

# FAQ

## EXCAVATIONS AND TUNNELLING IN EUSTON APPROACHES

July 2023

High Speed Two (HS2) is the new high-speed railway for Britain.

Skanska Costain STRABAG (SCS) is the HS2 main works contractor that will build the section of HS2 between Parkway and Hampstead Road, known as Euston Approaches.

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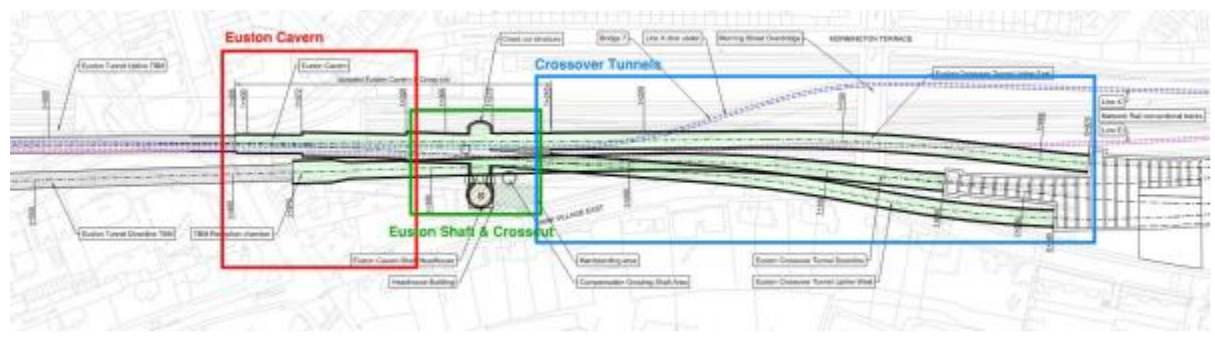
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## WHAT TUNNELS ARE YOU BUILDING?

SCS will build three underground tunnels for HS2 trains in Euston Approaches. These will run from Parkway to Mornington Street bridge. Two tunnels will be used by trains travelling from Birmingham to London (upline), and one tunnel will be used by trains travelling from London to Birmingham (downline).

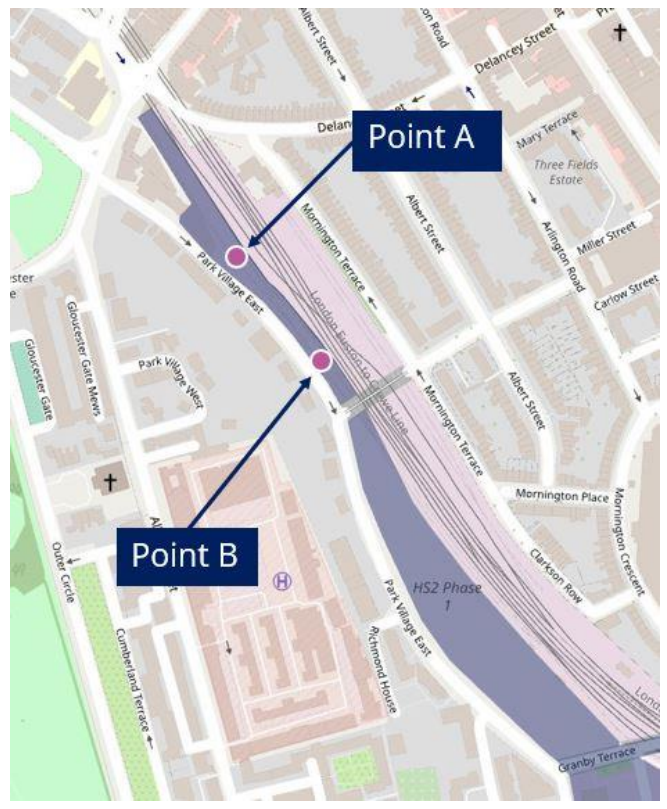
The in-bound tunnel will split into two so that trains can easily access all the platforms needed at Euston Station. Only one tunnel is needed for trains leaving the station.

Tunnelling involves major excavation. We plan to start digging from 2026. The tunnels will mainly run underneath the railway cutting, with a portion of one tunnel passing under Park Village East. All tunnel locations are within the area permitted under the HS2 Act.

