Transport for London

TfL Corporate Archives Research Guides

Research Guide No 13: A Brief History of the Northern Line

The Northern Line serves 50 stations, is an amalgamation of three different railways and extensions and has no less than six branches. It began in 1890 as the first tube (deep level) railway, and has been extended at intervals in the succeeding 120 years.

This subject guide is intended as an introduction to the story of the development of the Northern Line, from its beginnings as the City and South London Railway to the completion of the final extension in 1941.

In each section references are given to major primary sources contained within the Corporate Archives, but this list is not necessarily exhaustive so please do contact us if you have a more specific enquiry

Contents

The City and South London Railway

Tremendous disruption was caused from the 1860s by the 'cut and cover' method of constructing subsurface sections of the Metropolitan and District lines, which involved digging a huge trench and then roofing it over. This disruption led to the search for a better method and before long a cylindrical tunnelling shield was developed, which supported the newly bored tunnel until it could be lined, thereby allowing tunnels to be driven deep under roads and properties without disturbance. In the middle 1880s, Parliament authorised the construction of the City & South London Railway from Stockwell to King William Street, near Bank, using this method.

The tunnelling was started from a hole next to the Thames just west of London Bridge, enabling the removal of spoil directly to barges rather than horses and carts. The use of the tunnelling shield on this scale was novel, and the company had to pay out compensation for subsidence to overhead properties. Much of this was associated with the use of brick, rather than cast iron segments, to line the station tunnels.

Also in its infancy was investigation into how to power the trains. The small size (3.5 metres diameter) and large depth (10 to 20 metres) of tube tunnels prevented the use of steam - indeed a measure of its unpopularity can be gained from the authorising Act of Parliament, which banned steam as a form of traction. Electric motors were a novelty– the very first electric railway, Volk's in Brighton, opened in 1883 - and the initial plan was to use cable traction, which would have been very restrictive to operations, particularly at termini, where there has to be a change of direction. After a trial at Borough, the decision was taken for the railway to operate using electric locomotives, and a dedicated power station was constructed at Stockwell for the purpose. When opened, it was the largest in the world, generating a total of 675 kilowatts.

By today's standards, the railway was modest in size, with termini at King William Street (near Bank) and Stockwell, and just four intermediate stations (Borough, Elephant and Castle, Kennington and Oval). The locomotives had two 37 kilowatt motors, and pulled three carriages whose windows were so small they were dubbed 'padded cells'. In contrast, the trains introduced fifty years later consisted of seven carriages and had a motive power totalling 1253 kilowatts.

Despite these difficulties, the railway was an engineering and operational triumph and customer numbers grew steadily, from 5.4 million in 1891 to 13.4 million in 1901. However, running more frequent trains quickly identified 'pinch points' which required more signals to enable the scheduled train frequencies to be achieved. The single platform northern terminus at King William St was particularly cramped and limited capacity throughout the line, even with additional signalling. It was also on an east/west alignment, when the desired area for expansion was to the north.

As early as 1893, Parliamentary powers were obtained to construct a new line from just north of Borough to Angel. This resulted in the closure of King William St, but the opening of a further six stations (London Bridge, Bank, Moorgate, Old Street, City Road and Angel). The extension opened as far as Moorgate in 1900, Angel in 1901, and Euston

in 1907. The line was also extended from Stockwell in the south, to Clapham Common in 1900, with an intermediate station at Clapham North.

Primary sources held by the Corporate Archives relating to the City and South London Railway include:

Ref No	Dates	Description
LT001652/001	1884 – 1911	City and South London Railway – stationery, accounts and reports
LT001325/001-002	1903	City and South London Railway Company: Secretary's Office: Minutes of Evidence and Speeches in the House of Commons and the House of Lords
LT001662/001-002	1899-1901	City and South London Railway: Plans
LT001471/001	1901	City and South London Railway: Secretary's Office: Report and Minutes of Evidence from the Joint Select Committee of the House of Lords and the House of Commons
LT000449/025	1890-1919	City & South London Railway: Pay of All Grades
LT001499/130	1898	City and South London Railway Extension - Proposed Arrangements of Electric Lifts for Moorgate Street and London Bridge Station
LT000872/015	1898-1915	City and South London Railway Company - Agreements with other Companies

The Charing Cross, Euston and Hampstead Railway

The success of the City and South London inspired a number of other schemes. The Charing Cross, Euston and Hampstead railway had its origins in a Bill as far back as 1892. However, until the arrival of the American financier Charles Tyson Yerkes in 1899, the scheme was stalled for want of money to fund the construction contracts. With his contacts and knowledge of the mechanics of raising these sums, the line was built and opened in June 1907 between Charing Cross in the south, Golders Green and Highgate (now Archway) in the north, with a junction at Camden Town.

Like the Bakerloo and Piccadilly lines, which opened in 1906, the Hampstead Railway (as it became known) operated multiple unit trains, rather than with coaches and separate locomotives, like the City and South London Railway. This was enabled by technology (multiple unit control) that allowed the driver to control all the motors on the train, including those remote from the leading cab. The technology was developed following

the costly experience of the Central London railway, whose fleet of locomotives had heavy un-sprung motors that caused major vibration to properties above the line. This resulted in a Parliamentary enquiry, and the scrapping of their fleet of separate locomotives within two years.

Although customer numbers grew from 25 million in the first full year to 30 million in 1909, the line struggled to pay a dividend to shareholders due to high construction costs. A pinch point was also identified at Charing Cross, where all trains terminated: in addition, this location did not have convenient connections with the Bakerloo and District lines. These problems were dealt with in 1914 by running the line south a few hundred metres, and then round in a sharp loop to the present northbound platform at Embankment. Although this avoided the time involved in changing ends, it did result in a 15 mph permanent speed restriction due to the curvature.

