our second report, covering 2021 to 2022, will be released later this year. It provides a wide-ranging, detailed update of our performance on the Green Corridor, climate change, the community experience, the historic environment, and responsible consumption and production.

The ESPR is prepared with reference to Global Reporting Initiative (GRI) Standards, the world's most widely used framework for sustainability reporting, and independent assurance is provided by Lloyd's Register.

Case study

Boosting biodiversity and restoring historic landscapes

Work is set to get underway on six projects that will enhance the natural landscape along the Green Corridor in Staffordshire thanks to a £1.5 million HS2 funding package.

An area covering just over 3,500 hectares in the Trent Sow Parklands and the Cannock Chase Area of Outstanding Natural Beauty (AONB) will benefit from new wildlife habitats, the preservation of historic environments and improved access.

The area, close to the Phase 2a route between the West Midlands and Crewe, includes the washlands of the Trent and Sow rivers, the historic landscapes of Shugborough, Ingestre and Tixall as well as canals and listed buildings. The work, due to start in September, is designed to allow a range of species including birds, bats, aquatic flora and fauna to thrive. We identified the schemes working with the National Trust, the Cannock Chase AONB Partnership and other local partners.

The then HS2 Minister Andrew Stephenson said: "These projects are an example of how we're working to ensure we create an environmental legacy underpinned by our promises to deliver HS2's Green Corridor benefits, enhance the landscape and create new habitats for wildlife."



The Shugborough Estate and the Trent Sow area.
© National Trust Images, Chris Lacey

How HS2 is leading on cleaner construction

The scale of HS2 gives us a unique opportunity to champion 'clean' construction and create a legacy for low carbon construction and infrastructure.

We are using the latest technology and innovations to drive down carbon emissions as we build the railway. Advanced machinery, clean and renewable fuel sources and low carbon materials are allowing us to 'build back greener'. So far, we have cut emissions for Phase One by almost 25% as we lay the foundations for HS2 and build the main structures of the railway between London and the West Midlands. Here are some of the ways we are working to make HS2's net zero carbon plan a reality.



An electric crane at Curzon Street station.

Fully electric cranes

HS2 is the first UK construction project to use fully electric, heavy-duty crawler cranes. There are only five 100% electric Liebherr machines in

the world and three are being used to build the high-speed railway.

The giant cranes run off mains power or a battery, allowing us to cut carbon emissions, improve air quality and reduce noise.

Two cranes are being used at Old Oak Common and at the Canterbury Road ventilation shaft site in London.

We are looking to procure more equipment like this as we work towards having diesel-free construction sites by 2029.



The conveyor installation at Atlas Road.

Moving materials by rail

HS2 is moving materials by rail and conveyor wherever possible, avoiding an estimated 1.5 million lorry movements from the roads, reducing our impact on surrounding areas and local air quality.

The Willesden Euro Terminal Logistics Hub will process up to six million tonnes of material excavated from our London sites, arriving via a 2.1-mile conveyor system and to be sent onwards by rail for reuse outside of the city. Key materials will also arrive into Willesden Euro Terminal via rail, significantly reducing our impact on the environment and local communities.

We have also been using freight trains to support construction in Buckinghamshire. In the first year alone, they received more than 840,000 tonnes of materials.



A piling rig using retrofitted solution.

Retrofitting is reducing emissions

HS2 has successfully trialled an innovative way to retrofit older machines to meet the cleanest

diesel emission standards on our construction sites.

The solution, developed by British company Eminox, will help to cut emissions on plant and machinery such as piling rigs, excavators and bulldozers. It will also cut waste as it reduces the need to scrap older machines to meet the latest emission standards.

The system has subsequently been certified by the Energy Saving Trust and is being widely adopted across the industry.

How HS2 is leading on cleaner construction continued



A HIPER pile being installed in central London.

Tapping geothermal energy

A revolutionary method of building foundations at Euston station, developed by subcontractor Keltbray, could cut carbon emissions by up to 90%.

Described as the biggest innovation in the field for decades, Hollow Impression Precast Energy Reusable piles, or HIPER piles, combine several innovations. They use 70% less concrete because they are hollow and can be shorter because the pile's outer face has protrusions, known as impressions, that generate greater friction. Precast offsite, they can be reused once a building is demolished.