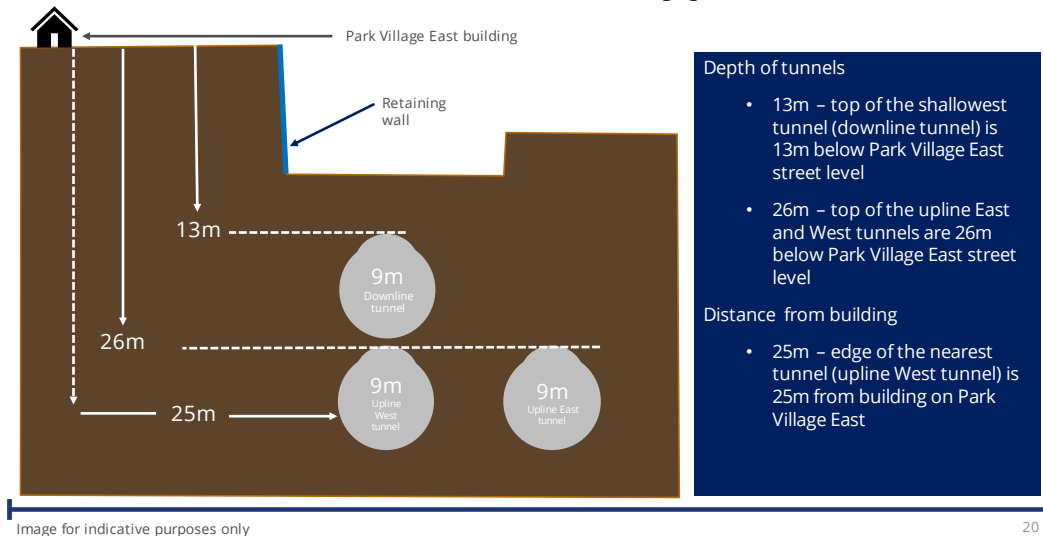


### ***Overhead view of the tunnel design***

The images below give an indication of the depth of our tunnels from street level and distance from Park Village East property boundary.



## Point A – cross-cut of Euston Approaches tunnels



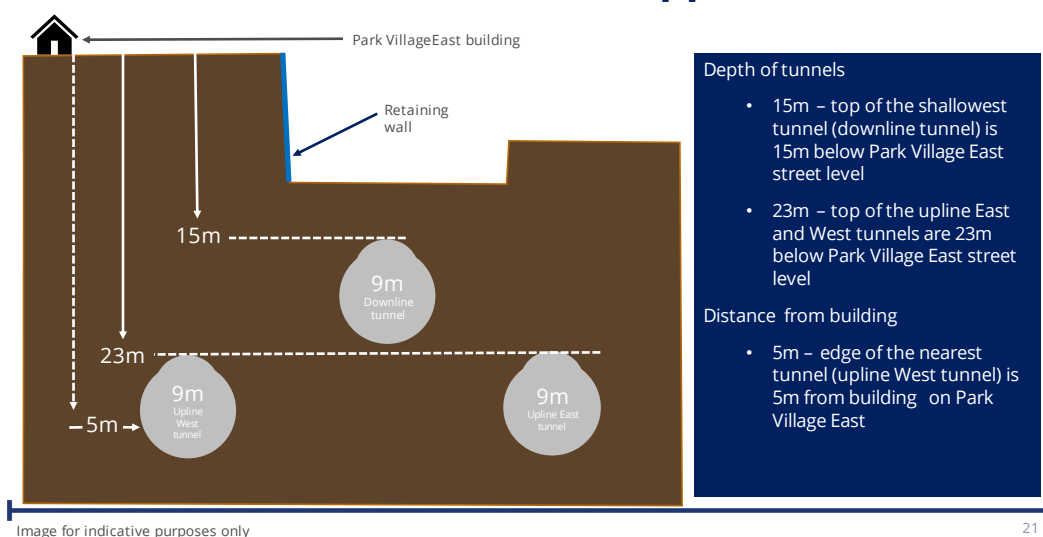
### Depth of tunnels

- 13m – top of the shallowest tunnel (downline tunnel) is 13m below Park Village East street level
- 26m – top of the upline East and West tunnels are 26m below Park Village East street level

### Distance from building

- 25m – edge of the nearest tunnel (upline West tunnel) is 25m from building on Park Village East

## Point B – cross-cut of Euston Approaches tunnels



### Depth of tunnels

- 15m – top of the shallowest tunnel (downline tunnel) is 15m below Park Village East street level
- 23m – top of the upline East and West tunnels are 23m below Park Village East street level