Primary sources include:

Ref No	Dates	Description
LT000683/189	1902	Charing Cross, Euston and Hampstead Railway Act, 1902 (Chapter 256)
LT000449/006	1905	Charing Cross Euston and Hampstead Railway: Session 1905
LT000197/044	1907	Charing Cross Euston and Hampstead Railway – formal opening
LT000683/115	1902	Charing Cross, Euston and Hampstead Railway Act, 1902 – session
LT000589/007	1902-1910	Charing Cross, Euston & Hampstead Railway Company: Seal Register
LT000370/045	1893-1905	Charing Cross, Euston and Hampstead Railway Company: Acts of Parliament. Number 6
LT000370/042	1893-1905	Charing Cross, Euston and Hampstead Railway Company: Acts of Parliament
LT000683/116	1903	Charing Cross, Euston and Hampstead Railway Act, 1903

Primary sources for the Charing Cross, Euston and Hampstead Railway are also available at London Metropolitan Archives and include:

Ref No	Dates	Description
LT000051/001-002116	1894-1910	Charing Cross, Euston and Hampstead Railway Company: Minute Books
LT000050/001-003	1893-1910	Charing Cross, Euston and Hampstead Railway Company: Minutes
LT000033/001	1914 – 1920	Charing Cross, Euston and Hampstead Railway, Board Minute Book
LT000033/002	1920 – 1924	Charing Cross, Euston and Hampstead Railway, Board Minute Book

Underground Electric Railways of London

In 1910, the Charing Cross, Euston and Hampstead Railway, with the Piccadilly and Bakerloo lines, became part of the Underground Electric Railways of London (UERL). UERL took control of the City and South London and Central London Railways in 1913. This was the cue for integration.

Joining up with the City and South London railway was complicated, as the tunnels were 30 cm smaller in diameter and had a different arrangement for supplying power to the trains. Work was therefore started in 1922 to rebuild the tunnels to the larger diameter and the line was closed from 1223-1924 .

Development after the First World War also saw further growth. The line was extended from Golders Green to Hendon Central in 1923, and to Edgware in 1924.

The rebuilt City and South London Railway was extended from Euston to join the Hampstead line just south of Camden Town in 1924. The work was very complicated, involving the construction of junctions with the minimum of conflicting moves. This far sighted design has been the basis for intensive peak services over the following 90 years, with a typical total of 80 trains per hour through the four platforms.

In the south, the line was extended in 1926 from Charing Cross to Kennington, and from Clapham Common to Morden. The fact that the line surfaced at Morden was very helpful, as it enabled the construction of the largest train depot on the line, providing 38 trains of the 91 required for each peak service.

Primary sources include:

Ref No	Dates	Description
LT000370/015	1910 – 1929	London Electric Railways – Acts of Parliament
LT000635/003	1910	London Electric Railway Amalgamation Act

Ref No	Dates	Description
LT001584/002	1920	London Electric Railway – extension from Golders Green to Hendon

London Passenger Transport Board

The London Passenger Transport Board took control of all tube and subsurface lines in 1933.

The last stage of development of the Northern line took place from 1939 to 1941, with extensions from the present Archway to Mill Hill East and High Barnet. The line was shared with the Great Northern Railway (GNR) until the 1960s, when the GNR services ceased. A feature of all the stations from East Finchley to High Barnet (except Woodside Park) is that that they used to have a goods yard. Although the tracks have been removed, the space they once occupied remains in places to this day.

The last extension was to be part of a major expansion of the Northern line, planned in the 1930s, to run from Edgware to Elstree, from Mill Hill East to Edgware, from East Finchley to Moorgate via Finsbury Park and from Highgate to Alexandra Palace. In the economic aftermath of the Second World War, these plans were abandoned in favour of extensions of the Central line.

Primary Sources include:

Ref No	Dates	Description
LT001912/001-007	1933	London Passenger Transport Board arrangements
LT000044/010	1926 – 1979	Northern line extension
LT000620/201	1939 – 1949	Electrification scheme and organization
LT001087/047	1940	Extension of trains from East Finchley to High Barnet

The Northern line remains a vital component of the underground network and carries 800,000 customers daily. It has the most complex network of any tube line, and requires considerable knowledge and skill to manage in the event of significant disruption.

If you would like to view any of the papers listed above or would like any further information please contact the Corporate Archives team at corporatearchives@tfl.gov.uk

For further reading please see:

The Last Link – The First 30 Years Of The Hampstead Railway, Mike Horne, 2007, published jointly by London Underground and Nebulous Books, ISBN 978 0 9507416 6 6.

The City and South London Railway, T.S. Lascelles, second printing 1985, The Oakwood Press, ISBN 0 85361 360 5.

The Amazing Electric Tube – A History of the City and South London Railway, Printz P. Holman, 1990, Buxton Press, ISBN 1 871829 01 1.

Re-opening of the City and South London Railway, Mon 1st December 1924, Limited edition reprint produced by West Farthing Grange for Northern Line centenary 1990, printed by Pendragon Press, Papworth Everard, Cambridgeshire.

The First Tube, Mike Horne and Bob Bayman, published by Capital Transport publishing, 38 Long Elmes, Harrow Weald, Middlesex, ISBN 185414 128 7.

London Underground – A Diagrammatic History, Douglas Rose, 1980, Published by Douglas Rose, 35 Summers Lane, North Finchley, London N12 0PE, ISBN 0 9507101 0 5.