Significantly, the piles can be used as a geothermal energy source to heat or cool the building above.



An electric crawler crane.

Cleaner energy for construction

To further aid reduction of our carbon footprint, we are making efforts to switch to diesel alternatives.

- Biofuels: SCS JV used Hydro-treated Vegetable Oil (HVO) in a piling rig for

the first time in the UK. BBV worked with Imperial College on a study of emissions from alternative fuels.

- Renewable energy: HS2 has rolled out the use of the world's first solar and hydrogen fuel-cell powered welfare cabins.
- Electric: HS2 is pioneering UK-first electric and hybrid pieces of equipment including telehandlers, forklifts, dumpers and excavators.
- Replacing diesel: HS2 is leading trials of ultra-low emission technology to replace diesel power on construction sites.



Sheet piling being installed for the Wendover Dean viaduct.

Using sustainable engineering

The design team behind HS2's Wendover Dean viaduct in Buckinghamshire is using an innovative technique to more than

halve the amount of carbon emissions produced during construction.

It is the first time a major UK railway viaduct is being built using a 'double composite' approach, with the 450-metre viaduct taking inspiration from high-speed railway viaducts in France.

The method involves two steel girders being sandwiched between layers of reinforced concrete to create a strong but lightweight span using less concrete and steel and cutting embedded carbon emissions by 7,433 tonnes.



Demolition materials are being reused.

Recycling waste

Almost half a million tonnes of waste material have been diverted from landfill during our early works in London – a recycling rate of 98%.

A key part of the strategy was to reuse demolition material to create new aggregate, which was used onsite for temporary vehicle access ramps, crane 'mats', haul roads and other structures. The method saved about 2,000 tonnes of carbon and more than £4 million on waste material and material delivery.

Works by Costain Skanska Joint Venture (CSJV) in London included clearing the Old Oak Common site of buildings and train sheds. More than 6,500 cubic metres of rubble was sorted onsite.

Boosting British business: Meet the Contractor

HS2's annual supply chain event showcases the huge contract opportunities open to UK businesses as we build the railway. Our fourth Meet the Contractor event was held with our Tier 1 main works contractors and station construction partners in late 2021. For the first time, we offered meetings with Tier 2 contractors, providing more opportunities for small and medium-sized enterprises (SMEs) to bid for work.

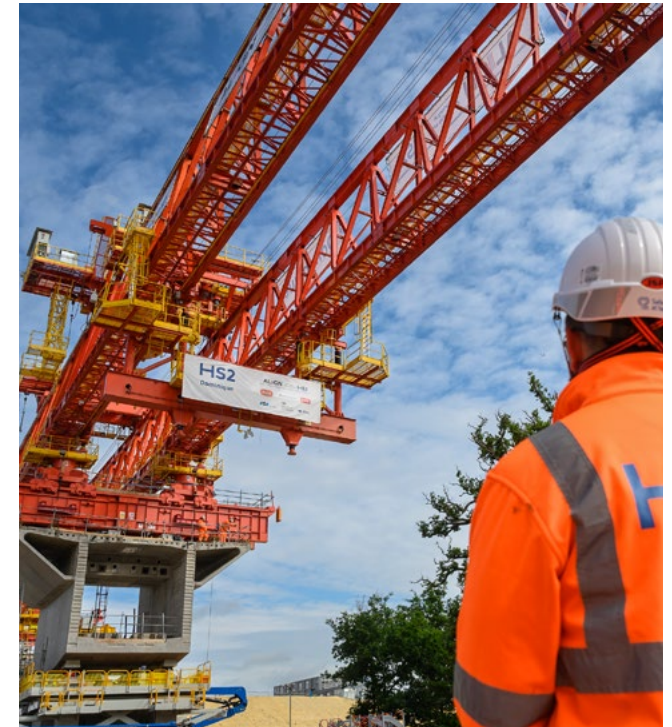
Sixteen subcontractors took part in the online event, offering more than 250 packages of work, with values ranging from £4,000 to £158 million. The six-day event highlighted how connecting with companies of all sizes is key to HS2's success as construction work intensifies. More than 400,000 contract opportunities are set to be available throughout the HS2 supply chain.

During Meet the Contractor 2021, we hosted 37 interactive webinars and featured more than 260 contributors. The webinars focused on contracts to build HS2 stations and our main works programme. The session filled the equivalent of 5,400 seats and we 'filled' 1,800 at networking sessions.

