HS2

# Environmental Sustainability Progress Report

April 2020 – March 2021

# Introduction

## Welcome to HS2 Ltd's first Environmental Sustainability Progress Report, which looks at how we performed from April 2020 to March 2021.

Our commitment to environmental sustainability has underpinned the Project since we started planning Britain's high-speed rail network in 2009. It guided the way we selected and designed the Phase One route between the West Midlands and London – and it guides us today.

Phase One main works civils contracts, or main works, started in 2020 and Parliament approved the construction of Phase 2a, north of Birmingham to Crewe, in 2021. A major contract for Phase 2a early environmental works has been awarded and we are preparing legislation to build the Phase 2b western leg to Manchester. The time is right to assess how HS2 is affecting the environment, how we are reducing our impact and examine our progress in setting and meeting environmental controls.

This report follows the setting up of the HS2 Ltd Environmental Sustainability Committee as a Board sub-committee and reflects the growing scale of our work and the breadth of our environmental responsibilities. It examines our progress against five key objectives and highlights areas where we have fallen short. We will use the lessons we are learning to drive improvement.

We have prepared this report with reference to Global Reporting Initiative (GRI)[1] Standards, the world's most widely used framework for sustainability reporting. Lloyd's Register (LR) has provided independent assurance with scope limited to selected information and key performance indicators (KPIs). We have provided the assurance statement on **page 64**.

The UN Sustainable Development Goals (SDGs) represent 17 social, economic and environmental priorities, designed to combat our global challenges. We report on the SDGs in line with the Sustainability Reporting Guidance 2020 – 2021 published by the Treasury. Our contribution to the SDGs is featured on **page 60**.

The **Environmental Sustainability Data Appendix** that accompanies this report examines our data, the environmental indicators, the assurance statement and our GRI Index.

We are looking at ways to enhance our environmental sustainability reporting and invite you to share your views on this report **here.**

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**Front cover image:** HS2 environmental works near Kenilworth in Warwickshire.

1 **globalreporting.org**

# Reviewing our progress

**Mark Thurston, Chief Executive Officer**

Environmental sustainability has been at the heart of HS2 since the beginning of the Project. Our commitment to reducing the railway's environmental footprint has informed more than a decade of planning, environmental statements, community engagement, petitioning and scrutiny.

HS2 is the most significant economic project of our generation and involves a vast and complex construction programme. HS2 Ltd is responsible for building and promoting the high-speed railway on behalf of the Government.

Phase One is now being built between the West Midlands and London and years of construction lie ahead of us. We also have permission to extend the route north to Crewe, with our Phase 2a hybrid Bill receiving Royal Assent in 2021. Our hybrid Bill for the Phase 2b western leg to Manchester is being prepared to submit to Parliament within the next few months.

This is our first Environmental Sustainability Progress Report, tracking how we have performed between April 2020 and March 2021. It records our achievements and highlights areas where improvements are needed.

Building Britain's high-speed rail network presents unprecedented challenges. They include the environmental sustainability challenge faced by all large infrastructure projects: how we meet the needs of the present and build for the future without compromising the ability of future generations to meet their own needs. For HS2, we need to meet the demands of a complex construction programme while working responsibly to protect the countryside and tackle climate change both now and in the future. This report provides context for our work and an update on our progress.

HS2's benefits for the UK are huge. The new railway will be the spine of the transport network, better connecting our towns and cities, creating and supporting new jobs and boosting economic growth. Transport is the biggest source of greenhouse gas emissions in the UK and HS2 will reduce our reliance on cars, lorries and domestic flights and provide zero carbon travel on the dedicated HS2 network. It will also release capacity on the existing network, making space for more commuter services and freight trains.

Planning a new rail line is incredibly complicated and more than 20,000 people are now working on the Project. Contractors are working at hundreds of sites on our early works, Main Works and stations programmes. More than half of Phase One is in tunnels and cuttings but it is inevitable that we will have to clear some land to make way for the new route. Of more than 52,000 ancient woodland sites in England, the route between London and Crewe will affect 43. We remain mindful that we need to work respectfully, moving and protecting wildlife habitats and minimising our impact on woodlands where possible. As a result, about 80% of the 43 sites affected by HS2 will remain untouched.

# Reviewing our progress

While HS2's operational footprint will be just 18 metres across in places, the effect of construction on flora, fauna, landscapes and communities along the route is significant. The HS2 Green Corridor will conserve, replace or enhance the landscape and biodiversity along the railway.

So far, we have planted more than 700,000 trees and shrubs along the route and will plant seven million in total on Phase One alone, leaving behind 30% more wildlife habitats than before. About 92 hectares of new woodland have also been created through the HS2 Woodland Fund.

While we have made good progress so far, it is clear that there is still work to be done to cut the railway's impact on the environment and we must learn from situations where we could have done better. Although we are not yet hitting our targets for no net loss on biodiversity for Phase One, this report outlines the work we are doing to make sure that any losses are matched by equivalent gains as we continue towards our goal. We are also working to improve our performance and investigating ways to achieve biodiversity net gain for our Phase 2b western leg.

We must tackle the carbon emissions involved in building HS2. These represent a small proportion of Britain's carbon budget but we must continue to work with our supply chain and the wider industry to better address and reduce our carbon emissions. We are carrying out exciting work in this field and we are examining proposals that will have a profound effect on our emissions targets and energy use. Our ambitions will build on technology we are already using 'on the ground' such as the zero-carbon electricity that is powering our tunnel boring machines as they construct a 10-mile tunnel under the Chilterns.

With main construction well underway on Phase One, the impact of our building work is now a daily reality for many, with construction-related traffic, noise and disruption being the cause of most complaints to our Helpdesk team.

We continue to work with communities to minimise the effects of construction, but it is clear there is more to do to make sure we consistently meet the standards local residents and businesses deserve.

In the same way that we are seeking to work better with local communities, we also need to engage more effectively with non-governmental organisations and other stakeholders to find the best environmental solutions. I'm pleased that our recent engagement with the Woodland Trust will help bring a greater focus on our plans for each ancient woodland site.

The UK's 2050 net zero target and the Government's drive to lead the world in ending our contribution to climate change came into sharp focus at COP26 in Glasgow. HS2 will be part of the solution – not only playing its part in decarbonising our transport system but in setting new standards on sustainability for global infrastructure projects.

Our Environmental Sustainability Committee is looking at ways to improve our environmental response and work with our partners to cut carbon emissions as we build HS2. We are publishing our **Environmental Sustainability Vision** and our **Net Zero Carbon Plan** together with this report. They will be followed in 2022 by HS2's Biodiversity Plan. Taken together, these key documents explain the work we have undertaken to date and our ambitions for the future as we build a climate resilient high-speed railway. We know that we can make further improvements and we are committed to leaving a legacy that will set new standards for cleaner construction and greener travel.

**Mark Thurston**
Chief Executive Officer

# About HS2

## Britain's high-speed railway

HS2 will be the spine of a new low-carbon rail network for the UK, offering zero carbon journeys. The dedicated line for high-speed, intercity travel will increase rail capacity on the existing network – and combat congestion – by freeing up space for local trains, commuter services and rail freight.

HS2 will help to rebalance the economy by better connecting our regions, linking London, the Midlands, the North and Scotland.

At peak construction, Phase One, Phase 2a and Phase 2b to Manchester are set to support more than 34,000 jobs.

## Phase One

The 140-mile Phase One route between London and the West Midlands is already being built. High-speed trains will travel between a new HS2 station at Euston and a new HS2 terminus at Birmingham Curzon Street in just 45 minutes. Phase One continues onwards and links to the West Coast Main Line (WCML) at Handsacre, Staffordshire. We are building more than 32 miles of tunnels to reduce the railway's impact on the natural environment. We are creating more than 33 square kilometres of new woodland, wildlife and river habitats. The route is due to open between 2029 and 2033.

## Phase 2a

Phase 2a was approved by Parliament in 2021 and will extend HS2 from Fradley, Staffordshire – north of Birmingham – to Crewe. The 36-mile route will support 6,500 jobs and connect with the WCML south of Crewe. The contract for early environmental works has been awarded.

## Phase 2b

Phase 2b will be built in two sections. The western leg will connect Crewe and Manchester, with a link to the West Coast Main Line, for trains to Scotland. Subject to consultation, HS2 East will connect Birmingham and the East Midlands, linking to the Midland Mainline near East Midlands Parkway. Trains will continue to Nottingham, Derby and Sheffield on an upgraded and electrified Midland Main Line. The Government is also looking at the best way to run HS2 trains to Leeds.

For more information about HS2 and each phase please visit our **website**.

# About HS2

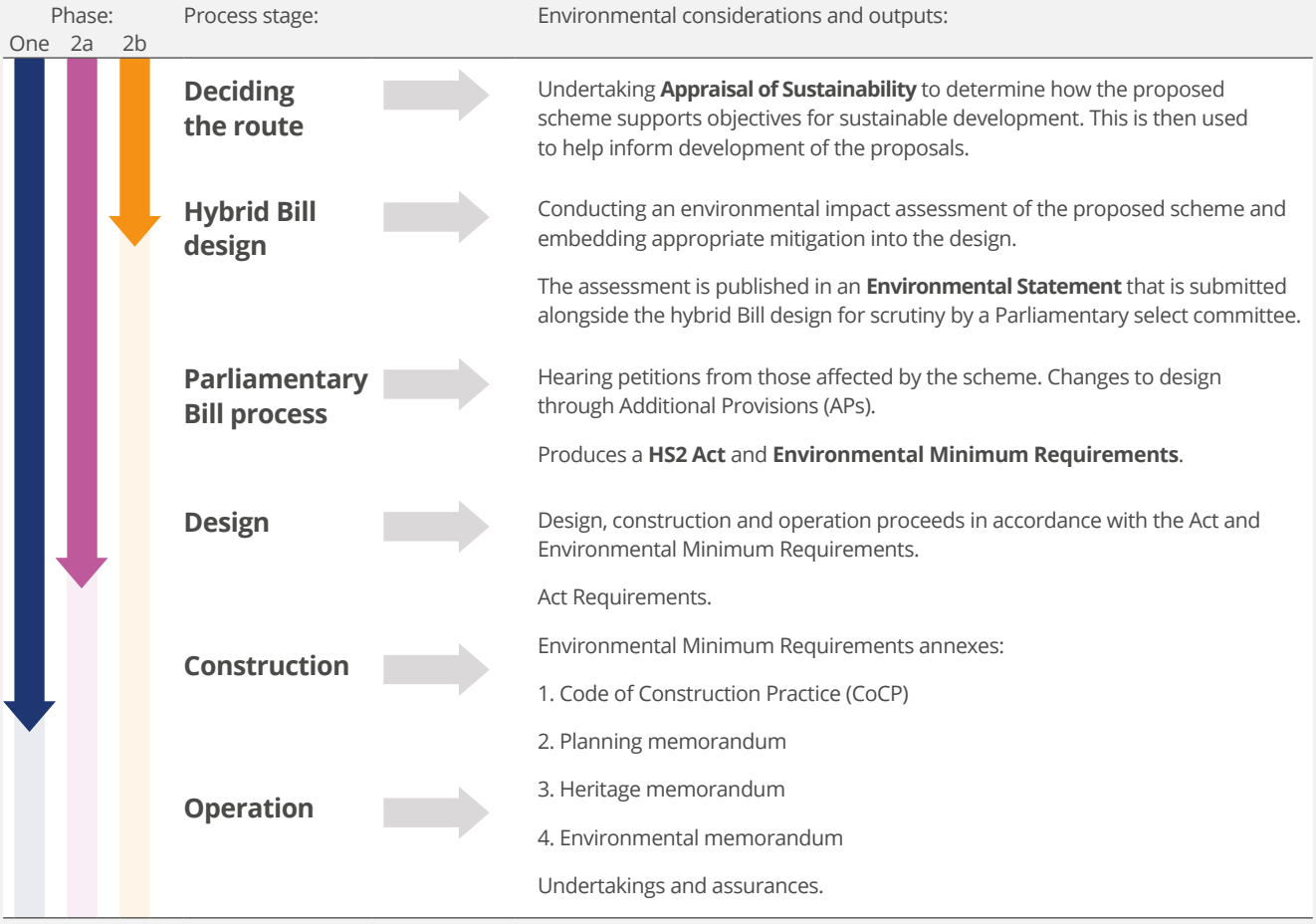
## Environmental sustainability is at the heart of HS2

Environmental sustainability has informed the Project from the start. It shaped our choice of route, which was subject to public consultation and has been modified to reduce the railway's effect on the natural world. Environmental sustainability guides our final design, the way we build, the materials we use and the proposed operation of HS2.

The graphic below illustrates how we consider and adopt environmental sustainability at every stage of the process, from deciding the route to the construction and operation of the railway. Our work is mapped against each stage of the Project's three phases – Phase One, 2a and 2b.

Each phase has to be authorised by an Act of Parliament. Draft legislation – in the form of a hybrid Bill – together with an Environmental Statement (ES) are considered through Parliamentary select committees. Our work has benefited from scrutiny by Parliament since the High Speed Rail Command Paper was presented in 2010. The hybrid Bill process, which we use to present the formal plans to build the railway, allows individuals, community groups and other organisations to petition against the draft legislation and have their case heard at the select committee stage. We are required to follow the arrangements provided in the Environmental Minimum Requirements (EMRs) in designing and constructing HS2.

**Building environmental considerations into all aspects of HS2**



# Global context

## Climate change and the UK's carbon commitment

Climate change is the greatest threat the world faces. Reducing its effects depends on cutting greenhouse gas emissions as soon as possible. The challenge we face was laid bare by the UN's Intergovernmental Panel on Climate Change (IPCC), which noted unequivocally that "human influence has warmed the atmosphere, oceans and land"[1].

Under the Paris Agreement[2], countries including the UK are committed to limiting global warming to well below 2°C and pursue efforts towards 1.5°C compared with pre-industrial levels. Working toward that goal, the UK was the first G7 economy to put in law a commitment to become a net zero carbon economy by 2050.

Global transport emissions increased by less than 0.5% in 2019 compared with 1.9% each year since 2000. This was due to improvements in efficiency, electrification and increased use of biofuels. However, transport still accounted for 24% of $CO_2$ emissions from fuel combustion. Road vehicles were responsible for nearly three-quarters of these emissions. In the UK, the transport sector is the largest emitter of $CO_2$, responsible for 27% of these emissions[3]. The Government's **Transport Decarbonisation Plan** sets out an ambitious pathway to cutting emissions including supporting the shift to electric transport infrastructure, modal shift to less polluting forms of transport and incentivising public transport.

HS2 has an important part to play as the UK moves to net zero. By offering zero carbon, all-electric travel, the high-speed railway will help reduce the number of domestic flights, take cars off the road and allow more freight to be carried by rail rather than road.

Read more about our work on **climate change**.

## Biodiversity, Nature Recovery Networks and capturing carbon

The value of biodiversity, its central role in supporting human prosperity and the urgent need to conserve and restore it were highlighted in the global review on The Economics of Biodiversity: The Dasgupta Review[3], commissioned by the Treasury and published in February 2021. The Government's 25 Year Environment Plan[4] sets out a programme to leave our natural environment in a better condition than we found it. The plan aims to create new Nature Recovery Networks[5] – a "national network of wildlife-rich places to increase and restore nature".

We recognise that building a high-speed railway of the ambition and scale of HS2 will inevitably disturb the natural environment in places along the route. However, we are committed to minimising disruption to the landscape and wildlife habitats and are committed to maximising the way HS2 can conserve, promote and enhance biodiversity. For Phase One, we will plant seven million trees and shrubs in a green corridor along the railway and leave behind 30% more wildlife habitats than before we started construction.

Improving biodiversity and helping nature to recover is part of the national strategy to 'absorb', or offset emissions, and capture more carbon on the UK's journey to net zero. We are exploring ways the Green Corridor can provide 'nature-based' solutions to capture and store carbon emissions.

Working with the Department for Transport, we are looking at ways to move our scheme for the Phase 2b western leg from no net loss in biodiversity to a net gain.

Read more about our work on **biodiversity**.

1 **ipcc.ch/report/ar6/wg1/**
2 **unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement**
3 **iea.org/topics/transport**
4 **gov.uk/government/publications/25-year-environment-plan**
5 **gov.uk/government/publications/nature-recovery-network**

# Progress on our commitments

# Our commitment to environmental sustainability

## What we mean by environmental sustainability

Environmental sustainability is part of HS2's broader commitment to sustainability. For HS2, this is made up of five key areas, which form our environmental sustainability objectives. They are:

- the HS2 Green Corridor;
- climate change;
- community experience;
- the historic environment; and
- responsible consumption and production.

Environmental sustainability is embodied in our strategic goal: "HS2 will create an environmentally sustainable solution and be a good neighbour to local communities."

## What success looks like

Success means the new railway, stations and supporting infrastructure are designed, built and operated to achieve the highest environmental sustainability standards. It means working towards the UK's 2050 net zero target, minimising HS2's environmental impact and taking action to make sure there is no net loss in biodiversity. The Project will continue to support communities to improve the local environment.

Every aspect of HS2 – the planning, design, construction and operational management – can contribute towards our environmental objectives. We are committed to achieving our environmental sustainability commitments, benefiting passengers, communities and, ultimately, the whole country.

More detailed information on how we approach environmental sustainability, including our governance, how we prioritise different topics, stakeholder engagement and approach to the UN Sustainable Development Goals can be found in the **Our approach** section of this report.

### Developing our environmental sustainability strategy

Environmental sustainability is one of HS2's seven strategic goals.

**Strategic goal:** HS2 will create an environmentally sustainable solution and be a good neighbour to local communities.

This goal is underpinned by three strategic objectives.

- To design every part of HS2 and its service to be sympathetic to the people and places HS2 affects and to stand the test of time.
- To communicate with neighbours and interest groups to minimise the impact of HS2 construction and operation on people and the environment.
- To design, construct and operate HS2 to reduce carbon and promote sustainably sourced resources.

Our five environmental policy objectives ensure that we deliver our sustainability strategic goal and objectives.

- HS2 Green Corridor
- Climate change
- Community experience
- Historic environment
- Responsible consumption and production

# Our environmental sustainability objectives

HS2 will play a key role in the UK's drive to build back better and greener. As a publicly funded project, we are committed to working in an environmentally sustainable way that offers value for money to the taxpayer. We also have a responsibility to make good – and learn from – any work where we fail to hit the high standards we aspire to.