### Distance from building

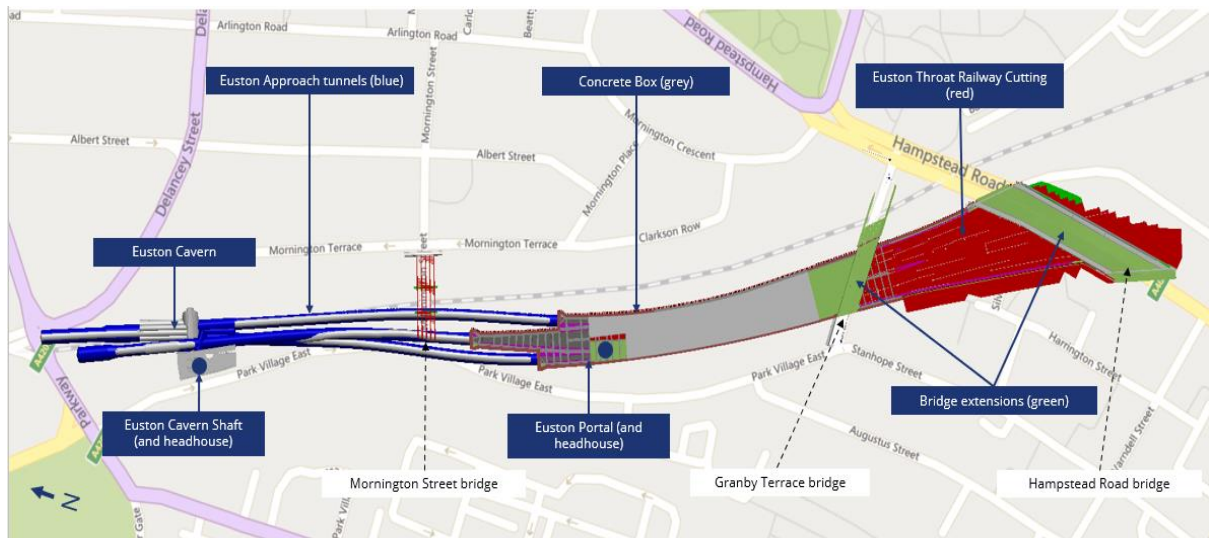
- 5m – edge of the nearest tunnel (upline West tunnel) is 5m from building on Park Village East

We will excavate the three tunnels and spray them with a concrete lining. This is a tried and tested method on major tunnelling projects known as sprayed concrete lining (SCL) tunnelling. This involves excavating a very small section of tunnel with diggers and then immediately lining it with concrete before moving forward and repeating the process.

Concrete cannot be allowed to dry out between sprayed sections so the team must work continuously with shifts operating 24 hours a day, seven days a week.

To build each of the three tunnels, we will first make a pilot tunnel that is narrower than the final tunnel diameter. We will then enlarge this to create the final tunnel. This staged approach helps us to control the ground movements generated by the tunnel excavation.

## WHAT ARE THE OTHER MAJOR EXCAVATIONS IN EUSTON APPROACHES?



To build the supporting structures for the tunnels and the future HS2 railway in Euston Approaches, we will also carry out other major excavations. This involves digging out large volumes of earth several metres below the current ground level and removing the spoil by lorries. Removal by rail is not possible in this location without causing unacceptable disruption to existing rail services.

Our major excavations include;

- Euston Cavern – a large, underground structure at the Parkway end of the worksite, to enable one tunnel to split into two, so that trains can access the various platforms at Euston Station. One of the tunnel boring machines will also be dismantled here and removed.
- Euston Cavern Shaft – a vertical shaft structure, next to Euston Cavern, going from below ground to street level and connecting into the tunnels by cross-passages, to allow for access into and out of the tunnels in an emergency.
- Euston Portal – the point at which the railway tracks will pass from underground to above ground. This will also include an underground chamber.
- Euston Concrete Box – a concrete box between Morningson Street and Granby Terrace bridges, partly above ground and partly below, to accommodate the HS2 tracks as they pass from the underground track into the open air, south of Granby Terrace bridge.
- Euston Throat Railway Cutting – a railway cutting with a depth of about 16m from street level, which allows trains access to the different platforms within Euston Station. This section is open air.

To accommodate the excavation in the Euston Throat railway cutting area, we will widen and extend Granby Terrace and Hampstead Road bridges. We will build headhouses on top of the Euston Cavern and the portal area of the Concrete Box. This will allow for emergency entry and exit from the HS2 railway below.