In addition, 481 one-to-one meetings took place. They were attended by 209 businesses, of which 77% were SMEs.

Our digital communication platforms were effective with more than 5,000 supply chain management webpage views. The event hashtag #MeetTheContractor picked up more than 200,000 impressions on social media.

HS2 has awarded contracts – direct to Tier 1 suppliers and indirect to Tier 2 suppliers or below – to 2,434 unique suppliers. Of these, 97% are UK businesses – and of these, 76% are SMEs.



HS2 is creating thousands of opportunities for British contractors.

Levelling up with HS2

HS2 is already playing a part in levelling up the country as companies join the supply chain building the railway. Here are some of firms benefiting from opportunities we are creating with Britain’s high-speed rail network.

We work with...

2,580 businesses

897

Micro businesses
1–10 employees

561

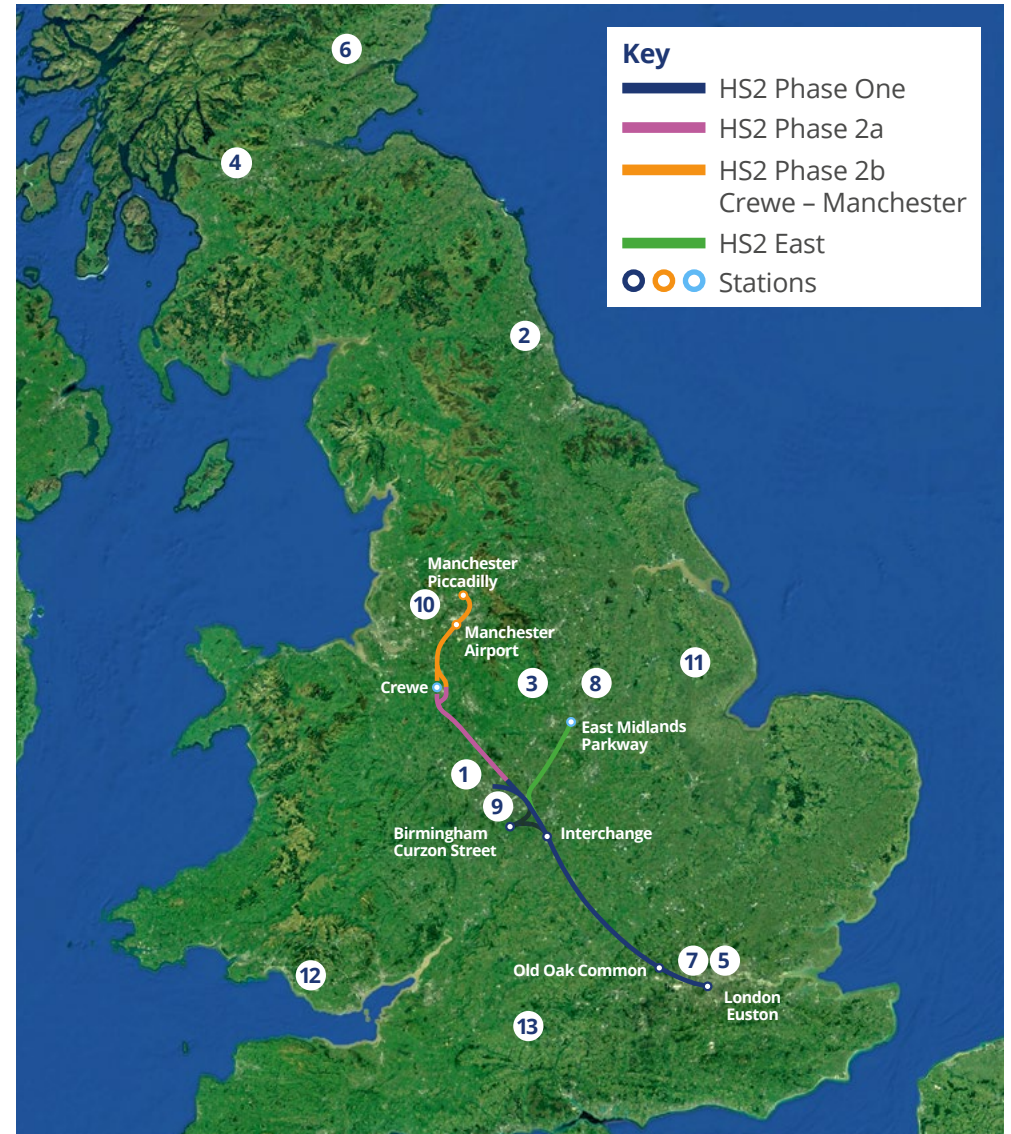
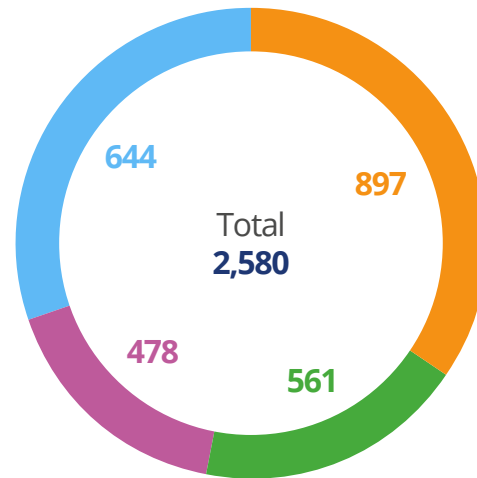
Small businesses
11–49 employees