The legislation that gave us permission to build Phase One and Phase 2a – and that we will seek for the Phase 2b western leg to Manchester – requires us to meet strict environmental standards. But our objectives allow us to go further, reducing our impact on the environment as much as we can and bringing long-term environmental benefits.

## The foundation of our environmental sustainability objectives

### Legislation

The legislation for HS2 sets out environmental requirements and standards that the Project must follow. For example, it provides a mechanism for local authorities to review specific elements of the scheme, such as viaducts, earthworks and landscaping proposals. We must produce an Environmental Statement, which identifies the likely significant environmental impacts along the route and the steps we intend to take to reduce them. As the legislation passes through Parliament, there may be changes to the scheme in response to petitions from individuals or organisations.

### Environmental Minimum Requirements

The HS2 Environmental Minimum Requirements (EMRs) are legally binding documents that accompany the legislation for each phase of HS2. There are EMRs for Phase One[1] and Phase 2a[2]. They include general principles: a Code of Construction Practice that contractors must follow; requirements for planning, heritage, and the environment; and undertakings and assurances, which are commitments made to various parties during the passage of the legislation for HS2. The EMRs set demanding minimum standards and push the Project to reduce environmental impacts further. These requirements also include a commitment to use recognised rating schemes for design and construction.

### Our Development Agreement

Our Development Agreement with the Secretary of State for Transport requires us to follow the rail industry's sustainable development principles and minimise adverse environmental impacts where they cannot be avoided.

### Our performance requirements

We set performance standards for our supply chain partners to make sure the high-level environmental requirements are met and that we achieve our environmental sustainability objectives. Our supply chain partners work with us to build the railway in a way that delivers environmental benefits to each community and the UK as a whole. We monitor our suppliers' performance through technical documents, technical assurance and reporting.

1 **gov.uk/government/publications/environmental-minimum-requirements**
2 **gov.uk/government/publications/environmental-minimum-requirements-for-hs2-phase-2a**

# Our environmental sustainability objectives

This progress report explores our five environmental sustainability objectives and looks at how we have performed. It examines how we work with our employees, contractors and the wider supply chain to make sure our objectives are met. They encompass the legislation and requirements outlined in this section, as well as our approach to different environmental sustainability topics, such as 'net change in biodiversity' and 'air quality', that we have identified in our **materiality assessment**.

For each objective, we set out our management approach, key activity and our performance for 2020 – 2021.

In addition, some environmental requirements are not specific to one single objective. We call these our **overarching environmental commitments**.

## HS2 Green Corridor

- **landscape design**
- **biodiversity and ecology**
- **ancient woodlands**
- **water**

## Climate change

- **carbon**
- **adaptation and resilience**

## Community experience

- **air quality, noise, traffic and transport**
- **flooding**
- **Community Environment Fund (CEF) and Business and Local Economy Fund (BLEF)**

## Historic environment

- **built heritage**
- **archaeology**
- **historic landscape**

## Responsible consumption and production

- **material efficiency, waste and circular economy**
- **responsible sourcing**


## Overarching commitments

- **BREEAM**
- **CEEQUAL**
- **environmental opportunities realisation process**

# At a glance: our performance 2020 – 2021

**703,950***
trees successfully planted during the construction of HS2

**1**
new tree planted for every tree that doesn't grow

**52***
hectares of ancient woodland restored through our Woodland Fund

**92***
hectares of new woodland created through our Woodland Fund

**6**
letters from regulatory bodies for failing to perform to expected environmental standards

**512**
complaints about traffic and transport

**293**
complaints about noise and vibration

**3.17%***
short of our biodiversity baseline, or target, for Phase One

**94.6%***
excavated material beneficially reused for Phase One

**97.1%***
construction and demolition waste diverted from landfill for Phase One

**99.8%***
proportion of cranes, dump trucks and excavators meeting our emissions standards

* Data with an asterisk (*) has been externally assured. All data without an asterisk has not been externally assured and is an internal calculation based on data provided by our supply chain.

# At a glance: our performance 2020 – 2021

**£2 million**

Biodiversity Investment Fund launched for Phase 2a

**£5 million**

Woodland Fund for Phase One for creating and restoring woodland up to 2023


**100%***

of concrete and steel responsibly sourced for Phase One

**99.9%***

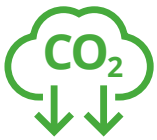
of timber responsibly sourced for Phase One


**12.2%***

of felled timber reused for high-value purposes

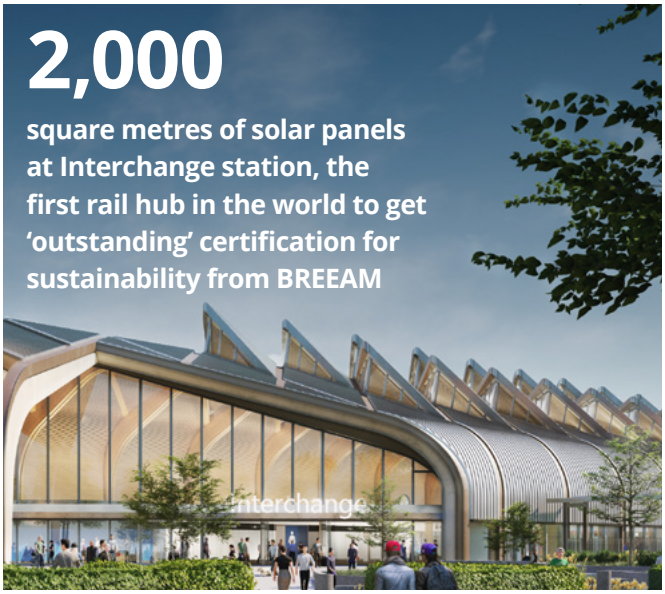

**2**

we are only the second client organisation in the world to achieve PAS 2080 for carbon management in infrastructure




**127**

hectares of new chalk grassland, woodland and wetlands being created on the edge of the Chilterns




**2,000**

square metres of solar panels at Interchange station, the first rail hub in the world to get 'outstanding' certification for sustainability from BREEAM

* Data with an asterisk (*) has been externally assured. All data without an asterisk has not been externally assured and is an internal calculation based on data provided by our supply chain.

# Progress on the HS2 Green Corridor

## Our commitment

Create a green corridor for nature and people that will conserve and enhance habitats and seek to achieve no net loss in biodiversity whilst designing mitigation and compensation measures to integrate into the character of the landscape[1].

**Related UN Sustainable Development Goal (SDG):**


1 This commitment reflects our environmental policy for the reporting period 2020 to 2021.

## Topics in this section:

→ Landscape design
→ Biodiversity and ecology
→ Ancient woodlands
→ Water

# HS2 Green Corridor
## Introduction

HS2 is a huge construction project and we are committed to reducing our environmental footprint as we build the railway. One of the key ways of doing this is creating the Green Corridor along the Phase One route between the West Midlands and London. We have already started this work. We are planting new trees, shrubs, grasslands and meadows and we are creating new habitats for wildlife alongside the climate-resilient rail network. We want to nurture new green spaces where nature can flourish and that local people can enjoy for generations to come.

HS2 will produce long-term environmental benefits as a low-carbon, city-to-city transport network moving millions of passengers safely and in comfort. But there is an environmental cost to the work and our challenge is to make sure the mark we leave on the natural world is as small as possible. Unfortunately, a small but important area of ancient woodland will be lost. There are more than 52,000 ancient woodland sites in England, and HS2 will affect 43 of them on the route between London and Crewe. These sites are part of Britain's ecology and they are irreplaceable. Of the 43 sites, 80% will remain intact and we are doing everything we can to make up for the loss.

Ancient woodlands make up less than 0.3 square kilometres of the 3.8 square kilometres of woodland that may be affected by our Phase One works. However, we are creating more than 9 square kilometres of new woodland alongside the railway as part of the Green Corridor between London and Birmingham.

We understand why people are upset and distressed when we fell trees, even though we make sure we follow the correct legal requirements. For example, some trees needed to be cleared in Leather Lane, Great Missenden because they lay in the path of the new railway. When we felled an ancient Cubbington Pear tree in Warwickshire, we took cuttings to grow more than 40 saplings from this landmark tree.

Together with modern, sustainable design, the Green Corridor is one of the key ways we will help to integrate HS2 into the landscape. We will use the lessons learned from Phase One to enhance the Green Corridor along Phase 2a and Phase 2b to Manchester. Our activity will contribute to the Government's 25 Year Environment Plan[2].

### Reducing our 'footprint' and promoting partnerships

We are building more than half of the Phase One route – 76 miles – in tunnels or cuttings, which limits the visual impact of the railway and noise from trains. We are working to enhance the landscape near the railway in both rural and urban areas to reduce the loss of natural habitats. Where we cannot do this, we will replace lost habitats with new habitats.

Working with our funding partners and communities along the route, we are supporting a range of environmental projects and encouraging people to tell us about new ones. Some of the projects are small-scale and quick to deliver. Others will take years to complete. Together, they will expand the Green Corridor beyond HS2's immediate footprint and beyond what we could deliver alone. They will create new woodlands, diverse habitats and community green spaces.

The Green Corridor is overseen by a working group that includes **Natural England**, the **Forestry Commission**, the **Environment Agency**, the **Canal & River Trust** and the integrated project teams building Phase One. This group reports to an assurance body, which provides governance. The team responsible for the Green Corridor produced a **Green Corridor Prospectus** and a **mapping tool** in December 2020.

2 **gov.uk/government/publications/25-year-environment-plan**

# HS2 Green Corridor
## Landscape design

Landscape design is informed by the complex relationship between people, place and time and it is a fundamental part of our Green Corridor policy. Our vision is to develop 'regenerative' landscapes and cityscapes, which aim to restore the environment and contribute to a sustainable and resilient future. The new landscapes, public spaces and places we create will also be a catalyst for economic growth, supporting jobs throughout the UK.

### How we work

Our approach to landscape design is divided into four stages.

- **Research** – we build an understanding of the historic character, unique patterns and subtleties of the landscapes which HS2 passes through. Design strategies are site-specific and fall into one of five categories: conserve; enhance; restore; transform; or celebrate.
- **Design** – designers work with project teams and use information from community and stakeholder consultation to develop an integrated landscape design.
- **Delivery** – this stage includes manufacturing, construction, testing and commissioning.
- **Management and maintenance** – this ensures designs fulfil their intended roles and meet the requirements set out in our **Environmental Statement.**

Our approach to landscape design is described in more detail in the **HS2 Landscape Design Approach document**.

### What we are doing

We promote good design as a catalyst for growth. This means that it should have economic, social and environmental benefits as well as being aesthetically pleasing and be in line with high-quality build standards.

We understand sustainable and environmental issues are a key concern for local planning authorities and the wider public. It is important that we develop a design that meets social, environmental and economic objectives.

### Case study

#### Edgcote viaduct

The Edgcote viaduct will carry HS2 across the floodplain of the River Cherwell, south of Chipping Warden, Oxfordshire, passing close to a War of the Roses battlefield site. At 6m to 8m high, the 515m viaduct will be supported by 20 pairs of concrete piers. From a distance, the structure will be largely hidden by hedgerows and woodland. The Design Panel said the proposal, including new wildlife sites for birds, bats and newts, is thoughtful and suits the sensitive heritage context of the 1469 battlefield site and Edgcote House.

We have clearly communicated this through public engagement events and submitting detailed applications, as required under the Phase One legislation, to planning authorities.

### How we are doing

The independent HS2 Design Panel, set up at the request of the Department for Transport in 2015, offers impartial expert advice to make sure we produce outstanding design. The HS2 Design Vision sets out nine principles centred on three themes: People, Place and Time. The panel uses the Design Vision to help our leadership team, project teams and other partners to make the right design choices and hold us to account.

In the last year, the Design Panel met 70 times to discuss areas including stations, main works, rail systems and governance.

# HS2 Green Corridor
## Biodiversity and ecology

The loss of biodiversity is of global concern. The Government's 25 Year Environment Plan[3] includes action to address this and the Environment Act aims to mandate a net gain in biodiversity as a condition of planning permission in England. Biodiversity is protected by law through legislation including the Wildlife and Countryside Act and Conservation of Habitats and Species Regulations.

HS2 will disrupt some habitats and wildlife; but we are working hard to minimise the disruption and we are using HS2 as an opportunity to enhance biodiversity, both along the route and in the wider landscape. We have a target of no net loss of biodiversity. Working with specialist ecologists and different partners, the Project can create benefits that extend beyond its original footprint, creating bigger habitats. As HS2 is built, we are planting trees, creating new habitats and adding new features for wildlife, creating a positive environment for flora and fauna. Where it is not possible to avoid disturbing protected species, we apply for licences so the work can be carried out legally and safely.

To date, we have planted 786,033 trees and shrubs as part of the seven million we will plant along Phase One, including native species such hazel, hawthorn, oak, blackthorn and silver birch. However, we have faced challenges with our tree planting programme and to date 82,083 trees needed to be replaced. Our planting was hit by the hot, dry summer in 2018 and the loss of our trees was consistent with planting carried out by other projects at the same time.

The Great Crested Newt is a protected species.

**241,302**
trees planted in the 2020 to 2021 planting season.

When trees fail, we replace them in the same location and remain committed to leaving a legacy of seven million trees and shrubs. We have now successfully replanted all failed trees and continue to monitor progress.

### How we work

To measure progress against our no net loss target, we use a biodiversity accounting mechanism adopted from the Department for Environment, Food and Rural Affairs (Defra)[4]. This mechanism scores habitats, showing us how many 'units' of biodiversity there are before the railway is built, and how many need to be in place after construction to meet the target of no net loss. Losses are balanced by gains.

We create ecology site management plans for every area of habitat creation along the route. Each of these is monitored so we can track progress against bespoke ecological site objectives to ensure they hit their targets. Every new habitat is targeted at achieving maximum value and 'habitat of principal importance' status.

Our contractors are required to meet rigorous technical standards for all aspects of our ecological work, such as habitat creation, and monitoring their progress. In many cases, this goes beyond what is required by legal mandates such as protected species licensing.

A dedicated team from Natural England ensures our species licensing is correct and that we are collecting the right information and applying appropriate monitoring.

3 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf**
4 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/490928/No_net_loss_in_biodiversity_calculation_-_methodology_and_results_v2.pdf**

# HS2 Green Corridor
## Biodiversity and ecology

### What we are doing

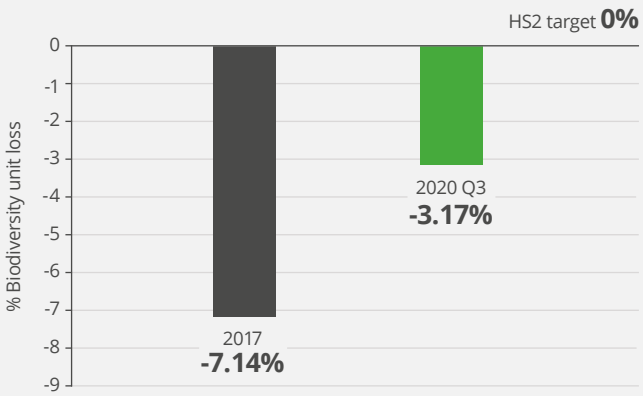
We have collated all the raw biodiversity data that has been collected since the last public data release, which coincided with our **Environmental Statement** for Phase One. This latest batch of data was published in April 2021[5]. We recognise the iterative nature of ecology data collection and aim to publish future biodiversity data on a six-month rolling basis.

Our biodiversity work is characterised by innovation and we actively support developments in ecology through programmes such as our **Innovation Accelerator**. For example, we are using the fast-developing field of environmental DNA to research the success of ancient woodland translocations, in which materials and species are moved to new sites. We are also taking advantage of drone technology to map habitats and monitor the success of rare nesting birds and using biodegradable materials in the design of tree guards and badger setts.

To maximise our progress with biodiversity, we have set up collaboration groups between our different contractors. These groups are a forum for exchanging ideas and innovations to achieve no net loss. Innovations include the Colne Valley Western Slopes project which will contribute to a net gain in biodiversity in the local area, reusing construction materials to create a large area of chalk grassland on the edge of the Chilterns.

In January 2021, we launched a £2 million Biodiversity Investment Fund[6] (BIF) for Phase 2a, engaging with the HS2 Ecology Review Group (ERG), whose members include Natural England, the Forestry Commission and the National Trust. The BIF aims to encourage projects that go beyond our existing HS2 environmental policy commitment of no net loss of biodiversity. It will look beyond the immediate construction footprint and allow us to work with conservation groups to create both new habitats and maximise the value of existing ones. Applicants will be asked to include an outline metric calculation, in line with Defra biodiversity metric guidelines. We meet three times each year with the National Environment Forum, whose members include Historic England, Defra, Department for Transport (DfT), the Environment Agency, Natural England and the Forestry Commission. Recent agenda items have included the rewilding of the Colne Valley and opportunities for biodiversity net gain.

**Phase One – Net change in area-based biodiversity unit calculation**




### How we are doing

We have a target of no net loss of biodiversity (i.e. 0%). This means all biodiversity losses need to be balanced out by equivalent gains.

At the start of the Project, our biodiversity baseline for Phase One was –10%. By 2017, we improved this to –7.14% and lifted this further to –3.17% by December 2020. This improvement is due to reducing land take, improvements in distinctiveness of habitats provided and targeted areas of biodiversity gain such as at the Colne Valley Western Slopes in Hillingdon. The design here includes creating 127 hectares of species-rich calcareous grassland, wood pasture and wetland habitat across an area dominated by arable fields. This will constitute the largest area of calcareous grassland in the Chilterns.

We have not met our target yet but we are moving in the right direction, creating more habitats and progressively reducing the ecology deficits as measured using a calculation based on the Defra biodiversity metric.

5 **data.gov.uk/dataset/1800a83a-1fc4-49e1-bac3-d970caf4451b/phase-one-ecological-survey-data**
6 **hs2funds.org.uk/biodiversity-investment-fund**

# HS2 Green Corridor
## Ancient woodlands

Ancient woodlands are unique natural habitats and they provide complex, biologically rich ecosystems that take hundreds of years to establish. In line with national policy, we recognise ancient woodlands cannot be replaced. Existing since 1600 in England, they are part of the fabric of British history, they are vital for wildlife and plants and they provide important spaces for recreation.

