At phase one consultation, we identified three viable main tunnel routes:

- **River Thames route** – this route starts in west London and broadly follows the River Thames all the way to Beckton Sewage Treatment Works, cutting across the Greenwich peninsula.

- **Rotherhithe route** – this route is the same as the River Thames route, except that the tunnel cuts across the Rotherhithe and Greenwich peninsulas.

- **Abbey Mills route (our preferred route)** – this route is the same as the River Thames route up until Shadwell, where it leaves the river and broadly follows the Limehouse Cut up to Abbey Mills Pumping Station. At Abbey Mills Pumping Station, the tunnel connects to the Lee Tunnel, which takes the flow to Beckton Sewage Treatment Works.

The Abbey Mills route remains our preferred route following analysis of phase one consultation feedback.

The Abbey Mills route has a number of advantages:

- it is the shortest route

- it is the least disruptive and most cost-effective option (it costs 20 per cent less compared with the other two options), while still meeting all the required environmental objectives

- it requires the least number of worksites

- it requires less tunnelling at depth through chalk in the east. Deep tunnelling through chalk is potentially more difficult and would bring greater health and safety issues.
The main tunnel will be one of the longest and deepest ever built beneath the capital.
The tunnel alignment

We propose to run the main tunnel from Acton Storm Tanks in the west to Abbey Mills Pumping Station in the east. It would run through the main tunnel drive shafts at Carnwath Road Riverside, Kirtling Street and Chambers Wharf. All of the drop shafts at CSO sites also need to be connected to the main tunnel, either directly or via connection tunnels.

Our proposed tunnel alignment takes into consideration many factors, including:

- avoiding underground structures, such as other tunnels and deep foundations
- minimising possible settlement to old and sensitive structures, such as bridges and tall buildings
- minimising possible settlement to other buildings, including houses, flats and businesses
- engineering limitations, such as the tightest curve that the tunnel boring machine (TBM) can build
- minimising the length of connection tunnels from CSO sites to the main tunnel
- ensuring safety during construction.

Details of our proposed tunnel alignment can be found in our Book of plans.

The main tunnel alignment runs mostly under the River Thames. This makes it easier to connect the CSOs on both sides of the river.

Where the tunnel passes underneath a bridge, we have designed the alignment to minimise possible effects on the bridge.

Where the tunnel runs under land, we have generally designed it to avoid running underneath buildings. Between King Edward Memorial Park Foreshore and Abbey Mills Pumping Station, the tunnel alignment generally follows a canal (the Limehouse Cut) for this reason.

Our tunnel has to fall from west to east and go underneath the existing infrastructure under London. It needs to fall one metre every 790 metres so it can be self-cleansing.

Different types of tunnelling machines are better suited to different ground conditions. By locating our main tunnel drive shafts near changes in ground conditions, we can ensure that we use the most appropriate type of machine.

Long connection tunnels

Most of the CSOs are connected to the main tunnel through a short connection tunnel but there are two long connection tunnels that link up CSOs further away from the river.

A long connection tunnel connects CSOs at King George’s Park and Dormay Street to the main tunnel at Carnwath Road Riverside.

CSOs at Greenwich Pumping Station, Deptford Church Street and Earl Pumping Station are connected to the main tunnel at Chambers Wharf by a long connection tunnel.

Wherever practical, we have designed the route of our long connection tunnels to run underneath roads. Where this is not practical, we have avoided tall buildings that may have deep foundations.

Limits of deviation

We have drawn a zone around the proposed alignment of the tunnels known as the ‘limits of deviation’. This gives us the flexibility to make small adjustments to the alignment if we find new information during design development and consultation.

For example, if we find an obstruction that we were not previously aware of, we would need to locally adjust the tunnel alignment to avoid it.

Depth

For most of its length the Thames Tunnel will be significantly deeper than other tunnels in London, avoiding London Underground lines, road tunnels, and major utility tunnels.

This means that where the tunnel alignment does run underneath buildings, the risk of any potential effects from tunnelling works is extremely low.

The tunnel needs to slope continuously downward from west to east, so that the CSO discharges can flow by gravity through the tunnel. This will allow the tunnel to empty and keep clean without needing any mechanical cleaning equipment or pumping facilities along the route.

The tunnel needs to start at a depth of about 30 metres at Acton Storm Tanks in the west and finish at a depth of about 67 metres at Abbey Mills finishing at about 75 metres deep at Beckton Sewage Treatment Works.
**Route and tunnel alignment**

**Tunnel construction**

We plan to use modern TBMs to build the main tunnel and the long connection tunnels.

Tunnelling can sometimes cause ground movement that leads to settlement of the ground above, but the use of modern tunnelling methods means that we do not expect this to be a problem. Our tunnel is much deeper than most other tunnels, further reducing the potential for ground movement. We are assessing the potential for ground movement wherever the tunnels passes beneath, or close to, buildings and other structures.

We have already completed a series of ground investigations across London, on land and in the river, to get a thorough understanding of what sort of ground conditions the TBMs will be passing through. We will be doing further investigations as the design progresses.

![A drill rig collecting ground data on the River Thames.](image)

**Subsoil**

Tunnel structures form a large part of the Thames Tunnel project and they will be underground in the subsoil, generally at a depth of 20-67 metres. Subsoil is a legal way of describing the ground beneath a property. In English law, freehold ownership of a property includes the ground below it, all the way to the core of the earth. If you are a leaseholder then you may share rights over this land as well.

Where our tunnels pass beneath a property, we will need to acquire an underground parcel of land for the tunnel itself and an area of exclusion zone surrounding it, to protect it. If we need to purchase the subsoil beneath your property this should not restrict your ability to do whatever you want to do with your property, as long as that doesn’t interfere with the structure of the tunnel, or its operation.

As most of the tunnel structures are very deep, your right to do what you want with your property is very unlikely to be affected.

For further information see our website: [www.thamestunnelconsultation.co.uk](http://www.thamestunnelconsultation.co.uk) or call us on **0800 0721 086**.

Phase two consultation (Autumn 2011)