478

Medium businesses
51–249 employees

644

Large businesses
250+ employees



The location of some of the companies in HS2’s supply chain. See next page for details.



Levelling up with HS2 continued

1. McAuliffe Group, West Midlands

Wolverhampton-based family firm McAuliffe, a specialist environmental contractor, carried out extensive remedial works at HS2's Curzon Street station site in Birmingham. The contract inspired McAuliffe to improve its apprenticeship offer and work with homeless people.

2. Hatton Traffic Management Ltd, Newcastle upon Tyne

Hatton Traffic Management has been working on HS2 since 2017 and has established a new depot in west London, recruiting 17 local people. Encouraged by HS2's drive to cut carbon emissions, it has installed vehicle tracking devices across its fleet.

3. Stanton Precast Ltd, Derbyshire

Up to 100 local jobs will be created by Stanton Precast after it was awarded a major contract to build three 'green' tunnels. About four miles of tunnel will be built in thousands of sections at the Ilkeston factory, which employs about 180 people.

4. GAP Group, Glasgow

GAP Group is supplying the world's first solar and hydrogen powered welfare unit for workers to HS2 construction sites. Developed with manufacturing partner AJC Trailers, the Ecosmart ZERO cabins are helping to reduce carbon emissions.

5. Concept Engineering, London

Concept Engineering has opened new premises in Coventry and expanded its workforce as a result of HS2. It provides specialist geotechnical, environmental and site investigation services, such as the ground investigation surveys used by civil engineers.

6. Zappshelter, Perthshire

Zappshelter supplies weather-proof storage shelters for HS2. The shelters are an alternative to the more costly option of building traditional storage facilities to protect machinery and materials.

7. EAVE, London

Ear defender manufacturer Eave used HS2's London construction sites to test the latest version of its hearing protection technology. Eave's solution uses a digitally-enabled headset that protects hearing and gathers noise data.

8. Expanded, Nottinghamshire

Expanded helped develop the Interchange station site in Solihull using its innovative modular manufacturing technology to build four bridges. The structures were manufactured offsite in Worksop.

9. CLM, West Midlands

Currall Lewis and Martin (CLM) has a proud history dating back to 1867. The Oldbury-based business poured the first structural concrete for HS2 – to build a bat house that provides new roosts for the protected species.

10. Booth Industries, Lancashire

Booth Industries in Bolton won a £36 million contract to supply more than 300 high-pressure doors on tunnels between London and Crewe. The project created 50 skilled jobs.

11. Crowders & Sons, Lincolnshire

Crowders Nurseries won the contract to grow seven million native trees and shrubs for new woodland habitats along HS2's Green Corridor. The 10-year contract is the largest in the family-owned firm's history.

12. Wernick Group, Port Talbot

The Wernick Group, founded in 1934, is the largest independent manufacturer of modular buildings. The company manufactured and installed office and welfare accommodation for main works contractor Align at its key construction site near the M25.