We regret the loss of any ancient woodlands caused by building HS2 and we are working hard to reduce irreparable harm to these special sites.

### How we work

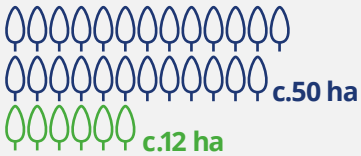
We published Ancient Woodland Strategies[7] for Phase One and Phase 2a following the work we completed on the Environmental Statements for both phases. The strategies provide an area-based comparison between losses of ancient woodland and the compensation measures we will put in place to make good the losses as far as we possibly can. A range of measures are explored in each document including: creating new woodland; sensitively moving, or translocating, ancient woodland soils to new sites; and enhancing those parts of ancient woodlands that are not affected by our work such as removing invasive plant species.

Expert ecologists examine each ancient woodland on an individual basis and look at HS2's impact on the site and the condition of the woodland. They then put together a strategy for the wider landscape, connecting ancient and non-ancient woodlands. The location and design of the compensation measures in each strategy are in line with the principles of the Lawton Review to make our network of ecology and wildlife sites 'more, bigger, better and joined'.

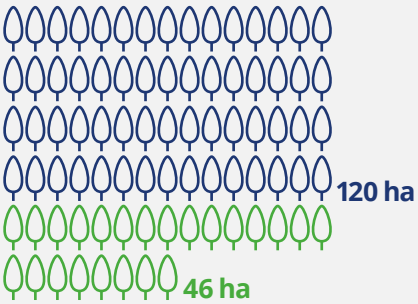
We launched the HS2 Woodland Fund in 2018 to encourage people to plant new native woodlands and restore Plantations on Ancient Woodland Sites[8] (PAWS) where ancient woodland has either been removed or degraded. The £5 million Phase One fund is grant-administered and managed by the Forestry Commission. The £2 million Phase 2a fund is due to open in 2022.

**Hectares of new woodland created and restored Plantations on Ancient Woodland Sites (PAWS) from Woodland Fund projects**

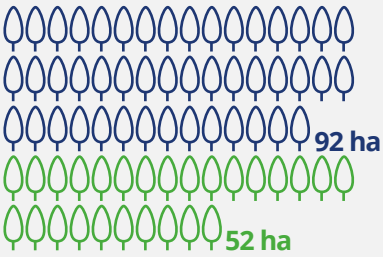
**£511k**
funding in the pipeline




**£1.3m**
funding committed




**£756k**
funding completed




7 **gov.uk/government/publications/hs2-phase-one-ancient-woodland-strategy**

8 Plantation on Ancient Woodland sites are ancient woodlands that have been planted with non-native species, mostly with the historical intention of providing timber reserves.

# HS2 Green Corridor
## Ancient woodlands

### What we are doing

Our Main Works Contractors have been looking at ways to further reduce HS2's impact on ancient woodlands during Phase One design refinement work. We will repeat this process for Phase 2a.

The area and number of ancient woodlands that we reported would be lost during construction has been reduced by 5.7 hectares from the figure in the Phase One Environmental Statement (ES). The total area now forecast is about 23.7 hectares and covers 25 woodlands. This compares with 29.4 hectares of ancient woodland – covering 32 woodlands – reported in the ES and Phase One Ancient Woodland Strategy. The reduction of 5.7 hectares includes two woodlands that have been declassified and removed from the ancient woodland inventory by Natural England since the ES[9].

The table below shows our progress to date and is based on our calculations obtained from the current design stage[10].

We believe reusing soils from ancient woodlands to plant trees in new sites helps to preserve the value of soils which have developed over hundreds of years.

Moving or translocating soils should take place in the dormant season between October to February, according to best practice. We make every effort to do so but this has not been possible in some cases without causing delays and additional costs to the taxpayer.

Where soils have had to be moved outside the dormant season, the work has been identified as 'soil salvage'. Soil salvage, or partial soil salvage, has been carried out at several woodlands including Broadwells, Crackley, Ashow Road and Birches Wood in Warwickshire and Jones' Hill Wood and Mossycorner Spinney in Buckinghamshire. At Jones' Hill Wood, Natural England successfully defended a legal challenge by protesters on its decision to issue a bat licence to allow tree felling. Our ecological work is designed to protect wildlife and we make sure all works are approved.

| Ancient woodland reported in Phase One Environmental Statement | Original area required for HS2 (hectares) | Area now required for HS2 (hectares) | Change (hectares) |
|---|---|---|---|
| Ranston Covert and Battlesford Wood, Buckinghamshire | 0.1 | 0 | 0.1 |
| Burnt Firs, Warwickshire | 1.1 | 0 | 1.1 |
| Sych Wood, Warwickshire | 0.2 | 0 | 0.2 |
| Vicar's Coppice, Staffordshire | 0.6 | 0 | 0.6 |
| Park Hall Wood, Birmingham | 0.4 | 0 | 0.4 |
| Fox Covert (Glyn Davies Wood), Northamptonshire | 1.3 | 0.3 | 1.0 |
| Woodland along bridleway adjacent to landfill southeast of Calvert, Buckinghamshire* | 1.4 | 0 | 1.4 |
| Woodland opposite Decoypond Wood, Buckinghamshire* | 0.9 | 0 | 0.9 |
| **Total** | | | **5.7** |

* Declassified as ancient woodlands by Natural England.

9 The woodlands declassified and removed from the ancient woodland inventory by Natural England are the woodland along the bridleway adjacent to the landfill southeast of Calvert and woodland opposite Decoypond Wood, Buckinghamshire.

10 The data has not been externally assured and figures shown are calculated by HS2 Ltd based on data provided by our supply chain.

# HS2 Green Corridor
## Ancient woodlands

### How we are doing and next steps

We are committed to 50 years of managing, maintaining and monitoring in all locations where we propose translocating, or moving, ancient woodland soils. We recognise there is a lack of long-term, detailed research into the success of habitat translocation and limited published evidence about the effectiveness of translocating ancient woodland soils.

We are encouraging innovation within this area and have launched an innovation project with NatureMetrics. The data from this project will inform scientific research into the success and viability of ancient woodland soil translocation, the range of factors that influence the outcome and help to steer management techniques in translocated woodlands to increase the chances of success.

We have also set up an Ancient Woodland Steering Group comprising our staff, contractors, Natural England and the Forestry Commission. The group discusses best practice for works in ancient woodland, exchanges expertise and creates learning legacy papers that will be added to our new Learning Legacy website.

We are developing an online interactive mapping tool to provide details on all the ancient woodlands affected by HS2 and the compensation measures we are providing. The mapping tool will also provide the locations and details of all projects funded by the HS2 Woodland Fund. Due to be launched this winter, it will be available via our website. We are working with stakeholders including the Woodland Trust, Natural England and the Forestry Commission to develop the tool.


### Case study

#### Compensating for ancient wood loss

Jones' Hill Wood is a small, 1.8-hectare ancient, semi-natural broadleaved woodland near Wendover, Buckinghamshire.

Building HS2 means 0.7 hectares of the area will be affected and we will carry out 4.1 hectares of woodland planting to compensate for this loss. The work includes moving, or translocating, soils and creating a new woodland block, with glades and rides, to link the retained areas of Jones' Hill Wood and existing woodland to the south-east.

We will increase the amount of foraging and 'commuting' habitat for bats, provide benefits to a range of other wildlife and support local nature recovery.

The image used here was generated by the new ancient woodland mapping tool we are developing in consultation with the Woodland Trust. The tool will show areas of woodland loss (red) in addition to compensation planting (blue) and areas where translocation will be carried out (green). Updates will be completed annually and published online.

# HS2 Green Corridor
## Water

### How we work

The Water Framework Directive (WFD)[11], which is delivered in England by the Environment Agency, is central to our process. Every approval issued must comply with the objectives of the WFD: to prevent deterioration and enhance the status of aquatic ecosystems; reduce pollution; and promote sustainable water use. We work closely on water impacts with Environment Agency specialists under a service-level agreement. However, our work goes beyond the WFD requirements, taking a holistic approach to water management that aims to integrate our work into the landscape.

Our aim is to ensure design elements that interact with surface water maximise the opportunities for promoting biodiversity. We use the latest Defra tools to quantify the link between design and ecological benefit. For example, we can create opportunities for a greater variety of flora and fauna by creating watercourses that do not follow straight lines and by varying the profiles of banks and beds.

### What we are doing

Major construction projects like HS2 face challenges with water use as we seek to ensure we manage water carefully. Contractors need water to be readily available and transporting water to sites is expensive. We use mains water, or potable water, as long as there is capacity.

The Environment Agency expects us to reuse water where we can in areas where resources are scarce and it may refuse the consents we need if we do not show our commitment. To date, we have not had any consents turned down.

The last year saw the culmination of several years of intense effort to ensure the water environment of the Chilterns and Colne Valley are protected during construction of HS2. This includes the protection of public water supplies. We have delivered additional water treatment capacity in this area and new infrastructure to ensure greater resilience and flexibility in water supply.

11 **ec.europa.eu/environment/water/water-framework/info/intro_en.htm**

Visualisation of River Cole viaducts.

This creates lasting benefits for water supply companies and consumers, as well as ensuring we meet all our commitments to the water environment.

### How we are doing

Groundwater from the chalk aquifer in the Chilterns and Colne Valley is a significant resource for the South East. We have started major works in this area while providing the reassurances and protections required by the Environment Agency and the local water company.

We take our environmental responsibilities incredibly seriously and launched an investigation after 1,600 cubic metres of bentonite slurry were lost into an unexpected fissure in the chalk aquifer around the Chalfont St Peter ventilation shaft. Bentonite is a naturally occurring clay that is widely used in construction. We regret the loss at this site but monitoring has not identified any adverse effects on the aquifer or water supplies. The Environment Agency and the water company have raised no concerns.

During 2020 – 2021, some 88.5% of the water used by our contractors was potable, or mains water, and 11.5% was non-potable – that is reused water (recycled and 'grey' water) or water abstracted directly from the environment. In general, the smaller or short-term nature of early works limits opportunities for water reuse and larger operations, such as our major works site for the Chilterns tunnel, provide more opportunities. Please see the infographic on **page 45** for 'proportion of water consumption that is non-potable'.

# Progress on climate change

## Our commitment

Build a network that is climate resilient for the long term, minimise the carbon footprint of HS2 and deliver low-carbon, long distance journeys that are supported by low-carbon energy[1].

**Related UN Sustainable Development Goal (SDG):**


1 This commitment reflects our environmental policy for the reporting period 2020 to 2021.

## Topics in this section:

→ Carbon
→ Adaptation and resilience

# Climate change
## Introduction

Climate change is the world's most pressing environmental concern and one of the fundamental challenges we are tackling as we build a low-carbon transport network for future generations. We are playing a vital role in the Government's post-pandemic recovery plan to 'build back better' and bring greenhouse gas emissions to net zero by 2050.

Transport is the UK's biggest source of carbon emissions and accounted for 27% of emissions in 2019[2]. The journey towards the net zero goal will require significant changes in many aspects of our daily lives, including how we travel. HS2 will run on zero carbon electricity from day one of service, allowing passengers to travel sustainably.

The design of HS2 accounts for predicted changes in climate to provide reliable and resilient travel. We are championing sustainable construction to reduce carbon emissions as we build the new railway.

An electric crane at our site at Curzon Street, Birmingham.

2 2019 UK Greenhouse Gas Emissions, Department for Business, Energy & Industrial Strategy (February 2021).

# Climate change
## Carbon

### Cutting carbon in transport

Energy-efficient trains carrying large numbers of passengers will play a vital role in the UK's shift to a net zero carbon economy over the next three decades.

The HS2 network supports this move. Our all-electric trains will emit seven times less carbon than the equivalent car journey[3] – and the network will be twice as efficient as the existing rail system. Our new stations will be environmentally sustainable and low carbon in operation.

However, carbon emission cannot be avoided during the construction and operation of HS2. In 2015, we estimated Phase One would emit 8.9 million tonnes[4] of carbon dioxide equivalent over 60 years. This preliminary assessment was made at an early stage of the Project before enabling works contracts were awarded or investigations into ground conditions were completed.

The Project has matured and we are able to provide a more informed calculation for HS2's carbon emissions. This calculation now covers 120 years – known as the life of the railway – and includes the construction, operation and maintenance of HS2. The calculation, also known as the 'baseline', allows us to track our performance in cutting emissions.

Our Phase One baseline is set at 14.5 million tonnes of carbon dioxide equivalent. This is the level of emissions HS2 could produce without any measures to cut carbon such as efficient design and low-carbon construction. This is often described as a 'do nothing' scenario.

We want to significantly reduce carbon emissions. For this reason, all our main works, stations and rail systems contractors are required to cut emissions by 50% against our baseline. They are doing this using industry-leading carbon reduction measures.

3 The calculation is per passenger kilometre.

4 8.9 million tonnes is made up of 6.1 million tonnes of construction emissions and 2.8 million tonnes of operational emissions. 6.1 million tonnes is reported in the Phase One Environmental Statement, as amended 2015, p24 to p25 **protect-eu.mimecast.com/s/ZBtbCrRyQu86LB0syc8pO?domain=gov.uk** 2.8 million tonnes is reported in the Phase One Environmental Statement, 2013, p35 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/259488/Volume_3_Route-wide_effects.pdf**

We are still at an early stage of main works and we are making good progress towards our 50% target. To date, we have achieved a reduction of 24.6% – or 3.7 million tonnes of carbon dioxide equivalent.

About three-quarters of HS2's carbon emissions are the result of construction and the baseline is subject to change as the programme evolves. Changes in the scope of major infrastructure projects are common and these can affect carbon baselines.

The construction and operation of the Phase One route will emit less carbon over its 120-year life than the UK road network produces in a month[5].

### Why our carbon baseline is different to the 2015 assessment

There are important reasons – both in scope and methodology – why our Phase One carbon baseline is different to the Environmental Statement (ES) assessment submitted with the hybrid Bill, as amended in 2015.

- The ES assessment covered 60 years of HS2's construction and operation[6]. Our new baseline covers 120 years of HS2's design life. This means it includes an additional 60 years of emissions. The ES also excluded maintaining and replacing HS2 assets, which require significant additional materials. We have covered 120 years of maintenance and renewals in our new baseline. The difference is 1.2 million tonnes[7].
- The ES assessment focused on a limited number of 'significant' assets and construction materials and there was less certainty about quantities of construction materials due to the design maturity at that stage. The new baseline is more comprehensive for the assets we have included, the components and the types of materials following detailed design. The difference is 2.1 million tonnes[8].

5 **hs2.org.uk/why/carbon**

6 Phase One Environmental Statement, 2013, p34 **assets.publishing.service.gov.uk/government/uploads/system/uploads/ attachment_data/file/259488/Volume_3_Route-wide_effects.pdf**

7,8 These figures are not within the scope of Lloyds Register's external assurance.

# Climate change
## Carbon

- Ground investigations (GI) were completed after the ES was published. Extensive GI work gave us more details about the ground conditions and earlier assumptions were revised. We needed higher volumes of building materials, including cement and lime to stabilise assets, and imported aggregates when ground conditions were unsuitable for landscaping and embankments. The difference is 1.7 million tonnes[9].
- Detailed construction equipment requirements were not determined until our construction contracts were awarded. Therefore, at the time of the ES assumptions were made to estimate these impacts. This difference is 0.6 million tonnes[10].

### Cutting carbon in construction

Most of the carbon emissions produced by HS2 will be created in the construction stage. We are reducing emissions as much as we can by minimising the resources we need, using responsibly sourced materials and challenging our supply chain to cut carbon in everything they do. We are encouraging innovation to significantly reduce reliance of fossil fuels and reduce the carbon associated with concrete and steel.

We have set challenging targets to cut carbon in the construction of Phase One. They are:

- main works, stations and railway systems: 50% reduction on our baseline; and
- enabling works, or early works: 30% reduction on our baseline.

### How we work

We operate a sector-leading carbon management approach which we have refined over several years. Under this approach, carbon reduction is a project requirement, built into our procurement processes, contractual requirements and commercial arrangements. Carbon reduction is also one of the key performance indicators in our Corporate Plan. Our carbon management system was accredited to the PAS 2080:2016[11] – Carbon Management in Infrastructure standard.

### Case study

#### Spreading carbon literacy

We formed a partnership with the Carbon Literacy Project[12] to raise awareness about carbon reduction and encourage our staff to take carbon reduction action.

The Carbon Literacy Project defines carbon literacy as "an awareness of the carbon costs and impacts of everyday activities and the ability and motivation to reduce emissions on an individual, community and organisational basis." Trainees make pledges to take carbon action in their own work and in interactions with others. CEO Mark Thurston, for example, pledged HS2 Ltd (the organisation) will be net zero carbon by 2025.

The pledges are reviewed by the Carbon Literacy Project to assure they are significant. Trainees have included members of the Board, Executive and leaders of our integrated project teams. The majority of our Board and Executive have been certified carbon literate and we have achieved bronze accreditation. We are rolling out training across our organisation.

9,10 These figures are not within the scope of Lloyds Register's external assurance.

11 **mediacentre.hs2.org.uk/news/hs2-becomes-first-uk-transport-sector-client-to-achieve-global-carbon-management-standard**
12 **carbonliteracy.com**

# Climate change
## Carbon

We apply the industry-recognised carbon reduction hierarchy.

- Is there a 'build nothing' solution?
- Can we build less?
- Can we build 'clever'?
- How can we build efficiently?

### What we are doing

As well as working with our suppliers and contractors to manage carbon effectively, we are helping the construction industry to adopt a similar approach. We are helping our Tier 1 suppliers to follow PAS 2080 standards, including our civils contractors, early works contractors and our station construction partners on Phase One. They are required to become PAS 2080 certified – and all our early works and main works contractors are certified. In this way, we are helping to spread carbon reduction best practice across the industry.

We also work with our supply chain in a Carbon Reduction Collaboration Group, which is attended by our main works contractors and station construction partners on Phase One.

### How we are doing

We have set annual (interim) targets to monitor our progress towards hitting our overall carbon reduction target of 50%.

This year, our interim target was to achieve an overall 23% reduction by March 2021. We surpassed this and achieved[13] a 24.6% reduction, equivalent to 3.7 million tonnes of carbon dioxide equivalent. Carbon reduction progress by contract type is presented in the **data appendix**.

