Canal Tunnels

New journeys through a new rail link

Better connections
We have created a brand-new rail link, allowing passengers to travel for the first time ever from Peterborough and Cambridge directly to Blackfriars, Gatwick Airport and beyond. This link provides much improved connectivity and more journey options between north-south services across London.

The Canal Tunnels are a pair of bored tunnels which have been built between the East Coast main line (ECML) at Belle Isle junction, just north of Kings Cross, and the St Pancras low level station at Canal Junction. As the two tunnels pass about 15 metres under the Regents Canal, they are known as the Canal Tunnels.

Forward thinking
The tunnels were constructed between 2004 and 2006, during the Channel Tunnel Rail Link project which created the UK’s first high-speed railway and saw St Pancras station extensively redeveloped.

Each tunnel was constructed with a six metre diameter bore and fitted with a pre-cast concrete lining. The northbound tunnel is 860m in length, while the southbound tunnel is 820m. The difference is due to the curvature of the tunnels. At the northern end there is a 100 metre cut-and-cover concrete box which leads up to an open area and a new junction with the ECML which, in total, forms a 1km length of new twin track railway.

The Canal Tunnels were the first piece of Thameslink Programme infrastructure to be constructed, albeit by another project, with good foresight shown for the overall development of London’s transport network to ensure that the two tunnels would be ready and in place for when the rest of the Thameslink Programme began.

The tunnels then lay dormant until 2013, when we set to work installing new tracks, electrical power supply, signalling equipment and safety systems to ready the tunnels for passenger services.

Flexible, safe and reliable
To offer the maximum operational flexibility, both the northbound and southbound Canal Tunnels have been designed for bi-directional working, meaning trains can run safely in both directions on each line. This means that if something goes wrong or maintenance is required, trains can still be routed through this crucial area to keep services moving.

The power supply which feeds the conductor beam in the tunnels usually comes from the Midland Mainline supply line, but in the event of an outage, the tunnels are also hooked up to the supply from the ECML power supply, which can step in and provide the necessary power to keep everything running.
In the event of an emergency, the tunnels are well equipped to manage any situation. Emergency service radio systems have been installed, automatic LED lights have been installed every four metres to illuminate the tunnels, while a walkway alongside the tracks allows safe passageway out of the tunnel, should passengers ever need to be evacuated inside the tunnel.

Flood management also had a major part to play in the design. Due to the gradients of the tunnels as they sink under the Regents Canal (up to 1 in 34 in places), a drainage system has been installed which collects water in a sump at the bottom of the tunnel and pumps any collected water back up the gradient to the ECML drainage system.

Crucial connections
After a period of testing using empty carriages, the first passenger service through the Canal Tunnels ran on Monday 26 February 2018. The tunnels entered regular service after the May 2018 timetable change. The tunnels and the links to the ECML are crucial to meet the major objective of delivering a 24 trains per hour service between St Pancras and Blackfriars.

Sixteen trains per hour come from Bedford, Luton and St Albans via the Midland Mainline. The other eight per hour come from Cambridge and Peterborough, necessitating the Canal Tunnels link to complement the other projects building towards the delivery of this goal.

World leading technology
The Canal Tunnels signalling and telecommunications design is integrated with the Thameslink Programme’s High Capacity Infrastructure. This means that alongside regular colour light signalling, two new signalling systems have also been installed.

These are the European Train Control System, an in-cab signalling system that allows trains to run closer together, and Automatic Train Operation, which means the trains movements are automated and regulated between St Pancras and Blackfriars.

In the future, this combination of signalling systems will deliver the targeted 24 trains per hour capacity in the core area. This is the world’s first implementation of such technology on a mainline ‘heavy’ railway.