13. FiveRivers Environmental Contracting, Wiltshire

Specialising in ecological projects, FiveRivers secured over £4 million of work developing new aquatic areas, natural grasslands and translocating, or moving, habitats along the Phase One route. The company started working on HS2 in 2017 and has subcontracted £1.5 million worth of contracts in its supply chain.

Health, safety and security

Safety is one of our core values. It goes to the heart of everything we do and it cannot be compromised as we strive to create an environment where no one gets hurt.

During 2021, there was a significant increase in the number of hours worked from 30 million to more than 40 million as main works intensified along the West Midlands – London route. The increase of about a third in ‘hours worked’ came as the challenges of working safely during the pandemic remained.

Like all major construction projects, health and safety risks increase in line with the volume and intensity of the work being carried out and HS2 has seen a rise in safety-related incidents. We track our Accident Frequency Rate (AFR) which allows us to benchmark our performance with others and we are recording an industry-leading AFR of 0.05.

Following a year-on-year achievement of the HS2 Health and Safety Performance Index (HSPI), 2021 – 2022 saw a new set of the HSPI developed and released. This sets a more challenging benchmark to meet the levels achieved in previous years.

Given the challenges we have faced and our performance, we are disappointed not to achieve the ‘stretching’ HSPI score of 2.2. However, this has highlighted areas we can improve and this will drive our actions for 2022 to 2023.

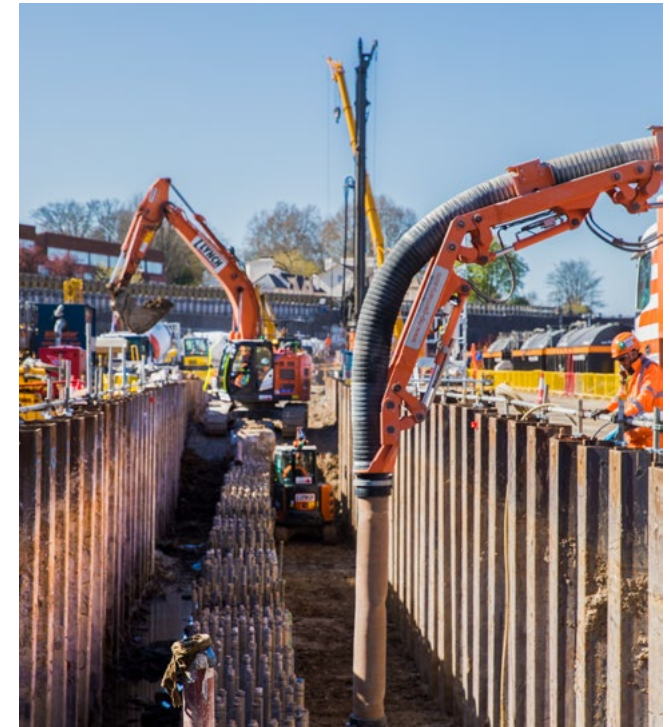
Health, safety and wellbeing

We have increased our focus on occupational health and wellbeing with the ‘Health by Design’ challenge, showcasing case studies across the programme. The Health Exposure Monitoring System trial started and we are researching psychological safety.

To help staff during Covid-19, we ran 63 wellbeing webinars focussing on mental, physical, financial and social wellbeing. Four ‘Get active’ programmes promoted ways to improve physical activity for staff affected by Covid-19 and resilience sessions were offered to support staff with change. Working with the supply chain, we produced new guidance and best practice standards for staff working from home and updated this for hybrid working.

The Safety, Health and Wellbeing Leadership Team (SHWeLT) has developed minimum standards for managing key risk areas covering ‘Plant and People Interface’, ‘Service Avoidance’ (covering underground and overhead utilities), and ‘Lifting Operations’. We mapped common risk areas and shared best practice with the supply chain.

The development of ‘zero trim piles’ by SCS joint venture shows how HS2 is innovating to eliminate or significantly reduce risk to workers. The new vacuum excavation technique removes the need for works to ‘break out’ the excess concrete, which causes health problems including hand-arm vibration syndrome and hearing loss.



The zero trim piling technique, using a vacuum excavator, is safer for workers.

Health, safety and security continued



Construction work at Old Oak Common station in west London.

Technology is being used to minimise risk when plant and equipment is moved onsite. Artificial Intelligence systems, sensors worn on the body and 'in-cab' fatigue monitoring equipment are being trialled.