We aim to make a further 3.4% reduction in 2021 – 2022, to reach an overall 28% carbon reduction by March 2022. We are working with our supply chain to reinforce low-carbon best practice and innovation is adopted as widely as possible.

**Carbon reduction performance**
% reduction from baseline


Looking in detail at how we performed, our enabling works contractors have so far achieved a carbon reduction of 24.5% against a 30% reduction target for the life of the contracts. We expect further reductions before the contracts end.

Significant progress has been made by our main works contractors who have achieved 33.4% carbon reduction. Our stations contractors have achieved 46.1% carbon reduction through design against their 50% contract target.

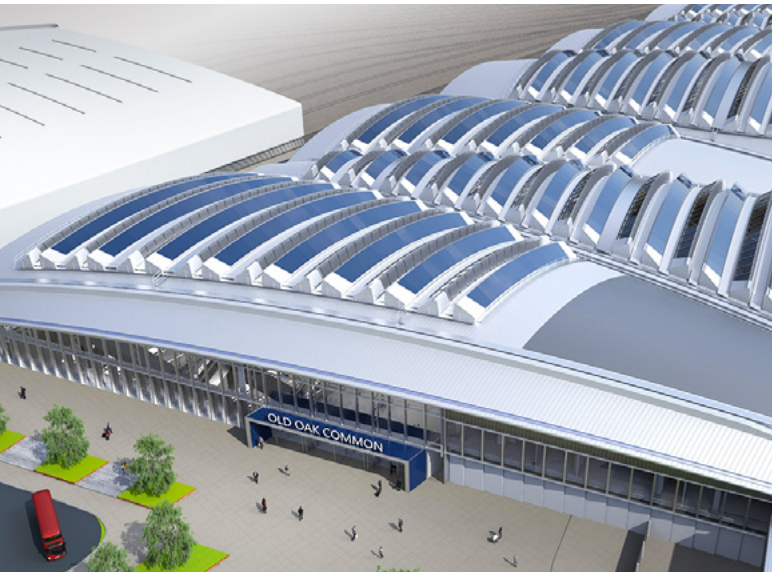
We are continuing to learn lessons from our Phase One work on assessing and reducing carbon both in construction and operation of HS2. We are using this knowledge across Phase Two to minimise our carbon footprint.

13 Reduction at this stage of the programme is forecast.

# Climate change
## Adaptation and resilience

Even if all greenhouse gas emissions stopped today, the world would still warm, bringing more extreme weather such as floods and heatwaves. Planning to adapt to these conditions takes time, especially for large-scale infrastructure projects that encompass both the built and the natural environment. Action is needed now to avoid high levels of risk to the future performance of our assets.

Like all planned infrastructure, HS2 needs to be climate-resilient so it can operate in a future where we may see warmer and wetter winters, hotter and drier summers and more extreme weather.




All HS2 stations like Old Oak Common will be climate-resilient.

### How we work

HS2 is being designed and built to serve Britain's travel needs well into the future. Our Environmental Policy sets out our commitment to build a high-speed rail network that is resilient to climate change for the long term. Our architects, engineers and environmental leads are working together and innovating across the programme to achieve this.

We recognise climate change resilience is about more than just the 'hard' infrastructure of HS2. When the Project affects the environment, it is important that resilience is also considered. This is why we are integrating resilience into our **Green Corridor** work and decisions relating to landscape design. This approach helps us to ensure the environment surrounding the railway is also managed with climate adaptation and resilience in mind.

We support the efforts of the Task Force on Climate-related Financial Disclosures and are working on how to develop our climate-related reporting.

### What we are doing

**Resilience and hazard assessments in Environmental Impact Assessments**

Phase One was one of the first projects to incorporate climate change adaptation and resilience assessments into its Environmental Impact Assessments (EIAs). We have carried out a high-level climate change resilience assessment for each phase of the railway. This is to identify the range of potential risks and to assess the railway's resilience and capacity to cope with them. These assessments considered the risks posed by extreme hot and cold weather, heavy rain, high winds and storms to railway infrastructure including tracks, tunnels, overhead line equipment, rolling stock, stations and earthworks.

# Climate change
## Adaptation and resilience

We have considered the likelihood and consequences of climate hazards based on the latest UK climate projections relevant to each phase[14]. We have also assessed the combined effect of HS2's construction and operation, and potential climate change impacts on the environment in which the railway is built. One of our biggest challenges is the lack of certainty on the forecasting of climate change impacts. Also, there is still no best practice approach to projecting climate change. The UK Climate Projections (UKCP) provides the most up-to-date assessment of how the UK climate may change in the future. UKCP09, the UK's earlier set of climate projections, have already been superseded by UKCP18, and many design standards remain broadly based on historic weather data. We address this by considering a range of climate change scenarios in our EIAs and in design. The Phase 2b EIA is based on UKCP18.

**Reporting requirements and design and construction standards**

Phase One main works contractors and stations contractors are required to complete climate change adaptation and resilience reports designed to identify and address climate risks in the design process. We also assess the climate change interdependencies between HS2 and other organisations such as rail, road, power and telecoms infrastructure operators.

To protect the railway infrastructure while it is being built, our Codes of Construction Practice for Phase One[15] and Phase 2a[16] have requirements that reduce risks relating to extreme weather and associated conditions. Requirements to manage climate change are integrated into relevant HS2 standards. For example, HS2 infrastructure is designed to be resilient to a 'one in a thousand year' flood event.

**Sharing best practice**

We have an internal Climate Change Adaptation and Resilience Forum which includes engineers, designers and senior environmental managers. Climate resilience work has not been undertaken on a project of HS2's scale before, so there is an opportunity to develop best practice and share it widely. We are also members of the Infrastructure Operators Adaptation Forum, organised by the Environment Agency and the Rail Safety and Standards Board Climate Change Adaptation Working Group.

**1/1,000-year**

HS2 infrastructure is designed to be resilient to a one in 1,000-year flood event.

We have been working with industry and in academic partnerships to advance knowledge of climate change adaptation and resilience. For example, we collaborated with the Institute of Environmental Management & Assessment (IEMA) on its recent guidance document for Environmental Impact Assessment (EIA)[17], providing a case study for this best practice guidance. We sit on the British Standard Institute's (BSI) greenhouse gas and adaptation sub-committee and have worked on the ISO 14090 adaptation to climate change standard.

### How we are doing

We are integrating climate change adaptation and resilience into each project stage. Our assessments have been cited as examples of good practice by the Climate Change Committee.

We are working to further understand and manage our climate change interdependencies with rail, road and other infrastructure providers. We are addressing climate change in our design. For example, we have completed a climate change adaptation and resilience strategy for stations. We are also protecting the construction process from extreme weather.

14 **metoffice.gov.uk/research/approach/collaboration/ukcp/index**
15 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/593592/Code_of_Construction_Practice.pdf**
16 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/960219/Phase_2a_Code_of_Construction_Practice.pdf**
17 **iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020**

# Progress on community experience

## Our commitment

Manage the impact of HS2 construction and operation on people and the environment including effects from air pollution, flooding, noise and vibration.

## Topics in this section:


- → **Air quality, noise, traffic and transport**
- → **Flooding**
- → **Community Environment Fund (CEF) and Business and Local Economy Fund (BLEF)**


# Community experience
## Introduction

Our works activities are being increasingly felt in local communities as the HS2 construction programme expands. We are committed to treating communities with respect, always considering their concerns and views and doing our best to put things right when we make mistakes. We are working hard to reduce the effects of our construction work on people's lives and we continually look at ways we can improve.

Our contractors are required to minimise disruption and act responsibly during HS2's design work, construction and the operation of the railway. This covers building-related noise, vibration, flooding, air pollution and traffic. We provide funds to help people who are disrupted by our building work.

We report on the effects we are having on people's lives and the ways we can improve our performance in our latest **Community Engagement Progress Report**.


We are working to improve the way we inform local people.

# Community experience
## Air quality, noise, traffic and transport

HS2 is a major construction project and many of our sites are close to homes, businesses and community facilities. We aim to set new standards for reducing the effects of our work on air quality, noise and local traffic.

### How we work

**Air quality**

The HS2 Code of Construction Practice requires all contractors to control dust in line with national best practice. Monitors continuously measure dust levels at the site boundaries of medium- and high-risk sites[1]. These monitors have trigger alerts, which tell contractors when dust concentrations reach a set level. This allows our contractors to respond quickly.

We control and manage emissions from our activities by applying industry-leading environmental standards. This includes setting strict emission requirements for all construction vehicles and plant and machinery[2]. HS2 information papers E31[3] and E14[4] contain further information on how air quality will be managed in Phase One and Phase 2a respectively.

### Case study

#### Setting new standards for dust control

A dust monitoring study carried out with King's College London has led to a nationwide revision of the 'trigger alert' level for air quality.

The HS2 Air Quality Strategy aims to raise the bar on best practice for mitigating dust emissions. One way we ensure that mitigation measures are effective is to continuously monitor particulate matter (PM10) along the boundaries of medium- and high-dust sites. Monitors have a trigger alert level that tells contractors when dust concentrations may be affecting local air quality. This enables them to investigate quickly and take action if needed. We funded and collaborated with King's to examine trigger alert levels in a study that looked at 1.8 million measurements from nine sites. The results led to a revised trigger alert level and monitoring period and have led to an update to national best practice for the construction industry.

1 The risk level is determined using the Institute of Air Quality Management Guidance on the assessment of dust from demolition and construction.
2 All construction vehicles on HS2 must comply with the Euro VI emission standard for Heavy Goods Vehicles (HGVs), Euro 6 (diesel) and Euro 4 (petrol) for Light Duty Vehicles (LDVs). Non-Road Mobile Machinery (NRMM), which includes excavators, dumpers, diggers and construction machinery, must currently meet at least the EU Stage IV emission standard within the Central Activity Zone, and EU Stage IIIB across Greater London and the rest of the route. From 01 Jan 2022, the NRMM requirements will increase to EU Stage V in the Central Activity Zone and EU Stage IV across Greater London and the rest of the route.
3 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/672406/E31_-_Air_Quality_v1.5.pdf**
4 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/960731/E14_Air_Quality_v1.3.pdf**

# Community experience
## Air quality, noise, traffic and transport

**Noise**

We are committed to minimising noise caused by our works. We are required to show how we are doing this at all key stages of the Project including design and construction. To gain consent for construction works, contractors must demonstrate that noise is being controlled as far as is reasonably possible. To achieve consent to operate the railway, Schedule 17 of the legislation for the high-speed railway requires evidence that noise from all components of HS2 is minimised.

The size of HS2's construction programme is unrivalled and major works are now underway at more than 300 sites. Unfortunately, our works are disrupting some local communities and we received 1,877 complaints between April 2020 and March 2021. Most of these complaints were about traffic and transport issues (512 complaints) and noise and vibration (293 complaints). This compared with 34 complaints relating to our land and property work. Traffic and transport received 27% of total complaints. Noise and vibration made up 16%. The vast majority of these complaints were resolved at the first stage.

Works underway at the Phase One terminus at Curzon Street in Birmingham.

We are using new construction methods to reduce disturbance to local people whenever we can. For example, our contractors at Euston developed an auger cleaning tool in preference to the traditional spinning technique to reduce noise related to the removal of excess of material from the drilling rig. We are continuing to work with our contractor to use new techniques to minimise disruption to residents.

Complaints about noise, traffic and other areas, and our response to complaints, are published in our **Community Engagement Progress Reports**. Covid-19 has affected the speed we have been able to install noise insulation in homes because of difficulties gaining access to properties. We collate and report on construction noise and vibration monitoring from all HS2 works on a monthly basis, and **publish our reports**.

**Traffic and transport**

All construction vehicles are required to follow permitted construction routes as consented in the HS2 Act, as well as comply with the requirements set out in the HS2 **route-wide traffic management plan** which sets out the requirements for managing traffic and transport related to HS2's construction activities.

Where we can, we reuse material within the Project and use rail access to sites to reduce construction traffic on local roads. By March 2021, we had delivered 150,000 tonnes of aggregate for use around the Calvert railhead in Buckinghamshire by freight trains. This took the equivalent of 7,500 HGVs off the roads and cut more than 24,000 tonnes of carbon emissions. We manage the effects of construction traffic through Local Traffic Management Plans, which are consulted on with highway authorities under the HS2 Code of Construction Practice. Construction traffic routes used by vehicles over 7.5 tonnes are the subject of approval from the relevant local authority, with the aim of minimising adverse effects on congestion, safety and local communities.

# Community experience
## Air quality, noise, traffic and transport

Compliance with the assessed levels of construction traffic impacts is monitored by recording the traffic using construction compounds. The HS2 Code of Construction Practice, which contractors are required to follow, also includes a range of controls to minimise adverse effects. These include measures related to vehicle and driver safety and managing highway conditions. In relation to workforce traffic, we require contractors to develop travel plans to minimise using private cars and promote more sustainable access to worksites. Similarly, travel plans are required for stations and depots to reduce any adverse effects during the operation of HS2.

### What we are doing

We want our high-speed trains to be as quiet as possible. We are offering incentives to our successful rolling stock manufacturer to design and build a fleet that exceeds the performance that current standards require. HS2 is the first railway to encourage a train manufacturer to achieve this level of environmental performance.

We have set ambitious targets for our supply chain to minimise emissions and to develop best practice solutions that can drive down emissions across the construction industry. These are some of our achievements.

- Developing low-emission technology for non-road mobile machinery (NRMM) to reduce our environmental impact. This retrofits technology to exhaust and engine systems to reduce emissions and recertify them as a newer engine class.
- Trialling the replacement of diesel power equipment with ultra-low emission engines on our sites.
- Leading the way with clean air measures by adopting a new plant emissions scheme. Working with the Construction Equipment Association, we have supported the development and adoption of the NRMM Emission Compliance Verification Scheme as part of a bid to create greener construction sites.


### Case study

#### ‘Clean’ generators cut carbon on construction sites

HS2 is leading a trial of ultra-low emission technology to replace diesel power on construction sites.

Construction sites need power, which is typically provided by diesel generators. To reduce both noise and emissions, we are trialling ultra-clean generator technology developed by three UK companies: OakTec Power Ltd, Sutton Power Engineering and Advanté. The Clean Air Gas Engine (CAGE) project, trialled at a site near Euston station, is integrated into a site welfare cabin and uses clean gas and biogas fuels to generate electricity. When available, CAGE is using Calor’s BioLPG, which has a much lower carbon footprint than diesel, yet is cost-competitive with red diesel.

# Community experience
## Air quality, noise, traffic and transport

### How we are doing

As part of Schedule 17 of the Phase One legislation, we are required to share information about the forecast noise performance of the railway. For some designs, for example, West Ruislip portal and Wendover Dean viaduct, we are forecasting noise improvements compared with forecasts at early stages of the Project.

Air quality monitoring results will be reported in the 2020 Air Quality Annual Report. As a result of Covid-19, background air quality pollutants were lower than under usual circumstances and the impact of the HS2 construction vehicles was lower than predicted in the Environmental Statement. As restrictions across the UK are lifted, the impact of our works on local air quality will continue to be monitored. We publish monthly noise and air quality reports. These are divided into local authority areas along the Phase One route.

During the reporting period, more than 186,000 heavy goods vehicle (HGV) trips took place across Phase One, of which 99.2% were Euro VI compliant.

More than 2,500 pieces of NRMM were deployed during the reporting period and 99.8% were compliant with our NRMM emission standards.

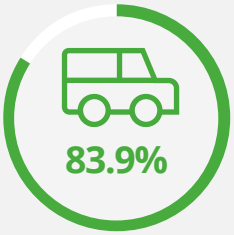
We have carried out detailed flood modelling at numerous river crossings along the route and at Euston, Old Oak Common, Interchange and Curzon Street stations to ensure our designs meet our commitment not to increase flood risk.

**Vehicle emission standards**


Non-road mobile machinery (NRMM) that meets HS2's emission standards.


NRMM performed better than HS2's emission standards.


HGVs (heavy goods vehicles) that are Euro VI.




LDVs (light duty vehicles) that are Euro 6 diesel or Euro 4 petrol.

# Community experience
## Flooding

Construction work can increase the likelihood of flooding because it changes the landscape and it is important we manage this risk. New structures and assets must also be built to be resilient to the risks of flooding, so the railway can operate safely. The potential impact of climate change on flood risk is also included as part of our assessments. We are committed to not increasing flood risk as a result of HS2.

### How we work

Working closely with the Environment Agency, we have been identifying the potential flood risks at all crossings to ensure we have the necessary expert understanding and evidence base for making design decisions and obtaining the agency's approval. Flood risk assessments are based on existing Environment Agency hydraulic models, which are approved tools for the strategic management of flood risk. Where we are able to improve the models, we pass the benefits back to the Environment Agency to share best practice. Our partner liaison for flooding extends beyond the agency to local authorities and the Canal & River Trust.

### What we are doing

We have carried out detailed flood modelling at numerous locations along the route including Euston, Old Oak Common, Interchange and Curzon Street stations to ensure our designs meet our commitment not to increase flood risk.

Throughout the Project, we have refined the Environment Agency's flood models and this will support its assessment of other schemes or developments. We have also been assessing 'multi-purpose' solutions. Green spaces can be more effective than physical barriers at preventing flood risk and they reduce construction activity and carbon emissions. New wetland, for example, can reduce flood risk while improving ecology and the landscape. This also benefits local people as it could reduce the duration or complexity of building work.

In terms of working with our stakeholders, we are striving to develop efficient approaches to obtaining flood risk approvals. For example, we have agreed a streamlined, time-saving approach to the design and approval of watercourse crossings with a number of local flood authorities.

### How we are doing

While there are no specific key performance indicators for flood risk, we work closely with our contractors to get all the required approvals in place to keep their programme on track. We manage our contractors' modelling and design progress, the Environment Agency's response to it and residual flood risk.

Drone footage of Colne Valley Viaduct jetty construction.

# Community experience
## CEF and BLEF

The Community Environment Fund (CEF) and Business and Local Economy Fund (BLEF) are available to support communities and local economies that are disrupted by the construction of HS2, and to help develop our Green Corridor. The funds create benefits for local people that go beyond the mitigation and statutory compensation that has already been secured in HS2 legislation. Communities and businesses can submit applications for the £40 million funding pot for Phase One between London and the West Midlands. An additional £5 million is now available and open for bids from Phase 2a communities and businesses, covering Fradley in Staffordshire to Crewe.

