

# Rail's Royal Achievement:



## London's Jubilee Line

*By Scott Bogren*

At its most successful, a passenger rail service becomes synonymous with the community it serves, an integral part of the city itself – it becomes impossible to imagine the city without the rail service. By this definition the Underground or Tube – London's iconic subway system – must be considered one of the world's rail transit treasures for its past, present and future is fused with those of London, one of the world's great cities.

The most recent addition to the Underground is the Jubilee Line, so-named for its initial development taking place in 1977, the time of Queen Elizabeth II's Silver Jubilee. The line features some of the newest, most spacious and accessible stations

in the Underground network, modern rolling stock and the latest signaling and safety technology.

In 1999, the Jubilee Line was extended to London's East End in response to increasing development in the area and in time for the opening of the Millennium Dome, a dome-shaped exhibition structure celebrating the third millennium. In 2012, the line is expected to play a pivotal role in the Olympic Games as it will serve as a prime connector between the Olympic Village and London's newly refurbished Wembley Stadium.

But one cannot fully appreciate the Jubilee Line without first understanding how the Underground has influenced, and reflects, the very history and development of London.

Many of the Tube's lines were first created to handle the city's outward migration and the larger network of subway lines that comprises today's London Underground continues to evolve to meet the needs of Londoners.

### **The World's First Subway**

On a cold January day in 1863, 40,000 Londoners turned out to ride the world's first underground passenger railway. The new Metropolitan Railway, as it was then known, ran between Paddington and Farringdon along dual gauge track – designed to serve both broad and traditional gauge trains and cars – and had been constructed using a cut-and-cover construction method



Photo courtesy Fulflow

The Jubilee Line represents the latest in London's Underground network – from its railcars and stations to its massive Stratford Market maintenance facility.

that many cities and subway systems would soon emulate. In the cut and cover method, a trench is dug, the rail line is constructed and then the line is covered.

The first trains that ran along this line were steam driven requiring ingenious ventilation methods along the route – none more so than the row house façade in Leinster Gardens that remains today a reminder of how the old Underground worked and seems pulled directly from a Hollywood film set.

By 1880 the Metropolitan Railway – known today as the Underground's Metropolitan Line – was carrying more than 40 million Londoners a year and its success inspired both competition and imitation. The Inner

Circle – the modern Circle Line – was completed in 1884 and the City and South London Railway – now known as the Northern Line – became the system's first deep-level, electrical line in 1890. Technology was beginning to impact the Underground – as it still does today.

### **The Modern Underground Takes Shape**

The early 20<sup>th</sup> Century saw increased underground line development all across London – with a focus on connecting growing suburban markets with the traditional center city. At the same time, system officials understood that by electrifying all the lines

were not always hazard-proof. In September 1940, the Marble Arch Underground station was bombed, killing 20 and injuring many more. The Central Line's Bank Station ticket hall was struck directly by a German Bomb in January 1941, with 58 Londoners losing their lives.

World War II would not be the only time in which Underground stations have come under attack – though in more recent years it is the system itself that has been directly targeted. On several occasions, most notably in the mid 1970s and early 1990s, the Irish Republican Army claimed responsibility for placing bombs on the London Underground. More recently, in July 2005, terrorists targeted the system with a series of three attacks on the Circle and Picadilly Lines resulting in the deaths of 52 passengers. Clearly, the importance of the Tube to Londoners and the world – both socially and economically – has not been lost on those intending to do the city and its residents harm. The democratizing effect of the Underground to move all people has in many ways revolutionized the city and its residents, and makes it an all-too visible target for those seeking to do it harm.

### **Expanding to Meet the Need**

After the war, Underground ridership continued to grow and the system added the Victoria Line in the late 1960s to handle rising Tube congestion and continue its role in the economic development of the city. The Picadilly Line was extended to Heathrow Airport in 1977, providing direct Tube access from one of the world's busiest airports – Underground trains call at two stations serving specific gates at Heathrow, with a third station due to come on-line in 2008 – to downtown London.