We are boosting safety awareness as the supply chain increases by using actors, role play and immersive engagement techniques during onboarding and inductions. BBV joint venture has set up a training skills centre to provide safer outcomes, delivering onsite upskilling and addressing the industry skills shortage.

HS2 has built a strong safety culture. We have piloted a safety climate tool (SCT), designed by the Health and Safety Executive. SCT showed we ran a baseline measurement in the 95th percentile for our main works and stations compared with other projects nationally. We repeated the process in spring 2022 across the whole programme and the results are being used to develop our safety culture.

We ran internal health and safety transformation workshops for main works partners and HS2's integrated project teams for stations. We have shaped leadership behaviours to keep safety at the top of the agenda.

Security and illegal protester activity

Security Incident Response Teams are now part of our proactive security provision and this has improved our response time and reduced programme delays. There is a framework to manage our fellow Civil Contingency Act responders. Partnership groups have been set up along the route and we have a presence on ResilienceDirect. This has increased our preparedness for a multi-agency incident response and we run emergency exercises involving both 'blue lights' and local authorities at operational, tactical and strategic levels.

Alongside Covid-19, safety was our overriding concern as we dealt with increased protester activity and a rising number of violent crimes. In 2021, we responded to 318 reports of protest and trespass on Phase One compared with 418 in 2020, a fall of 24%. During 2021, incidents of criminal damage decreased to 158 compared with 180 in 2020, a drop of 12%. However, physical assaults increased from 17 to 25.

The lessons we learned during the safe removal of protesters from a makeshift tunnel at Euston last year were used successfully to end illegal activity at Small Dean, Buckinghamshire.



Innovation: cleaner, faster, smarter

HS2 is at the forefront of innovations in the design and construction of high-speed railways. The technologies we are developing are setting new standards for cutting energy consumption, reducing emissions and driving efficiency.

We have more than 150 projects in our portfolio, which saved £150 million in capital expenditure during 2021 – 2022. In the long-term, we estimate innovation will save the British taxpayer more than £2 billion over the lifetime of the project.

We need to engage effectively with the HS2 supply chain and make sure innovation is integrated in our culture. Our first Innovation Engine Week allowed us to share ideas on how we can build the railway cleaner, faster and smarter. More than 1,100 people from the supply chain and HS2 Ltd attended over 20 events.

We have now launched the third and fourth cohorts of the HS2 Innovation Accelerator programme and the fifth is due to follow in September 2022 as we continue to focus our work with small and medium-sized enterprises (SMEs) and start-ups. To date, the programme has received more than 300 applications, accelerated 15 start-ups, approved 15 pilot projects and received over £50 million in investment funding.

To ensure we create an innovation legacy, we are engaging partners across the rail and construction industries and academia on HS2 projects. We have accelerated 10 SMEs in collaboration with Innovate UK this year and four of them have secured further projects with our supply chain.

We have developed an innovation portfolio with 20 of the UK's leading universities, working with the UK Rail Research and Innovation Network (UKRRIN) and the UK Collaboratorium for Research on Infrastructure and Cities (UKCRIC).

In June 2022, we supported the World Congress on Railway Research in Birmingham in collaboration with the University of Birmingham with a focus on innovation projects. We will run a Small Business Research Initiative competition with Innovate UK in partnership with National Highways and Network Rail in September.

During 2022 – 2023, the innovation team will launch the Horizon 3 Futures programme to understand the implications from global mega-trends and the underlying trends affecting the design, construction and operation of HS2. We will publish a Future Scenarios report capturing what the future might look like and a Roadmap of Actionable Outcomes.

Our Innovation portfolio will continue to drive value in cost and cutting carbon emissions. Project showcases for main works stations are planned and we will lead on automation projects in installing and embedding innovation in the rolling stock contract. We also plan to run the first semi-autonomous plant trials alongside other 'first of a kind' projects with main works and station partners during 2022 – 2023.

Innovation: cleaner, faster, smarter continued

How innovation is changing the way we work

Projects in the HS2 innovation portfolio have won industry awards and featured at UK conferences. Here are some of our inspiring innovations.