There are two types of CEF funds: those that focus on quality of life and the environment in individual communities; and strategic funds for large projects across several communities and local authority boundaries.

### How we work

The CEF and BLEF are managed independently by Groundwork UK[5], a federation of charities that promotes community action. Any applications over £75,000 are also reviewed by an independent panel, with the final decision made by a senior civil servant from the DfT.

The need to support local communities has never been greater than during Covid-19. We are making sure applicants know we are there to support them if they need to amend their project or put it on hold. Groundwork UK is trying to prioritise assessing projects that specifically aim to provide pandemic-related support for communities.

### What we are doing

The projects we have funded include a food bank, an outdoor adventure playground, nature reserves and peace gardens, the restoration of a windmill and the refurbishment of a village hall which was used as a Covid-19 test centre. For more information on CEF and BLEF, visit our **dedicated website**.

### Case study

#### Raising environmental awareness

Castlehaven Community Association in Camden, London, has received £73,591 for Greengage, an environmental project aiming to increase the local community's environmental awareness and support.

A team of 20 volunteers will recruit and train local people to organise community events and clean-ups, help develop a local nature park, promote wildlife habitats and address specific environmental issues that emerge throughout the construction of HS2. More than 4,000 residents will be involved in making real change where they live.

### How we are doing

By the end of March 2021, we awarded funding to 157 projects worth a total of £9.41 million. This consists of five CEF strategic projects, seven BLEF projects and 145 CEF local projects. Of these projects, 32 directly contribute to our Green Corridor by providing local green spaces. They feature on our **online interactive map**.

5 **groundwork.org.uk**

# Progress on historic environment

## Our commitment

Reduce harm to the historic environment and deliver a programme of heritage mitigation including knowledge creation through investigation, reporting engagement and archiving.

**Related UN Sustainable Development Goal (SDG):**


## Topics in this section:

→ **Built heritage**
→ **Archaeology**
→ **Historic landscape**

# Historic environment
## Introduction

The construction of HS2 Phase One features the largest historic environment programme ever undertaken in Europe. It creates opportunities to learn how our ancestors used and changed the landscape and to conduct new methods of investigation, improving professional practice. The information from our historic environment work informs design decisions as we develop our understanding of the past.

To meet the commitments of the Heritage Memorandum[1] for HS2 Phase One, a Historic Environment Research and Delivery Strategy (HERDS)[2] was developed to guide our approach. It is evolving the way historic environment works are typically designed and delivered as part of major infrastructure projects. Our goal is to provide lasting public benefit by creating knowledge, engaging with the public and building an enduring legacy of skills and archives. Rather than 'preservation by record', the philosophy is 'investigation with purpose'.

### How we work

The HERDS objectives establish priorities for our investigations and form a framework for decision-making. Work at any location is considered in relation to what can be delivered against these objectives. This reduces the amount of work and risk mitigation involved against these objectives, providing a focus on advancing our understanding rather than mechanistic recording.

HS2's historic environment activity requires contractors to operate to several principles.

- **Knowledge creation** – all investigative work supports creating knowledge around archaeology and history.
- **Collaboration** – activities are part of a wider programme of research, engagement and legacy-building.
- **Information sharing** – information and knowledge are rapidly shared with HS2 and other contractors.
- **Innovation** – the programme will develop new skills and ways of working to enhance historic works for Phase One and major infrastructure projects.
- **More than excavation** – a focus on developing skills, engaging with communities and inspiring future generations.
- **Prioritisation by outcome** – responses to discoveries should be based on whether they meet the objectives and priorities of the programme.

Our in-house specialists ensure we are consistent, use best practice and innovate. The team also makes sure the supply chain meets the historic environment requirements. We have developed a digital platform that hosts the results of various stages of work and allows contractors and stakeholders to share information.

As part of HERDS, our specialists, the supply chain, Historic England and other stakeholders meet to ensure consistency of approach and share research themes.

1 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/593595/Heritage_Memorandum.pdf**
2 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/642655/hs2_phase_one_historic_environment_research_and_delivery_strategy.pdf**

# Historic environment
## Built heritage, archaeology and historic landscape

### What we are doing

Building on the experience of major infrastructure projects, HS2 is conducting archaeological works in advance of main works construction. This ensures time is built into the Project to manage archaeological works in accordance with the Heritage Memorandum requirements. It also reduces the risk of construction delays. Archaeological investigations, alongside other early environmental works, are carried out by three early works contractors on Phase One. They all have a heritage management team and supply chain of archaeological contractors and specialists.

We have completed the evaluation stage along the Phase One route, allowing insights into what archaeological information lies beneath the ground. Evaluation techniques included non-intrusive surveys, such as geophysical survey and fieldwalking, and intrusive surveys, like trial trenches and test pits. The knowledge gained from the evaluation stage allowed us to design location-specific work.

We have made significant progress with locations that require detailed investigation and the investigation stage will be complete by the end of 2021. We will then analyse the information. This work will create a large body of knowledge and a legacy for future generations of professionals, interest groups, communities, academics and the wider public. The vast resource of digital data will be hosted on the Archaeology Data Service[3] and the artefacts and material recovered will be deposited with local museum archives.

We have already shared our stories at community and university lectures, specialist conferences and community events.

The historic environment works on Phase 2a are underway and we are building on our experience of Phase One. A key lesson was our approach to the historic landscape and integration with other disciplines. We have continued to evolve that lesson on Phase 2b by using the national historic landscape mapping of Natural England and adding to it with county-level mapping.

### Case study

#### Coleshill, Warwickshire

Excavations on the HS2 site at **Coleshill in Warwickshire** revealed one of the best-preserved late 16th century gardens ever discovered in this country.

In this way we have been able to maintain a local focus while being consistent at a national scale. This has strengthened landscape design discussions, for example, regarding enhancing hedgerow patterns and ultimately biodiversity. On Phase 2b, we are providing specialist input to the environmental impact assessment work, stakeholder engagement and the scoping of the HERDS for the western leg between Crewe and Manchester.

### How we are doing

**Collaboration with contractors**

We have established a new process with the supply chain, specialist teams and stakeholders to progress faster from the evaluation of an archaeological site to the design, agreement and implementation of investigation, or excavation, works. This has reduced the decision-making process from about 43 weeks to 11 weeks.

3 **archaeologydataservice.ac.uk**

# Historic environment
## Built heritage, archaeology and historic landscape

**Public engagement**
In autumn 2020, a three-part BBC 2 series, Britain's Biggest Dig, looked at our archaeological excavations at Park Street Gardens, Birmingham and St James's Gardens, Euston. About 2.5 million people watched the final episode and we ran 10 webinars alongside the documentary, attracting more than 720 attendees.

Our online archaeology event for the Coleshill site in Warwickshire was attended by more than 70 people and public webinars about archaeological works at the site drew nearly 400 attendees.

**Professional engagement**
The pandemic made direct engagement more difficult. However, 'remote' engagement allowed specialists to contribute their expertise. One example was Wellwick Farm, Buckinghamshire, where an osteological (bone) specialist from the University of York worked with the on-site team as they live-streamed the excavation of a lead coffin. We ran online conferences, a series of webinars and talks during the national Heritage Open Days and the Festival of Archaeology, as well as giving lectures to community groups and societies.

Other work included contributing to the Chartered Institute for Archaeologists' conferences, publications and professional practice papers.

**Old Curzon Street station**
We have learned lessons when mistakes have been made. During works at the original Curzon Street station, monitoring equipment was fixed directly to the stonework of the Grade I listed building in a way that was not compliant with the relevant Schedule 18 Listed Building consent. This incident was investigated, with findings presented to Birmingham City Council and Historic England. A conservationist has been engaged to oversee the refurbishment works and has advised on the best way to address the effects of this incorrect installation.

### Case study

**Wellwick Farm, Wendover, Buckinghamshire**

Work at **this site** has revealed a ceremonial landscape, including a late Neolithic timber circle, together with Bronze Age, Iron Age and Roman burials. This landscape of ritual, ceremony, death and burial spans more than 4,000 years.

### Case study

**Curzon Street station**

Investigations at the **old Curzon Street station** unearthed the world's oldest railway roundhouse. 3D reconstructions produced in partnership with the University of Bradford captured the roundhouse and helped researchers and the public to understand the structure and its context.

# Progress on responsible consumption and production

## Our commitment

Promote circular economy principles, responsibly source and make efficient use of sustainable resources, reduce waste and maximise the proportion of material diverted from landfill.

**Related UN Sustainable Development Goal (SDG):**


## Topics in this section:

→ **Material efficiency, waste and circular economy**

→ **Responsible sourcing**

# Responsible consumption and production
## Introduction

When we manage materials responsibly, it creates environmental benefits and helps the Project to meet its strategic goals. Responsible consumption and production is especially important as we start to build HS2 because we are using large volumes of materials and creating many new structures.

We can drive positive change in this area: developing local supply chains, driving innovations in sustainable materials and working in new ways that are energy and resource efficient. Managing materials sustainably will not only help the railway to minimise its environmental footprint – it will also have a positive effect on the UK infrastructure supply chain.

### Case study

#### Reducing waste in tree planting

Biodegradable tree guards reduce plastic waste, transport costs and emissions.

We will plant seven million trees and shrubs along the Phase One route between London and the West Midlands. Young trees often need protecting from deer and rabbits but traditional plastic tree guards create waste. Our joint venture contractor Fusion is using tree guards made from recycled cardboard, which offer high performance but are biodegradable. Using the guards takes plastic out of the environment and reduces costs and emissions as there is no need for waste collection and treatment.

# Responsible consumption and production
## Material efficiency, waste and circular economy

**Material efficiency**
We select materials with a focus on environmental efficiency, minimising the use of 'virgin', non-renewable materials and maximising the use of materials that are either reused or renewable and have the best service life. This also helps to drive the sustainable consumption of materials more broadly.

**Waste**
Significant volumes of construction and demolition waste will be produced building HS2. We have strict measures to minimise the amount of waste we produce and ensure waste is reduced and managed in line with the waste hierarchy[1]. Disposal to landfill is the last resort for waste that has no alternative treatment option.

**Circular economy**
The circular economy replaces the traditional 'take, make, use, dispose' model[2]. Diverting waste into materials that can be used to make new products reduces both waste and costs. In the long term, it means economic growth and development do not depend on using finite resources. For HS2, it can foster innovations that meet the Project's need for durable structures and create assets that can last longer, be maintained efficiently and become new products at the end of their life.

### How we work

**Material efficiency**
To determine material efficiency, we use a weighted metric that compares asset designs based on the materials they use. It applies a heavier weighting to less sustainable materials and a lower weighting to materials that are sourced from reused or renewable sources. The metric, which has been independently verified by a panel chaired by the Institute of Civil Engineers, also considers service life.

Our contractors must use and track the efficiency metric, which is reported alongside carbon footprint and lifecycle analysis figures. Contractors are required to provide baseline data and to identify improvements. In this way, we encourage the use of renewable materials, refurbishment or recycling and waste reduction.

**Waste**
We have set route-wide targets for waste generation and diversion from landfill (**see chart on page 45**). Our waste management targets are:

- 95% diversion from landfill for all construction and demolition waste; and
- 95% beneficial reuse of excavated material.

We prioritise reuse within the scheme but also count off-site beneficial reuse towards this target. The targets are linked to **BREEAM/CEEQUAL assessments**.

All contractors must produce a site waste management plan to control day-to-day waste management activities on-site. The plan ensures they comply with legal requirements and segregate waste to maximise reuse, recycling and recovery.

Reuse of excavated material is covered by a materials management plan in line with the Definition of Waste: Development Industry Code of Practice[3]. This ensures the materials are not considered to be waste as long as the principles of the Code of Practice are followed. Excavated material is only considered as waste if it is either unsuitable for use, or not required to build HS2.

1 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb13530-waste-hierarchy-guidance.pdf**
2 **ellenmacarthurfoundation.org/circular-economy/concept**
3 **claire.co.uk/component/phocadownload/category/8-initiatives?download=212:definition-of-waste-development-industry-code-of-practice**

# Responsible consumption and production
## Material efficiency, waste and circular economy

**Circular economy**
We follow three circular economy principles:

- keep resources in use for as long as possible;
- recover and regenerate resources at the end of each use; and
- keep resources at their highest quality and value at all times.

Our contractors must identify opportunities for circular economy approaches and either implement them or demonstrate lessons learned if this has not been possible.

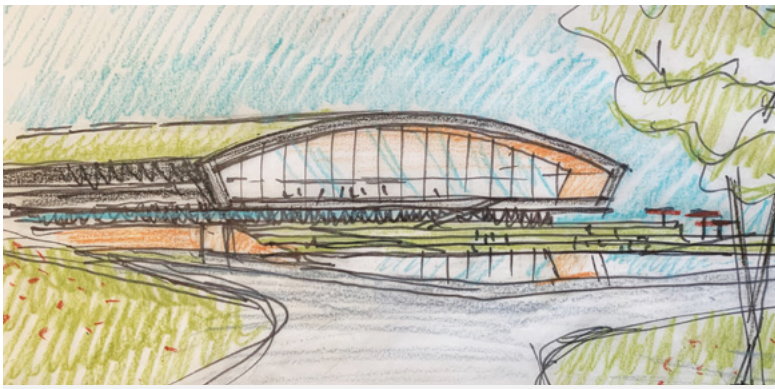
Our circular economy approach is in line with the BS 8001 framework and sets out alternative options for contractors to apply circular economy principles into real-world design and procurement environments. A 2021 guidance note on circular economy principles explains to suppliers, contractors and design teams how to apply the principles.

### What we are doing

**Waste**
Our key stakeholder here is the Environment Agency. Engagement is directed through the agency's core team, which includes a waste and materials recovery specialist and permitting specialists.

During the year, we and our supply chain partners have worked with the Environment Agency to develop and submit a number of major environmental permit applications for Phase One works. These include:

- a transfer station for excavated material from the London tunnels at the former Willesden Euro Terminal site;
- a treatment plant for the slurry from the Chilterns tunnel, which will be used to create 127 hectares of new chalk grassland, woodland, wood pasture; and
- the northern sustainable placement area near West Ruislip, which will significantly reduce traffic movements on local roads.



### Case study

#### Integrating circular economy principles

Work at Calvert depot looks at material and design choices from a different perspective.

Calvert depot in Buckinghamshire is an exemplar project for circular economy approaches, with detailed requirements linked to circular principles included in the contract specifications. Now being integrated into the design for the depot, these principles are driving the project to look at material choices and service life in different ways. For example, sustainable urban drainage systems (SUDS), which control rainwater run-off, are proposed for the parking area, while structural timber flooring systems offer a lower carbon material choice that still retains a lifespan appropriate to the buildings.

### How we are doing

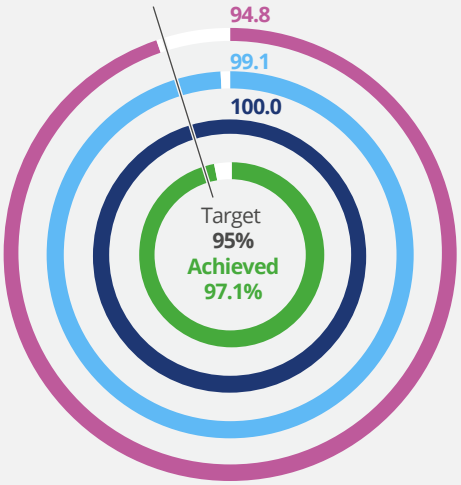
Our figures reflect limited amounts of waste and materials and the overall forecast waste for Phase One is expected to increase significantly from 2021 as main works step up.

Our target for beneficial reuse of excavated materials is 95%. Beneficial reuse can be either within the scheme for engineering or landscaping earthworks, or off-site in restoration of quarry sites, for example. Last year, we narrowly missed this target, achieving 94.6%, predominantly due to the performance of our early works contractors. Their work has involved extensive working on contaminated sites where much of the excavated material was unsuitable for beneficial reuse.

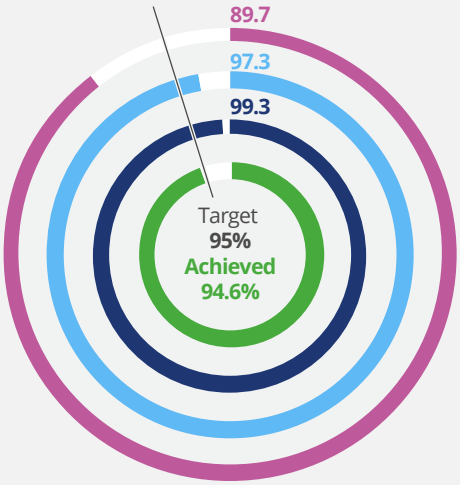
# Responsible consumption and production
## Material efficiency, waste and circular economy

It is standard industry practice to reuse timber and 100% of our timber was reused. Our contractors also look at ways to beneficially reuse timber in line with our circular economy principles. We want to make sure felled timber is kept at its highest value and we have narrowly defined what we classify as high-value beneficial reuse. It includes reuse on-site, provision for community uses and use in solid wood production. Our Phase One early works contractors felled the majority of timber during 2020 – 2021. Of the timber they felled, 10.8% was recorded as high-value beneficial reuse. Half of the timber felled on Phase One by main works contractors went to beneficial reuse. Some timber and vegetation waste was sent for energy recovery in biomass facilities. Biomass forms a significant element of the Government's renewable energy policy[4].