## WHAT ARE THE IMPACTS OF TUNNELLING AND EXCAVATIONS?

Major excavations cause changes in the ground level nearby, known as ground movement or settlement.

We carefully design our structures and plan our construction methods to minimise disruption to our neighbours. We use a variety of protective measures – or mitigations – to help reduce such impacts. We also closely monitor our works so that we clearly understand the effects of anything we are doing.

The process of removing large volumes of earth can cause some noise, vibration, and dust. Our works require a significant amount of equipment on site and periods of 24 hour working.

In recent years, there have been several large projects that have involved tunnelling in built up areas. These include the Eurostar High Speed line, London Underground extensions, and London's Crossrail.

We have been doing detailed studies that will predict the amount of ground movement we will cause, any impact these movements will have on surrounding buildings, and how to manage this.

We continue to monitor ground movement and nearby structures to verify predicted movement levels and potential impacts from HS2 works.

Some structures will need preparing before we start tunnelling or other major excavations nearby. We are already in contact with the owners of any structures which this could apply to.

## WHAT IS GROUND MOVEMENT?

Ground movement – or settlement – is the technical term given to the way the ground moves around a hole after it has been dug out. It also occurs naturally when trees drink a lot of water for example. Building tunnels, shafts, and basements causes a small amount of extra movement to the ground nearby.

We know how to limit the effects of this movement on buildings. In most cases, ground movement does not cause damage to properties. In some cases, there may be small cracks in plaster, and in a few cases doors or windows may stick. In very rare instances, settlement can affect the structure of the building. For more information about ground movement, please read the [HS2 Phase One HS2 Guide to Ground Settlement](#).

## HOW DO YOU MONITOR GROUND MOVEMENT?

We use satellite monitoring, laser and physical monitoring via prisms, stick-on targets and sensors installed on local properties, structures and in the railway cutting. We use these methods to monitor ground movement across the local area which helps us understand existing levels of movement, and to accurately predict changes due to our works. Ground movement typically happens slowly, allowing time to respond appropriately and safely to any changes.

We also install small metal studs in publicly accessible spaces, such as on footpaths and roadways, which enable us to monitor levels very accurately and determine trends over long periods.

## WILL YOUR WORKS CAUSE EXTRA GROUND MOVEMENT?

We have been monitoring the area for a few years now to understand these usual patterns of movement in the area.

Our major excavations, such as tunnelling, will create additional ground movement – beyond that caused by seasonal change or large trees drawing water from the ground for example. This additional movement has the potential to cause changes or damage to structures such as utilities, buildings, bridges and rail lines. The likelihood and degree of damage to a structure depends on many factors, including how it is constructed, the condition of the structure and its location in relation to major works. It is also dependent on the type and scale of excavation work itself.

We continue to monitor ground movement and nearby structures to verify predicted movement levels and potential impacts from HS2 works.

There will be occasions where we will strengthen or mitigate structures prior to nearby major excavations to protect against potential damage.

## HAVE ANY BUILDINGS BEEN AFFECTED SO FAR?

No buildings in the Euston Approaches have been impacted by ground movement from our works so far. We have however identified a small number of buildings which require extra monitoring or protective works before we begin our major excavations here. We have contacted the owners of these properties to discuss this directly.

## WHAT ARE YOU DOING TO LIMIT THE IMPACTS ON RESIDENTS AND BUILDINGS?

In building the new railway, we are committed to being a good neighbour, by respecting the people and communities we affect and being sensitive to their needs. We are already implementing measures to reduce the impacts of our upcoming major excavations.

Firstly, we aim to cause as little ground movement as possible by controlling the way the excavation work is carried out and if necessary, treating the ground or the structures themselves to reduce movement.

Measures to address ground movement and potential damage include:

- Employing industry best practice when undertaking the major excavations. The application of in-tunnel mitigation measures has been shown to reduce ground movements generated by construction works. For example, installing our concrete tunnel linings to support the ground as quickly as possible, limits the amount of time the ground is exposed and can move.

- Carefully planning the works and choosing the best equipment to avoid or reduce noise, vibration, dust, and ground movement within the worksite – and therefore the surrounding area – as much as we can.
- Surveying and investigating before we start major excavations to understand the condition of the ground, buildings, bridges, utilities and other structures, and to assess if we need to provide any extra protection ahead of starting the major works.
- Ground treatment, such as injecting grout or installing ground anchors to add strength and reduce or offset movement.
- Designing specific solutions for buildings or structures that we have identified as being at risk. These solutions can provide additional strength to help the structures accommodate the ground movements or lessen the effect of the ground movements.
- Monitoring to be sure our forecasts and baseline measurements are in line with the actual situation once major works start. If there are unexpected monitoring results, we assess the situation and decide on next steps. These may involve more frequent monitoring, changing our working methods, or adding extra support or insulation to structures.