🔍 Case studies

Building blockchain

Using blockchain, smart contracts and other technologies to increase trust, efficiency and value in our procurement pipeline has a projected benefit of £6 million. We presented this innovation at TechFest 2021.

Try before you build

An award-winning passenger experience project has helped us to test how passengers will navigate their way around the new HS2 station at Old Oak Common. It used a world-first virtual reality, eye-tracking and emotion-sensing technology.



New technology is being used to enhance the passenger experience at HS2 stations.

'Printfrastructure'

In a major step forward for construction technology, SCS JV is using an onsite, 3D reinforced concrete printing technology during HS2 works in London. Known as 'printfrastructure', this cutting-edge technology has not been used in the UK before and is set to provide environmental, cost and community benefits.

Sentry work study

Sentry is a highly accurate work study tool that combines worksite cameras with an intelligent metrics-gathering process. Our partner BBV has tested the technology on its works at the northern end of the Phase One route. It could provide efficiencies of £7 million and will roll out across the programme.

VR safety training

It is difficult to prepare people for potentially dangerous situations until they have been in one. Virtual reality (VR) can bridge the gap, as proven by our Zero Harm project. Construction partner BBV used VR technology from 3D Repo to create an immersive experience for people working on sites. The training prepares people for a range of scenarios and prevents serious incidents.

Phase Two

We are reaching important milestones in the planning, preparation and advance works for Phase Two as we look to extend the benefits of HS2 further north.

Preparatory works are underway on the Phase 2a line, which will take HS2 from Birmingham to Crewe. We have also deposited the hybrid Bill for the Phase 2b Crewe – Manchester scheme with two new stations planned at Manchester Airport and Manchester Piccadilly.

Phase 2a

The High Speed Rail (West Midlands – Crewe) Act gained Royal Assent in February 2021. The 36-mile route takes HS2 to Crewe, one of Britain’s historic railway towns and principal rail hubs, and represents the first new intercity railway built in the North of England for over 100 years.

The proposed hub at Crewe will see £180 million of investment and regeneration in the town itself, and spread HS2’s benefits to all points of the compass. Heading north, HS2 trains will continue to destinations such as Liverpool, Preston, the Lakes, Carlisle and Scotland. Going south, HS2 trains will connect to the West Midlands and London. Crewe also offers connections west to Chester and North Wales, Shrewsbury and South Wales as well as local links east to Sandbach, Manchester and Stoke.

We have been refining the design of Phase 2a, seeking the best route alignment, the best value for money and the best connections at Crewe. This has given us a ‘configured’ design that can be developed into a detailed scheme design including two tunnels, 17 viaducts and 65 bridges.

Construction of Phase 2a will support around 6,500 jobs and a maintenance base, to be built at Stone, will create 140 permanent jobs.

We have worked closely with Network Rail to form a joint programme team focused on Crewe. This will align renewals work on the existing railway line with the works being undertaken for Phase 2a. Working together has allowed us to improve the design of the station layout in response to local concerns, reduce overall disruption from the works and improve value for the taxpayer.

We are now working with Network Rail to see whether we can realise similar opportunities north of Crewe for Phase 2b.

Early works are underway to prepare the ground for the construction of the high-speed railway. Our ground investigations programme for Phase 2a is nearly complete, with only a few sites remaining. The information gathered from more than 1,200 sites will be used by our engineers to further develop the design of HS2.



Andrew Stephenson, then HS2 Minister, unveiling the HS2 plaque at Crewe station.



Crewe station.

Phase Two continued

The contract for early environmental works was signed in April 2021 and Balfour Beatty is creating hedgerows, woodlands and wetland habitats, working on landscape mitigation and carrying out archaeological investigations.

In April 2021, Kier began advanced civils work including strengthening the road network in Staffordshire and building a new bridge over the M6, near Stone.

In 2022, we will award a further contract to carry out advanced civils works. This will feature building haul roads and temporary bridges as well as site clearance and moving wildlife species and plants to new homes.

We have issued the tender for a design and delivery partner to manage the detailed design and construction of Phase 2a, working with our construction partners. Bidders were shortlisted in October 2021 and we expect this £500 million contract to be awarded in September 2022.

The tender for main works went through market engagement in March 2022. The responses will be considered in the final scope of the procurement before going through governance, tender and award of the framework in autumn 2023. Earthworks are expected to begin in 2024.