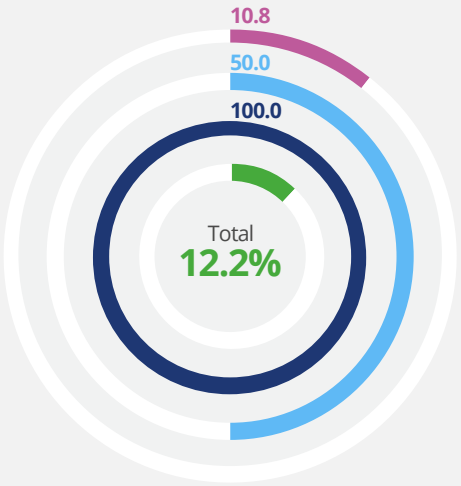
**Proportion of construction and demolition waste diverted from landfill (%)**



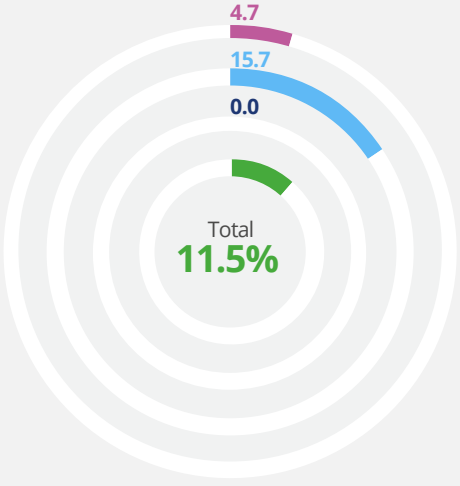

**Proportion of excavated materials beneficially reused (%)**




**Proportion of felled timber beneficially reused (%)**




**Proportion of water consumption that is non-potable (%)**




EWC MWCC Stations Total Phase One contracts

4 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48337/5142-bioenergy-strategy-.pdf**

# Responsible consumption and production
## Responsible sourcing

Responsible sourcing is part of our environmental commitment, ensuring the materials we use comply with minimum requirements for environmental impact, health and safety, ethical trading, local sourcing and restricted materials.

### How we work

Responsible sourcing is managed through a plan that sets out how the materials required for a specific contract will be responsibly sourced and how the supply chain will meet our minimum requirements. For example, we require that 100% of timber, steel and concrete is responsibly sourced and that 25% of other materials are responsibly sourced. Contractors must have a responsible sourcing plan showing how this will be achieved. They also have to set measurable targets and produce mitigation plans for when targets are missed.

Contractors must also produce a design for the 'deconstruction' plan for their assets. Required for assets with a service life of 60 years or less, this includes details about the materials an asset is made from, so it can be maintained and deconstructed while retaining its composite materials at the maximum value. These plans also support modular design, so assets can have modules swapped out for repair or upgrade without whole units having to be replaced.

The main construction materials used in the Project must meet a minimum level of certification accepted by the Building Research Establishment. Reused materials also fall under this heading, which allows for the reuse of excavated materials from sites and a wider reuse of surplus materials as long as our supply chain partner is comfortable with the material quality.

### Case study

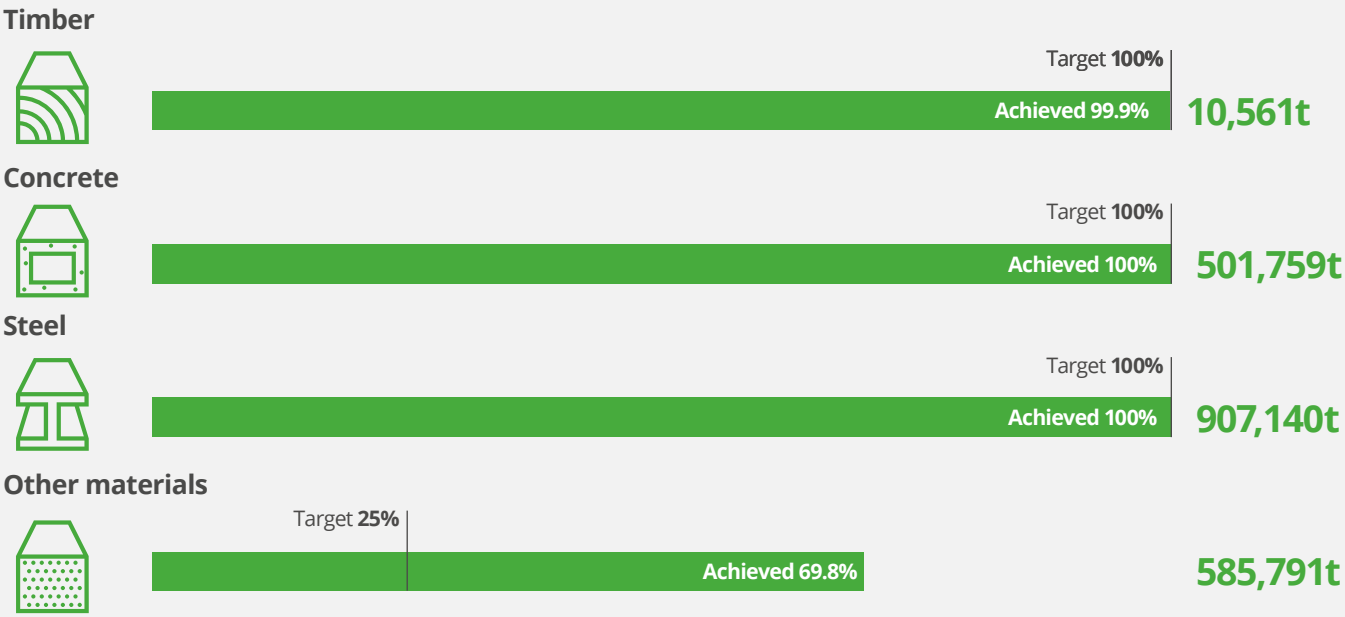
#### Innovative concrete set for UK first

Patented fibre-reinforced concrete to be used on HS2 reduces material use, carbon and costs.

In what is thought to be a UK first, HS2 joint venture partner EKFB is pioneering the use of Ultra-High Performance Fibre Reinforced Concrete (UHPFRC) along a section of the Phase One route. The new material uses less concrete and steel than traditional reinforced concrete and is also more durable, meaning it saves resources, carbon emissions and maintenance costs. Initially used to build bridges on EKFB's section of the route, UHPFRC could be rolled out across the whole line.

# Responsible consumption and production
## Responsible sourcing

**Proportion of construction materials responsibly sourced (by mass – tonnes)**




### What we are doing

In 2021, we held an inaugural Responsible Sourcing Working Group, in which contractors expressed interest in a holistic approach to sourcing that included elements such as 'upcycling'. We are also engaging with the Supply Chain Sustainability School[5] to deliver contractor training.

We engage with the Major Infrastructure – Resources Optimisation Group (MI-ROG) and the CARES Sustainable Constructional Steels scheme on responsible sourcing of materials and we are always looking for partners to help make our processes more efficient.

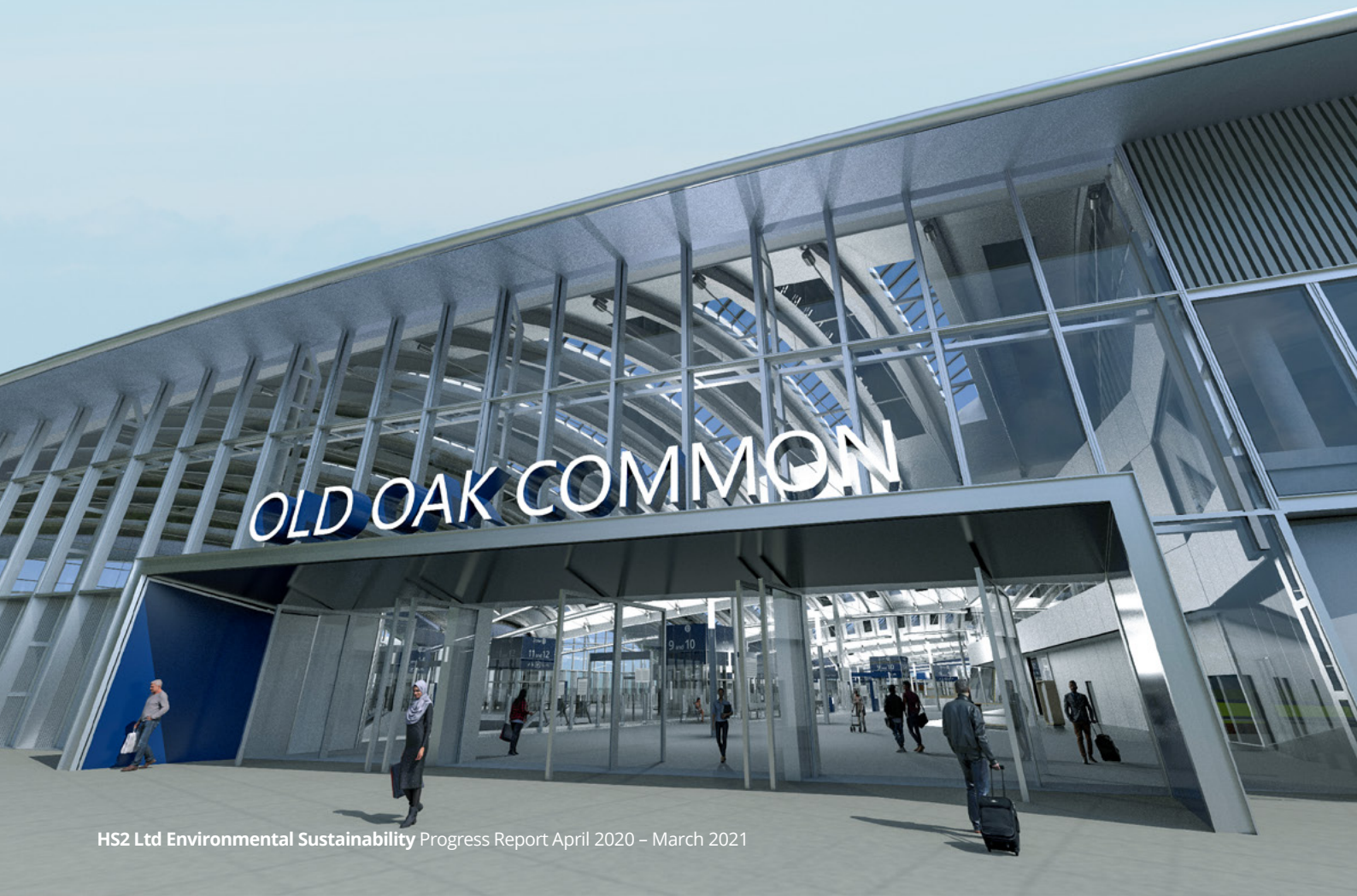
### How we are doing

Overall, we are achieving our targets. We have had some historical issues with responsible sourcing certification management that has occasionally led to materials being reported non-certified. In most cases, the data is updated the following month once certifications have been confirmed. We continue to work with our supply chain to improve reporting on responsible sourcing data.

5 **supplychainschool.co.uk/**

# Progress on overarching commitments

We have environmental commitments that are not specific to our five environmental sustainability objectives but still apply across all our work. These commitments require our contractors to achieve a high performance rating under BREEAM and CEEQUAL, two external sets of standards for the construction industry. Our overarching commitments also include our environmental opportunities realisation process, which is an internal mechanism for identifying new opportunities to deliver environmental benefits.



# Overarching commitments

## BREEAM and CEEQUAL

BREEAM and CEEQUAL are independent sustainability assessment methods developed by BRE[1] for buildings and infrastructure projects. Using these systems helps us to drive contractors' environmental performance and measure it against independent standards.

As a minimum, our main works contractors for Phase One main works and stations must achieve an 'excellent' rating under the BREEAM Infrastructure pilot scheme at design stage. After successfully completing their design stage assessments, the schemes move to CEEQUAL and must also achieve an 'excellent' rating. Early works feed into the main works assessments.

For rail systems contractors and Phase 2a infrastructure works, a CEEQUAL excellent rating must be achieved at design and construction stage. All buildings constructed as part of our contracts must achieve a BREEAM excellent rating. We also set requirements over and above those needed for an excellent rating to drive performance in priority areas.

By pushing for these high scores, we are leading the industry to higher standards. For example, the BREEAM excellent rating, which represents best practice for sustainability, is only awarded to the top 10% of buildings[2].

### BREEAM/CEEQUAL

#### BREEAM buildings

| Contract | Target rating | Design rating (as at March 2021) | Post-construction rating (as at March 2021) |
|---|---|---|---|
| Euston | Excellent (70%) | On target | On target |
| Old Oak Common | Excellent (70%) | On target | On target |
| Interchange | Excellent (70%) | Outstanding achieved (86%) | On target |
| Curzon Street | Excellent (70%) | On target | On target |

### BREEAM infrastructure/CEEQUAL

| | | BREEAM infrastructure | CEEQUAL |
|---|---|---|---|
| Contract | Target rating | Design rating (as at March 2021) | Post-construction rating (as at March 2021) |
| SCS JV | Excellent (70%) | Excellent achieved (82.6%) | On target |
| Align JV | Excellent (70%) | On target | On target |
| EKFB JV | Excellent (70%) | On target | On target |
| BBV JV | Excellent (70%) | On target | On target |

**Notes:**
- An 'Excellent' rating is achieved if the current projected score is ≥70%+ for BREEAM infrastructure and ≥75%+ for CEEQUAL.
- 'On target' achieved if 'current projected score' – 'credits targeted, high risk' ≥ target rating.
- Interchange station row: The target rating for the station is 'Excellent' but we have achieved a design rating of more than 85% which is the threshold for the 'Outstanding' rating.

1 **bregroup.com**

2 **breeam.com/BREEAMIntNDR2016SchemeDocument/content/03_scoringrating_all/rat_benmks_all.htm**

# Overarching commitments

## Case study

### 'Outstanding' HS2 station

Interchange station achieves the highest BREEAM score.

The design for Interchange station achieved a BREEAM outstanding rating – the highest possible – in April 2020. Our environment team worked with the designers to identify opportunities to achieve this high rating and incorporate them into the design. Our environmental approach builds elements such as net-zero regulated carbon into designs. Interchange includes a range of sustainability features including photovoltaic energy generation, rainwater harvesting, air source heat pumps, EV charging points and cycle storage. The interim certificate awarded to Interchange at the design stage puts it in the top 1% of buildings in the UK and is a global first for a railway station.

Work towards the BREEAM and CEEQUAL standards involves many roles across our teams, from design and engineering to project management. For both BREEAM and CEEQUAL, a working group brings us together with contractors every quarter to discuss technical issues. Over the past year, this has focused on the transition process for our Phase One early works and main works from the BREEAM Infrastructure pilot scheme (at the design stage) to the new CEEQUAL Version 6 scheme (for construction).

We monitor performance against both standards on a quarterly basis and report progress to the DfT. Each contract is pre-assessed to show where credits towards the ratings could be achieved.

Over the past year, one key challenge has been meeting our BREEAM Environmental Minimum Requirement (EMR) for all buildings. The London Underground ticket hall at Euston station is assessed separately to the main HS2 station but must still comply with the EMR. This has presented a challenge as the BREEAM scheme is not intended for underground buildings, so we have had to work with the Building Research Establishment (BRE) to find a solution. We have agreed a revision to our bespoke criteria for stations specifically for the ticket hall. This adapts the criteria so they are suited to underground buildings.

All HS2 Phase One main works contractors should achieve their design-stage BREEAM infrastructure assessments in 2021. This year will see strategy-stage assessment for CEEQUAL begin, as well as the construction-stage CEEQUAL assessments for the Phase One main works and design-stage assessments for rail systems and Phase 2a early works.

# Overarching commitments
## Our environmental opportunities realisation process

### Case study

#### Uncovering sustainability potential

Main works contractor BBV used the environmental opportunities realisation process to identify improvements.

BBV's ecology team used the process to find opportunities to increase biodiversity or expand the quality of green space in existing designs. Working with a wider team, BBV identified opportunities with the most positive environmental impact and assessed whether these were subject to time constraints. The opportunities, for example, exploring the possibility of cultivating road and railway verges with low-maintenance grassland, are now being investigated.

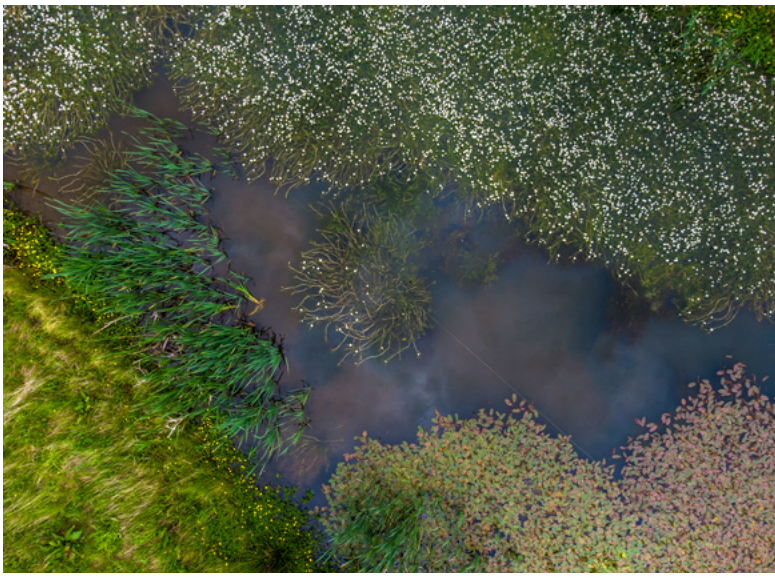
We have a process to identify, prioritise, investigate and implement new environmental opportunities. It covers all known and emerging environmental topics and helps to improve standard practice.

We provide our contractors with this process and associated guidance, and collaborative management software to manage the deliverables. Contractors have access to dedicated training from our subject-matter experts and continual support from our environmental team.

All phases of the Project are now engaged with this process and we have opportunities for all contracts that are in the process of being developed through to implementation. Phase One early works contractors have contributed finalised good practice case studies, and early design opportunities have already been identified for Phase 2b.

To date, our project teams have implemented 110 opportunities, with a further 382 prioritised and under active investigation, and 54 under development.

The process supports many aspects of HS2, including work to achieve PAS 2080 verification for carbon management in infrastructure[3] and measuring our circular economy activity. It will also create a library of case studies that will help to move the wider industry forward.



Wildlife regeneration measures near Kenilworth, Warwickshire.

3 **bsigroup.com/en-GB/our-services/product-certification/product-certification-schemes/pas-2080-carbon-management-in-infrastructure-verification/**

# Our approach

# Environmental sustainability governance

## HS2 Ltd Board

The HS2 Ltd Board provides oversight on environmental sustainability for HS2. There are two Board sub-groups for environment: the Health, Safety, Security and Environment (HSSE) Committee and the Environmental Sustainability (ES) Committee. The Board Chair also chairs the ES Committee.