## IS MY PROPERTY AT RISK?

If your property requires additional measures to protect against damage from additional ground movement, our team will have already been in contact with you. If you have not heard from us and are worried about damage from tunnelling, please contact HS2 Helpdesk and we can tell you what to expect from tunnelling.

Should your property be identified in future studies as one that may benefit from extra monitoring or protective measures, we will contact you.

Most properties will not experience additional ground movement or damage as a result of HS2 works. We do understand many properties in the area already experience cracks and sticking doors and windows from seasonal and other types of ground movement. Our technical review panel monitors all HS2 works and associated ground movement. This data is used to assess building damage claims submitted to HS2 Helpdesk.

You can find out more about the process for assessing potential damage from ground movement, and how to claim for any damage, in the [HS2 Works Information Paper C3: Ground Settlement](#).

## IS THE TUNNEL ALIGNMENT AND DESIGN COMPLETE?

The alignment and design for the tunnels is complete.

## WHAT PERMISSION DO YOU HAVE FOR THESE WORKS?

The HS2 Act gives permission for the tunnels and major excavations in Euston Approaches. The Act outlines the location of the HS2 scheme and includes initial designs.

The tunnel alignment remains within the Act limits and the changes to the initial design do not create any new significant impacts, which means the tunnels are permitted to be built under the existing legislation.

## WHAT IS A SETTLEMENT DEED?

Any properties within 30m of major excavations such as tunnelling are eligible for a settlement deed. A settlement deed is a formal legal agreement between a property owner and HS2, which records the protection already provided to a property by the HS2 act.

HS2 is committed to preventing damage wherever possible and to repairing damage if it does occur. A property owner does not need a settlement deed to ensure HS2 pays to repair damage.

## DO I NEED A SETTLEMENT DEED?

Some property owners may want a settlement deed as an official document to reassure potential buyers or insurers, for example, that HS2 will repair any damage to their property proved to be caused by HS2 works.

However, you do not need a settlement deed to be eligible for these repairs. The HS2 Act already requires us to fix – or pay to fix – any damage caused by HS2 works as long as you follow the correct procedure. Find out more about the process for assessing potential damage from ground movement, and how to claim for any damage, in the [HS2 Works Information Paper C3: Ground Settlement](#).

The settlement deed process provides the owner with a free engineer's assessment and a settlement report, which explains the predicted ground movement near your property and, if applicable, any impact this may have.

## HOW DO I GET A SETTLEMENT DEED?

Settlement deed letters have been sent to all eligible properties affected by works within Euston Approaches.

Please email [Hs2enquiries@hs2.org.uk](mailto:Hs2enquiries@hs2.org.uk) if you would like to take up this offer, or do not recall seeing a letter and believe your property is eligible. Please include your name, contact details and the address of the property owner.



## WHEN ARE THESE WORKS GOING TO HAPPEN?

Tunnelling and other major excavations in Euston Approaches are planned to start in 2026, with preparatory works under way beforehand. We will keep the community updated with details and any changes.

We have already started contacting property owners about potential protective works to their buildings and will continue surveys, monitoring and any necessary protective works.

## WHERE CAN I FIND MORE INFORMATION?

For more information about ground movement and settlement deeds, please see the below documents, available on the [HS2 website](#)

- [HS2 Phase One HS2 Guide to Ground Settlement](#)
- [HS2 Works Information Paper C3: Ground Settlement](#)
- [HS2 Ground Settlement – Information for homeowners and insurers](#)

Information on our works in Euston Approaches in general can be found on the HS2 website. A good source of up-to-date information is the [Works in Euston Approaches](#) page.

To find out more about what we are doing about noise and vibration from our works, please see the [SCS noise and vibration factsheet](#).

For more information about how we manage air quality, please see the [HS2 Air Quality Factsheet](#).

## CONTACT US

If you have a question about this topic, HS2, or our works, you can contact our HS2 Helpdesk team 24 hours a day on 08081 434 434, or email [HS2enquiries@hs2.org.uk](mailto:HS2enquiries@hs2.org.uk). For those who have speech or hearing difficulties we offer a minicom service on 08081456 472.