Phase 2a remains on track for delivery into service between 2030 and 2034.



Phase Two continued

Phase 2b

The Government's Integrated Rail Plan (IRP) was published in November 2021. The plan outlines how major rail projects will be delivered so communities, towns and cities across the North and Midlands are better connected. It sets out proposals for high-speed rail from Crewe to Manchester with new stations at Manchester Airport and Manchester Piccadilly.

The IRP also proposes taking HS2 from the West Midlands to East Midlands Parkway (HS2 East), about six miles south-west of Nottingham, as well as a new high-speed line between Warrington, Manchester and Yorkshire, known as Northern Powerhouse Rail.

Following publication of the plan, we deposited the Phase 2b Crewe – Manchester hybrid Bill and the accompanying Environmental Statement in January 2022. This marked the start of the Parliamentary process to secure powers for the construction and operation of the line between Crewe and Manchester. The new railway will cut the journey time between Manchester and central London to 1 hour 11 from 2 hours 5 minutes – and Manchester to Birmingham will take 41 minutes compared with 1 hour 27 minutes today.

We have contacted 148,000 addresses about the hybrid Bill deposit and the start of the consultation and petitioning process. We have also deposited the 11-million word, 36,000-page document at 170 locations around the country for the public to access. It has also been made available in digital and physical formats and includes short, non-technical summaries.

Learning from our work on the Historic Environment Research and Delivery Strategies (HERDS) for Phase One and Phase 2a, we have started engaging with stakeholders on the Phase 2b HERDS much earlier. We have staged interactive, online workshops with key local authority and Historic England specialists together with community groups, contractors and academics to build understanding of HS2's historic environment work.

Ground investigations have started along the route and we are planning a further programme, beginning in autumn 2022, to deepen our understanding of ground conditions. The opening of the route to Manchester remains in the schedule range of 2035 to 2041.

Planning will continue during 2022 and 2023 to develop the HS2 line from the West Midlands to East Midlands Parkway. The work will prepare for a future hybrid Bill. Planning will continue for the new Northern Powerhouse Rail lines over the next three years.



HS2 public information event in Manchester.



HS2 map technology in use at an event in Manchester city centre.



Part Four

Key Performance Indicators (KPIs)

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Image: Concrete ring sections for the Chiltern tunnel.



Key Performance Indicators (KPIs) 2022 – 2023

The table below presents our Key Performance Indicators for 2022 – 2023, as agreed by the Department for Transport (DfT) in June 2022.

In accordance with the Framework Document, progress against our KPIs will be regularly assessed and shared with the Government's dedicated HS2 Minister.

Our progress will also be reported quarterly in an HS2 Client Report, shared with the DfT, as well as via monthly review meetings between the department, Ministerial staff and our Board.

Category	Indicator	Target
1 Are we safe?	Safety, Health and Wellbeing Performance	Improve Health & Safety Performance Index (HSPI) score to ≥ 2.20 .
2 Are we on time?	Phase One Progress	Delivery Into Service (DIS) Target Date maintained. Achieve the key Phase One delivery milestones for 2022/23.
3 Are we on time?	Phase 2a Progress	Achieve the key Phase 2a delivery milestones for 2022/23.
4 Are we on time?	Phase 2b Progress	Outline Delivery Strategy for Phase 2b to be agreed by the HS2 Ltd Board by end of December 2022.
5 Are we on budget?	Phase One Cost Performance	Current Observable Cost (Tangible Risk) below Target Cost.
6 Are we a good neighbour?	Environmental Performance: Biodiversity	Realise No Net Loss (0%) in biodiversity across Phase One by end of March 2023. Forecast 5% improvement in biodiversity against the baseline for Phase 2a design and delivery contracts by end of March 2023.
7 Are we a good neighbour?	Environmental Performance: Carbon Emissions	Forecast 28% reduction in carbon emissions against the carbon baseline for Phase One by end of March 2023. Achieve a 40% reduction in corporate carbon generation by end of March 2023.
8 Are we a good neighbour?	Community Experience	Resolve 80% of construction queries and complaints within 2 working days of them being reported to the HS2 Ltd Helpdesk.
9 Our organisation	Equality, Diversity and Inclusion (EDI)	Maintain the EDI balance for HS2 Ltd employees at 40% Women and 23% BAME representation.

HS2

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