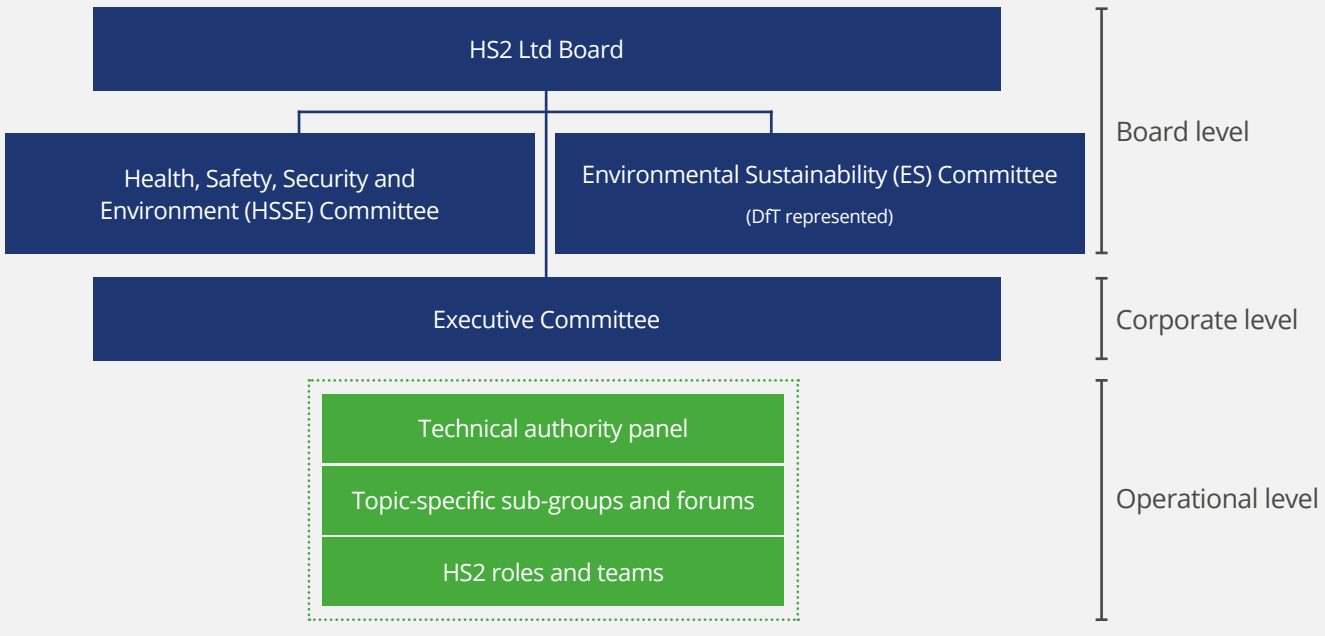
## Health, Safety, Security and Environment Committee

From an environmental perspective, the HSSE Committee monitors compliance with statutory and regulatory requirements. Its responsibilities include reviewing performance against targets, monitoring risk, reviewing our independently certified environmental management system and assuring lessons learned. The HSSE Committee is chaired by our Chief Executive Officer. Its membership includes non-executive directors and senior executives with responsibility for safety and assurance, infrastructure, human resources, delivery, environment, land and property and Phase Two. The HSSE Committee meets at least bi-monthly. It submits a report to the Board for information after each meeting.

## Environmental Sustainability Committee

The ES Committee is responsible for strategic direction and scrutiny in support of our environmental sustainability objectives. It supports our strategic goal to 'create an environmentally sustainable solution'. Membership of the ES Committee includes non-executive directors and senior executives with responsibility for technical requirements, project delivery and stakeholder engagement. We invite external stakeholders to attend committee meetings: in 2020, the chairs of Natural England and the Environment Agency made presentations. The ES Committee, which meets on a quarterly basis, is responsible for oversight of environmental reporting. After each meeting, it submits a report to the Board for information.

**Environmental sustainability governance**



# Environmental sustainability governance

## HS2 Ltd Executive Committee

The Executive Committee manages our day-to-day governance and operations. Executive Committee members are measured on their delivery of the corporate priorities that are set out through the key performance indicators (KPIs) in our Corporate Plan. In 2020 – 2021, this included commitments on carbon management. The CEO's remuneration is linked to effective delivery of these KPIs.

## Operational level

Our employees, contractors and suppliers have operational responsibility for specific issues and solutions for environmental sustainability.

## Technical authority panel

This decision-making and review body is responsible for managing technical change, technical communication to suppliers and setting technical baselines.

## Sub-groups and forums

Specific aspects of environmental sustainability are managed by a range of topic-specific working groups, forums and sub-groups. They cover the following topics.

- BREEAM/CEEQUAL
- Carbon reduction
- Climate change adaptation and resilience
- Responsible sourcing
- Planning
- Heritage
- Environmental health
- Innovation

## HS2 roles and teams

Our environment and town planning director and their direct reports are responsible for specialist topics and help set and oversee policy and assure outputs.

The heads of environment and engineering in Phase One and heads of environment in Phase Two make sure delivery by contractors and consultants meets environmental sustainability policies and contributes towards requirements.

For more information on governance, please visit **here**.

# Prioritising environmental sustainability topics

We need to prioritise the different areas of our environmental sustainability work to make sure we act on the issues that are most important to HS2 – both in building and operating the railway – and to our stakeholders.

We have identified 20 environmental sustainability topics such as 'net change in biodiversity', 'carbon' and 'air quality'. The process we use to prioritise these topics is called materiality.

A materiality assessment was carried out in late 2020 and early 2021. The methodology follows the Global Reporting Initiative Standard foundation principles[1]. It exclusively covers topics relating to environmental sustainability and it is based on HS2's design and construction stage. The materiality assessment has helped to decide the topics in this report.

## The materiality process

Our sustainability specialists identified 20 environmental topics based on our five environmental policy objectives. We then held meetings and interviews with internal and external stakeholders and asked them to rank the importance of each material topic. Each topic was given a 'stakeholder priority score' from 0 (no importance) to 10 (extremely important). A session was held with industry experts from the HS2 Independent Design Panel to examine the methodology. Members of The National Environment Forum, which comprises statutory bodies, were asked to validate the stakeholder priorities. We also consulted NGOs including the Canal & River Trust, Woodland Trust and National Trust.

To establish the significance of the topics for HS2, we held an internal workshop with key department heads. Topics were given a 'significance of impact' score from 0 (no impact) to 10 (extremely impactful).

We then took an average of the scores from our stakeholders and department heads to plot the 20 topics on to a matrix.

**Our materiality process**

**1. Identifying topics**
We identified 20 environmental sustainability topics to prioritise our work.

↓

**2. Determining stakeholder priorities**
Interviews and meetings confirmed the priority scoring to stakeholders.

↓

**3. Establishing significance of impact**
Topics were scored according to their impact on HS2.

↓

**4. Plotting the materiality matrix**
Stakeholder priorities and impact scores were plotted on to a matrix.

## Engaging with external stakeholders

We carried out interviews, meetings and polls with a broad group of stakeholders to create and check the materiality assessment. This included:

- National Environment Forum members: Environment Agency, Historic England, Natural England and Forestry Commission;
- sustainability NGOs including Canal & River Trust, National Trust, The Wildlife Trusts and Woodland Trust; and
- The Department for Transport.

We also considered the interests of the construction and engineering industries; communities; businesses; local authorities; and MPs.

1 **globalreporting.org/standards**

# Prioritising environmental sustainability topics


## Prioritising material topics

All topics have been included in this report within the relevant objectives sections and the materiality assessment (above) shows us where we must focus. Topics in the top right-hand corner of the matrix reflect the most important priorities for HS2 and our stakeholders. As the matrix shows, carbon and net change in biodiversity score the highest on both stakeholder priority and significance of impact.

## Improving our materiality process

We asked the independent HS2 Design Panel[2] to review our materiality assessment and it has recommended ways to help strengthen our process and the outcomes. This includes considering additional topics. We will consider these recommended changes in our next assessment in 2022.

2 gov.uk/government/publications/hs2-design-panel

# Stakeholder and community engagement

## Our approach

For local communities, our teams and contractors are becoming an increasingly visible presence as we start to build Phase One. Keeping people up to date about our work, particularly those who are directly affected, is a priority for us.

We use meetings, site visits, webinars, reporting and events to exchange information, knowledge and advice with our stakeholders and communities. This helps us to improve governance, assurance and delivery. Examples of our engagement for environmental sustainability are listed in the table on **page 58**.

We also engage with stakeholders on wider topics including community matters and employment opportunities. For more information on our wider engagement, please read our **Community Engagement Progress Reports** and **visit our website**.

## Our service level agreements (SLAs)

We have a number of service level agreements with statutory authorities to ensure they have the necessary resources to review our applications for licences and permits and provide technical advice. Key organisations include the Environment Agency, Natural England, Forestry Commission and the Canal & River Trust. SLAs provide a three-year agreement, which is reviewed and extended as HS2 develops. Due to the size, pace and demands of the Project, the SLAs are an important way to make sure organisations are staffed to provide the required level of service. Our environmental SLAs help to ringfence the necessary support of more than 40 full-time employees per year. Stakeholders operating under an SLA have been indicated by an asterisk (*) in the table on the next page.

## Engaging communities during Covid-19

We understand the disruption our work can cause in local communities and we are committed to improving our performance. We outlined our approach in our Community Engagement Strategy, which was published in 2017. It is being refreshed in 2021 to reflect the progress of the Project and the start of main works construction on Phase One. We publish case studies and data on our progress against each of the commitments in the strategy, as well as our commitment to public response in regular public progress reports.

Covid-19 meant most of our engagement this past year was online. We ran virtual design events and exhibitions, community drop-in sessions and webinars on topics ranging from archaeology to local business opportunities. A total of 1,534 online engagements were held in connection with HS2 between April 2020 and March 2021, with 9,303 people taking part. The number of visits to our 14 local community websites increased by 33% to 198,172, with the most visits recorded by our websites covering Euston, Warwickshire, Buckinghamshire and Oxfordshire.

# Stakeholder and community engagement

| Stakeholder group | Stakeholders | Engagement |
|---|---|---|
| **NGOs** | • Woodland Trust<br>• Canal & River Trust*<br>• The Wildlife Trusts<br>• The National Trust<br>• The Country Land and Business Association | • We engage with NGOs who specialise in sustainability to develop our commitment to environmental sustainability. We work with partners to deliver programmes and guide our activities.<br>• We developed an online portal with the Woodland Trust to share information.<br>• Canal & River Trust: Our SLA supports the trust to provide dedicated staffing to deal with our applications for consents and delivery of undertakings and assurances. |
| **Funded project partners** | • Groundwork UK<br>• Carbon Literacy Project | • We fund these organisations to administer grant schemes and carbon-related training respectively.<br>• We work with partners to report on environmental activity. In 2021, Groundwork UK reported on some of our **community and environmental programmes**. |
| **Government departments and statutory bodies** | • Department for Transport<br>• National Environment Forum (Environment Agency*, Natural England*, Historic England*, Forestry Commission*, Defra)<br>• Joint Regulator Forum (Health and Safety Executive), Office of Road and Rail, Environment Agency, local authority representatives | • DfT is HS2 Ltd's sponsor and we engage daily through our sponsorship team. There is a formal governance structure including boards such as the Sponsor Board.<br>• We meet the National Environment Forum during design and construction to review our environmental impacts.<br>• Meetings with the Joint Regulator Forum discuss regulatory issues for the design and construction of HS2. |
| **Government representatives** | • MPs (along route and off-route) | • We engage with MPs across the UK to raise awareness of the Project and its benefits.<br>• Additional engagement programmes for MPs on the route keep them informed about HS2 in their area including ecology works and environmental mitigation. |

* Stakeholders currently operating under an SLA.

# Stakeholder and community engagement

| Stakeholder group | Stakeholders | Engagement |
|---|---|---|
| **Regional and local authorities** | • Ecology Technical Group (comprising NGOs, statutory bodies and local authorities)<br>• Planning Forum (and sub-groups, e.g. environmental health and heritage) | • We sit on the Ecology Technical Group to achieve best outcomes for ecology.<br>• Bi-monthly meetings with the Planning Forum including local authorities and the DfT. |
| **Sector and industry groups** | • Green Building Council<br>• Infrastructure Client Group (through the Institute for Civil Engineers)<br>• Supply Chain School<br>• Rail Safety and Standards Board (RSSB) | • We are a member of the Infrastructure Client Group's (ICG) Carbon Task Group.<br>• Represented on RSSB groups including the Sustainable Rail Leadership Group, the Sustainable Rail Executive and the Carbon Management Working Group. This allows us to share knowledge and help shape strategic documents such as the Sustainable Rail Strategy. |
| **Contractors and suppliers** | • Multiple contractors and suppliers | • We engage with suppliers on our environmental sustainability objectives through our HS2 Supplier Relationship Management programme.<br>• Suppliers must report sustainability data and take part in topic-specific forums. |
| **Academic institutions** | • London School of Economics (LSE)<br>• Durham University<br>• Imperial College London<br>• University of Oxford<br>• University of Birmingham<br>• The Francis Crick Institute<br>• Loughborough University<br>• Cambridge Centre for Smart Infrastructure and Construction<br>• The UK Rail Research and Innovation Network<br>• UK Collaboratorium for Research On Infrastructure And Cities | • We work with academic institutions to develop industry-leading research into sustainable solutions.<br>• We are sponsoring a student at Loughborough University to complete a PhD on "Embedding circular economy principles into infrastructure". |

# HS2 and the UN Sustainable Development Goals

The UN Sustainable Development Goals (SDGs)[3] are "a blueprint to achieve a better and more sustainable future for all". The SDGs represent 17 social, economic and environmental priorities, designed to combat the global challenges facing humanity by 2030.

As the largest infrastructure project in decades, HS2 has an important part to play in the UK's progress toward the SDGs. As a public body, we report on the SDGs in line with the Sustainability Reporting Guidance 2020/21 published by the HM Treasury[4].

We have mapped our environmental sustainability work to seven of the 17 SDGs. We have looked at the goals where we can have the most impact based on our efforts and contributions and measured our relevant performance. We have aligned with the SDGs to goal-level, not yet to target-level. At the moment, our contributions listed here only reflect our work on environmental sustainability and do not include our work on economic or social sustainability.

## How HS2 contributes to the UN SDGs

Our **environmental objectives** contribute to seven of the **17 SDGs**.


3 **sdgs.un.org/goals**
4 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907011/Sustainability_Reporting_Guidance_2020-21.pdf**

# HS2 and the UN Sustainable Development Goals

## How our five Environmental Policy Objectives contribute to the UN SDGs


### Clean water and sanitation

**HS2 Green Corridor**

**Our performance towards the SDGs**

- In the Chilterns and Colne Valley we have provided extra water treatment capacity and new infrastructure for greater water resilience and flexibility.


### Affordable and clean energy

**Climate change**

**Our performance towards the SDGs**

- Interchange station's design includes minimising demand for carbon using natural ventilation and daylight. Energy efficient technology will be incorporated, such as air source heat pumps and LED lighting. The station and a maintenance facility have more than 2,000m$^2$ of solar panels generating zero-carbon electricity.


### Industry, innovation and infrastructure

**Responsible consumption and production**

**Our performance towards the SDGs**

- Sponsoring a Loughborough University student on a PhD on "Embedding circular economy principles into infrastructure".


### Sustainable cities and communities

**About HS2**, **Historic environment**

**Our performance towards the SDGs**

- HS2 will be the backbone of a low-carbon transport network for the UK. It will provide extra capacity and is integral to rail projects in the North and Midlands, helping to rebalance the economy. Linking London, the Midlands, the North and Scotland, HS2 will serve more than 25 stations, including eight of Britain's 10 largest cities, and will connect about 30 million people.
- We have undertaken precautions to protect and safeguard the historic environment around HS2. We have engaged the public in our cultural and natural heritage.


### Responsible consumption and production

**Responsible consumption and production**

**Our performance towards the SDGs**

- 100%* of steel responsibly sourced.
- 100%* of concrete responsibly sourced.
- 99.9%* of timber responsibly sourced.
- 97.1%* of waste diverted from landfill.
- 94.6%* of excavated material converted into beneficial use.
- Circa 70,000 biodegradable tree guards used this planting season instead of plastic.


### Climate action

**Climate change**

**Our performance towards the SDGs**

- 24.6% carbon emissions reduction against the carbon baseline for HS2 Phase One by March 2021 (the target for 2020/21 was a 23% reduction).
- PAS 2080 accreditation achieved.


### Life on land

**HS2 Green Corridor**

**Our performance towards the SDGs**

- 703,950* trees successfully planted during the construction of HS2.
- 92 hectares of additional new woodland created through the Woodland Fund.
- £756k funding provided to 25 landowners through the Woodland Fund via the Forestry Commission.

* Data with an asterisk (*) has been externally assured. All data without an asterisk has not been externally assured and is an internal calculation based on data provided by our supply chain.

# Technical information

# About this report

The HS2 Environmental Sustainability Progress Report 2020 – 2021 reflects the period April 2020 to March 2021. This is our first Environmental Sustainability Progress Report and we will continue to publish these reports each year.

For any enquiries, please contact us:
**hs2.org.uk/in-your-area/contact-us/**

## Environmental sustainability data

Data has been reported as figures and data visualisation to offer an accurate and transparent picture of our progress against our commitments. Detailed performance data for the topics covered in this report can be found in our **Environmental Sustainability Data Appendix**.

Please note: the reporting period is the 2020 – 2021 financial year (April 2020 to March 2021). However, due to the way the data is reported into our main reporting platform, data is reported from March 2020 to February 2021, unless stated otherwise. This is in line with the annual corporate reporting period.

All data presented relates to Phase One. The only exemptions are the no net loss (NNL) calculation on page 4, for which we also have the Phase 2a baseline, and the carbon footprint data on page 6, which includes the Phase 2a rail systems (including depots). This has been noted next to the relevant data points.

Phase One data has been grouped into three categories.

- Enabling works contractors (EWCs) – CSJV, Fusion, LMJV
- Main works civil contractors (MWCCs) – SCS, Align, EKFB, BBV
- Stations (Euston, Old Oak Common*)

* Interchange and Curzon Street stations are still at design stage so they are only included in the BREEAM/CEEQUAL datasets.

## Reporting scope and methodology

Specific scope and methodology notes regarding our performance data have been provided within the **Environmental Sustainability Data Appendix**.

## External assurance

Lloyd's Register (LR) has provided limited assurance on selected information and key performance indicators (KPIs). The KPIs verified by LR can be found in the **Environmental Sustainability Data Appendix**. You can find our limited assurance statement within both **this report** and our **Environmental Sustainability Data Appendix**.

## Frameworks and standards

This report has been prepared with reference to the Global Report Initiative (GRI) Standards: Core option and in line with the GRI Reporting Principles for defining report content. The GRI Index within the **Environmental Sustainability Data Appendix** can be used as a reference for our disclosures against the relevant requirements.

This report has also been written in line with the considerations and recommendations of the HM Treasury Sustainability Reporting Guidance 2020-21[1].

The GRI Index and Treasury guidance are outside the scope of LR verification.

1 **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907011/Sustainability_Reporting_Guidance_2020-21.pdf**

# LR Independent Assurance Statement

## Relating to the Environmental Sustainability Data Appendix of the HS2 Ltd Environmental Sustainability Report for the period from April 2020 to March 2021

This Assurance Statement has been prepared for High Speed Two Ltd (HS2) in accordance with our contract but is intended for the readers of this Report.

### Terms of engagement

Lloyd's Register Quality Assurance Limited (LR) was commissioned by High Speed Two Ltd (HS2) to provide independent assurance on selected information and key performance indicators within the Environmental Sustainability Data Appendix ("the data download") of the HS2 Ltd Environmental Sustainability Report against the assurance criteria below to a limited level of assurance using LR's verification procedure.

Our assurance engagement covered HS2 Enabling Works Contracts, Main Works Civil Contracts and Stations Contracts in Phase One of the project. The only exemptions are the whole life carbon footprint and no net loss in biodiversity datasets which include Phase 2a baseline data. Specifically, we verified conformance with HS2 Ltd Technical Standards for Environmental Sustainability Reporting for the following selected datasets:

- Progress on no net loss in biodiversity calculation
- Number of trees and shrubs planted
- Woodland Fund
- Whole life carbon footprint
- Energy and fuel consumption data
- Air quality
- Responsible sourcing
- Construction and demolition waste
- Excavated material
- Beneficial reuse of timber
- Water
- Environmental Incidents
- Considerate Constructors Scheme
- BREEAM buildings
- BREEAM infrastructure/CEEQUAL

**Note**: Ancient Woodland and Material Efficiency Metric datasets were withdrawn from the initial scope of engagement by HS2. It is our understanding HS2 will publish a report on Ancient Woodland in 2022.

The scope of our assurance engagement reflects the current stage of the HS2 Phase One programme and did not include other programmes such as the Rail Systems and Rolling Stock programmes where HS2 has not awarded the contracts.

LR's responsibility is only to HS2. LR disclaims any liability or responsibility to others as explained in the end footnote. HS2 responsibility is for collecting, aggregating, analysing and presenting all the data and information within the report and for maintaining effective internal controls over the systems from which the report is derived. Ultimately, the report has been approved by, and remains the responsibility of HS2.

## LR's Opinion

Based on LR's approach, except for the effect of the matters described in the Basis for Qualified Opinion, nothing has come to our attention that would cause us to believe that HS2 has not, in all material respects:

- Met the requirements above
- Disclosed accurate and reliable performance data and information as no errors or omissions were detected

The opinion expressed is formed on the basis of a limited level of assurance and at the materiality of the professional judgement of the verifier.

**Note:** The extent of evidence-gathering for a limited assurance engagement is less than for a reasonable assurance engagement. Limited assurance engagements focus on aggregated data rather than physically checking source data at sites. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

## Basis for Qualified Opinion

Data and information is self-assured by contractors in accordance with the HS2 Technical Standards for Environmental Sustainability Reporting. Non-material errors were noted in the reporting of Number of Trees Planted, Responsible Sourcing, Air Quality, Construction and Demolition Waste, Excavated Material and Beneficial Reuse of Timber. HS2 should reduce the probability of errors by assessing the reliability and quality of contractor environmental sustainability data in Technical Assurance Reviews.

## LR's approach

LR's assurance engagements are carried out in accordance with our verification procedure. The following tasks were undertaken as part of the evidence gathering process for this assurance engagement:

- Interviewing HS2 Subject Matter Experts who were responsible for the HS2 Technical Standards for Environmental Sustainability Reporting which enable efficient and effective environmental sustainability reporting.
- Auditing the HS2 data management systems to confirm that there were no significant errors, omissions or mis-statements in the report. We did this by reviewing the effectiveness of data handling procedures, instructions and systems, including those for internal verification.
- Reviewing data and information submitted by Enabling Works Contractors, Main Works Civil Contractors and Stations Contractors into the HS2 data management system (HORACE).
- Interviewing the HS2 Environmental Management System & Reporting Analyst who was responsible for reviewing and assuring the contractor data submissions.
- Interviewing the HS2 Senior Environmental Managers of the Project Delivery Team who were responsible for the collation of data and information disclosed in the data download.

## Observations

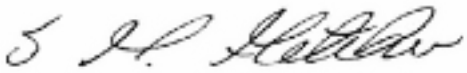
Further observations and findings, made during the assurance engagement, are:

- Effective processes are established to assure contractor No Net Loss in Biodiversity and Life Cycle Assessment data submissions.
- The methodology used for the No Net Loss in Biodiversity for Replaceable Habitats calculation is based on consultation with the Department for Environment, Food & Rural Affairs (DEFRA) and Natural England. Ancient Woodland is considered to be irreplaceable and is not included in the calculation.
- HS2 should retain clear and transparent audit trails to reduce the time required to verify data reported in Climate Change, Environmental Incidents and Number of Trees Planted.

## LR's standards, competence, and independence

LR ensures the selection of appropriately qualified individuals based on their qualifications, training and experience. The outcome of all verification and certification assessments is then internally reviewed by senior management to ensure that the approach applied is rigorous and transparent.

LR is HS2's certification body for ISO9001, ISO14001, ISO45001 and PAS2080. The verification and certification assessments are the only work undertaken by LR for HS2 and as such does not compromise our independence or impartiality.



Steve Fletcher
LR Lead Verifier
On behalf of Lloyd's Register Quality Assurance
1 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES, UK.

Dated: 14th December 2021

LR reference: LRQ00004067

# Glossary

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| Appraisal of Sustainability | The appraisal of sustainability report describes the extent to which the proposed new high-speed railway between London and the West Midlands either supports or detracts from the objectives for sustainable development. The report focuses on a scheme that has been identified by HS2 Ltd as being preferred in overall terms, taking account of different factors including strategic fit, build cost, engineering and economic benefits, as well as sustainability. |
| Additional Provisions (APs) | Additional Provisions are the form in which changes to Parliamentary Bills are made. |
| **Biodiversity Investment Fund (BIF)** | Fund that has been allocated for projects that will enhance Biodiversity. The primary aim of BIF is to produce biodiversity gains through the creation and restoration of ecological habitats along the line of the Phase 2a route. BIF will also encourage a broad range of secondary outcomes to enable a diverse range of projects. |
| Biodiversity units | A 'biodiversity unit' is a unit of account for a habitat according to its relative biodiversity value. |
| **BREEAM** | Global sustainability assessment method for infrastructure and building projects. |
| **Business and Local Economy Fund (BLEF)** | HS2 fund set up to benefit business and the local economy along the Phase One and Phase 2a routes. |
| **Carbon Literacy Project** | Education scheme run by the Carbon Literacy Trust, which aims to raise awareness of carbon emissions and climate change-related issues. |
| Carbon Reduction Collaboration Group | We host this group to bring together civil engineering and construction partners to share challenges and best practice on carbon reduction. |
| **CARES** | Independent certification body for constructional steels. |
| **CEEQUAL** | Global sustainability assessment method for civil engineering and public realm projects. |
| Circular economy | Economic model that aims to keep resources in use and at their highest value for as long as possible. It looks at the lifecycle of a process, reconsidering what might be seen as waste and seeking the best whole-life outcome. |
| Climate Change Adaptation and Resilience Reports | Reports supplied by our contractors identifying opportunities to improve climate change adaptation and resilience. |
| **Code of Construction Practice (CoCP)** | Control measures and standards to be implemented in the construction of HS2 Phase One. |
| **Community and Environment Fund (CEF)** | HS2 fund set up to benefit communities along the Phase One and Phase 2a routes. |

# Glossary

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| **The Dasgupta Review** | The Dasgupta Review is an independent, global review on the Economics of Biodiversity led by Professor Sir Partha Dasgupta (Frank Ramsey Professor Emeritus, University of Cambridge). The Review was commissioned in 2019 by HM Treasury and has been supported by an Advisory Panel drawn from public policy, science, economics, finance and business. |
| **Department for Environment, Food & Rural Affairs (Defra)** | Defra is a ministerial department responsible for improving and protecting the environment. Their aim is to grow a green economy and sustain thriving rural communities. They also support our world-leading food, farming and fishing industries. |
| **Department for Transport (DfT)** | DfT is a ministerial department, working with agencies and partners to support the transport network that helps the UK's businesses and gets people and goods travelling around the country. They plan and invest in transport infrastructure to keep the UK on the move. |
| Ecology Review Group (ERG) | An Ecology Review Group comprised of relevant statutory bodies, non-governmental organisations and local authorities will be established to review the outputs of monitoring for habitat creation sites and make recommendations for remedial action where appropriate. |
| Ecology Site Management Plans | Set up for every area of habitat creation along the route, these plans specify the site objectives, the measures to be taken to establish and manage the habitats/planting, the detailed planting requirements and the monitoring regime. They are used to measure success and inform the development of an effective programme of adaptive management. |
| Enabling works | The preparation of a site for the first stage of development, for example, ground clearance, groundworks or creating access roads. Also known as early works. |
| **Environment Agency** | Public body sponsored by the Department for Environment, Food & Rural Affairs, working to create better places for people and wildlife, and support sustainable development. |
| Environmental Impact Assessments (EIAs) | A process to systematically assess the potential environmental effects of proposed development. An environmental impact assessment is a legal requirement for certain public and private projects. |
| **Environmental Minimum Requirements (EMRs) for Phase One**<br>**Environmental Minimum Requirements (EMRs) for Phase 2a** | The high-level environmental and sustainability commitments that accompany the legislation for HS2. |
| **HS2 Phase One environmental statement (ES)**<br>**HS2 Phase 2a environmental statement (ES)** | A suite of documents providing the necessary environmental information in respect of an environmental impact assessment undertaken for a proposed development. It must include all information that is reasonably required to assess the potential significant environmental effects. |

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| Environmental Sustainability Committee | An internal HS2 Ltd committee that provides strategic direction in support of HS2's sustainability goals. |
| **Global Reporting Initiative (GRI)** | The world's most widely used framework for sustainability reporting. |
| Health, Safety, Security and Environment (HSSE) Committee | An internal HS2 Ltd committee responsible for assuring statutory and regulatory environmental compliance. |
| Historic environment | The National Planning Policy Framework defines historic environment as: "All aspects of the environment resulting in the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora." |
| Historic Environment Research and Delivery Strategy (HERDS) | Our approach to historic environment works. |
| **HS2 Green Corridor** | Network of climate-resilient habitats and green spaces that runs alongside the HS2 line. |
| **Infrastructure Industry Innovation Partnership (I3P)** | Industry-wide collaborative network for innovation in construction and infrastructure. |
| **Institute of Environmental Management & Assessment (IEMA)** | Professional body supporting sustainability initiatives. |
| **Intergovernmental Panel on Climate Change (IPCC)** | The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change. The IPCC was created to provide policy makers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation options. |
| Main works | The major construction that takes place once **enabling works** are completed, such as building tunnels, viaducts, stations and the railway itself. Also called main works civils, or main works civils contracts. |
| **Major Infrastructure – Resources Optimisation Group (MI-ROG)** | Circular economy forum for infrastructure operators. |
| National Technical Specification Notices (NTSNs) | NTSNs set standards to be complied with in relation to the design, construction, placing in service, upgrading, renewal, operation and maintenance of the parts of the rail system, as well as the professional qualifications and health and safety conditions of the staff who contribute to its operation and maintenance.<br><br>They have been published by the Secretary of State for Transport pursuant to regulation 3B of the Railways Interoperability Regulations 2011 and have effect from 1 January 2021. They are applicable in Great Britain (GB) only. |
| Nature Recovery Networks | A national network of wildlife-rich places to increase and restore nature, and the role of the delivery partnership and management group. |

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| Net gain (biodiversity) | Biodiversity net gain is an approach to development, and/or land management, that aims to achieve a biodiversity credit rather than simply preventing a deficit. |
| Net zero (carbon) | Net zero refers to achieving a balance between the amount of greenhouse gas emissions produced and the amount removed from the atmosphere. There are two different routes to achieving net zero, which work in tandem: reducing existing emissions and actively removing greenhouse gases.<br><br>Net zero means any emissions would be balanced by schemes to offset an equivalent amount of greenhouse gases from the atmosphere, such as planting trees or using technology like carbon capture and storage. |
| No net loss (biodiversity) | When losses in biodiversity are compensated by gains. Details of the HS2's Phase One no net loss metric are **here**. |
| Non-Road Mobile Machinery (NRMM) | Mobile machines and transportable industrial equipment or vehicles that are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads. |
| Paris Agreement | The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. |
| **PAS 2080** | Publicly available specification setting out the requirements for the management of whole life carbon emissions in infrastructure. |
| **Phase 2a** | The HS2 route from the West Midlands to Crewe. This phase was given Royal Assent on 11 February 2021. |
| **Phase 2b** | This part of the route will be built in two sections. The western leg will connect Crewe and Manchester, with a link to the West Coast Main Line, for trains to Scotland. Subject to consultation, HS2 East will connect Birmingham and the East Midlands, linking to the Midland Mainline near East Midlands Parkway. Trains will continue to Nottingham, Derby and Sheffield on an upgraded and electrified Midland Main Line. The Government is also looking at the best way to run HS2 trains to Leeds. |
| **Phase One** | The HS2 route between London and the West Midlands. This phase is under construction. |
| Planning/Heritage/ Environment memoranda<br><br>**Phase One memoranda**<br><br>**Phase 2a memoranda** | The Planning, Heritage and Environment Memoranda are three of the suite of documents forming Phase One of the High Speed Two (HS2) Environmental Minimum Requirements (EMRs) – the overarching commitments by the Secretary of State to afford appropriate management and protection of people, communities and the natural, cultural and built environment. Their aim is to cover requirements for planning, heritage, and environment respectively. |

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| Plantation Ancient Woodlands Sites (PAWS) | Plantations on Ancient Woodland Sites are ancient semi natural woodlands that have been felled and replanted with other tree species, typically non-native ones such as spruce, fir and larch. |
| **Rail Safety Standards Board (RSSB)** | A membership organisation supporting railway members to improve safety and performance. |
| Schedule 17 | Schedule 17 of the HS2 legislation for **Phase One** and **Phase 2a** sets out the approvals and agreements required to be obtained by the nominated undertaker.<br><br>These approvals are:<br>• plans and specifications (Schedule 17 paragraphs 2, 3 and 7);<br>• matters ancillary to development (Schedule 17 paragraphs 4 and 5);<br>• road transport (Schedule 17 paragraph 6);<br>• site restoration (Schedule 17 paragraphs 8 and 12); and<br>• bringing into use (Schedule 17 paragraphs 9 and 10) |
| Soil salvage | Soil salvage is a pre-disturbance technique to conserve a site's topsoil, which is critical for maintaining nutrient cycling, organic matter, soil biota and plant propagules. In other words, it's a technique to preserved the excavated topsoil so it can be reused when the site has been decommissioned. |
| **Sustainable Development Goals (SDGs)** | Priorities set up by the United Nations to address social, economic and environmental issues by 2030. |
| **Task Force on Climate-related Financial Disclosures (TCFD)** | Recommendations set up by the Financial Stability Board for financial disclosures that take account of climate-related risks. |
| **UK Climate Predictions (UKCP18)** | The latest set of climate predictions from the UK Met Office. |
| **UK Green Building Council** | Membership organisation that aims to improve the sustainability of the built environment. |
| Water Framework Directive (WFD) | The Water Framework Directive originates from the EU but has been retained in UK law following the UK's exit from Europe. It sets out environmental objectives that must be met for all water bodies within. It aims to prevent deterioration of the water environment and improve water quality by managing water in natural river basin districts, rather than by administrative boundaries. |
| West Coast Main Line (WCML) | The West Coast Main Line is a 399-mile (641.6km) rail route between London and Glasgow, connecting major cities, including Birmingham, Liverpool and Manchester in the UK. |

# Resource list

The resources listed below provide further information on aspects of HS2 related to environmental sustainability.

## General resources:

**Environmental Sustainability Data Appendix**

**Environmental Sustainability Vision**

**HS2 Ltd Annual Report and Accounts 2020 to 2021**

**HS2 Ltd Corporate Plan 2021 to 2024**

**HS2 Phase One Environmental Minimum Requirements**

**HS2 Phase 2a Environmental Minimum Requirements**

**HS2 Sustainability Policy**

**HS2 Environmental Policy**

**Monitoring the environmental effects of HS2**

**Net Zero Carbon Plan**

**Information papers Phase One**

**Information papers Phase 2a**

**Factsheets Phase 2b**

## Topic specific resources:

Green Corridor
**Green Corridor Prospectus**

**HS2 interactive route map**

**More than a railway: HS2 and the natural environment**

Climate change
**Information Paper E9: Climate change: Adaptation and Resilience – Phase One**

**Information Paper E26: Climate change: Adaptation and Resilience – Phase 2a**

Community experience
**Environmental Minimum Requirements and Code of Construction Practice Phase One**

**Environmental Minimum Requirements for HS2 Phase 2a**

**HS2 Residents' Charter**

**Groundwork UK Impact Report**

**HS2 funds supporting communities**

Historic Environment
**Environmental Minimum Requirements – Heritage Memorandum – Phase One**

**Environmental Minimum Requirements – Heritage Memorandum – Phase 2a**

**Information Paper E8: Archaeology – Phase One**

**Information Paper E24: Archaeology – Phase 2a**

**Information Paper E12: Burial Grounds – Phase One**

**Information Paper E25: Burial Grounds – Phase 2a**

Responsible consumption and production
**HS2 circular economy principles**

**Information Paper E3: Excavated Material and Waste Management – Phase One**

**Information Paper E17: Excavated Material and Waste Management – Phase 2a**

Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

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