Today, the Underground is operated by Transport for London – part of a public-private partnership under which the rolling stock and





The Jubilee Line utilizes Alstom's 1996 rolling stock – complete with its signature red-white-and-blue paint scheme – and fits aptly with the Underground: quintessentially London.

system infrastructure are maintained by private companies with 30-year contracts. The massive system has 12 lines – (listed alphabetically) the Bakerloo, Central, Circle, District, East London, Hammersmith and City, Jubilee, Metropolitan, Northern, Picadilly, Victoria and Waterloo and City – 275 stations and more than 250 miles of track. On any given day, more than 3 million passengers ride the Tube.

### The Jubilee Line

In 1977, Queen Elizabeth II marked her Silver Jubilee – the 25<sup>th</sup> anniversary of her reign. Throughout Britain and the Commonwealth, from Canada to Australia and in every corner of the world, festivities and events marked the notable occasion. Today's London Underground Jubilee Line was thus re-named to honor the Queen's first 25 years. The Jubilee moniker was a considerable change

from the line's originally planned name: the Fleet Line – after the River Thames Fleet and its planned route along Fleet Street. Coincidentally, the color of the line on the Underground maps – silver/grey – pays homage to both the original Fleet name and the color of its ships as well as to the Queen's Silver Jubilee.

The Jubilee Line's development occurred primarily in two phases. The first phase opened in 1979 and incorporated a section of the existing Bakerloo Line from Stanmore to Baker Street that dated back to 1932 – and then running southward through downtown London to the Green Park Station and then over to a newly configured Charing Cross Station. The second phase, which came to be known as the Jubilee extension, as its completion was 20 years after the first phase, routed toward the burgeoning East End of London along the Thames.

In the two decades following the opening of the Jubilee Line, the actual path of the extension south and eastward from Charing Cross – as the Jubilee line had always been planned – proved problematic. One plan was to follow Fleet Street on to Wapping and then under the Thames down to Lewisham. Another concept evolved running the line parallel to the Thames to Thamesmead. However, neither of these concepts won out.

The Jubilee line extension that emerged in 1999 routes from Green Park to Westminster and across the Thames to the intermodal Waterloo Station that also serves the National Rail system and features the EuroStar rail service through the English Channel tunnel, or Chunnel, and on to Brussels or Paris. From Waterloo, the line follows the Thames east toward one of its signature stations, Canary Wharf before heading north in the East End and to its terminus at Stratford. Once all of the extensions had been completed, the Jubilee became the only London Underground line to intersect with each of the other lines

# The London Underground: A Familiar Look

Among the many innovations and advances that the London Underground has brought to the passenger rail industry, perhaps none is more unmistakable — or significant — than the stylized, colorful system map that the system first introduced in 1933.

Harry Beck, an engineering draftsman with the London Underground Signals Office, is widely credited with developing the iconic Tube map in his spare time. Beck's real innovation was to abandon the traditional geographical strictures that transit maps of all types adhered to. Rather than simply place the Underground's routes atop a geographically accurate map of London — which had been the system's norm previously — Beck developed a map that showed all stations and along spatially inaccurate, color-coded lines. Many likened the original concept to an electrical engineering schematic.

According to author Ken Garland, who wrote *Mr. Beck's Underground Map* (Capital Transport Publishing, 1994), Beck believed that the information most needed by passengers riding trains and entering the system was the next station, and how to transfer between stations. Similar linear maps had already appeared aboard Underground cars by the late 1920s as straight lines but did not show the entire system.

The design won immediate approval from Londoners and the principles Beck applied to his innovative map soon began to appear in the maps of other subway and passenger rail operations. Today, the stylized, color-coded system map is virtually de-rigueur for most bus and rail systems.

Early last year, visitors to London's Design Museum voted Harry Beck's Tube map as the second favorite British design of the 20th Century — following the Concorde. For passenger rail systems around the world, however, it might be number one.

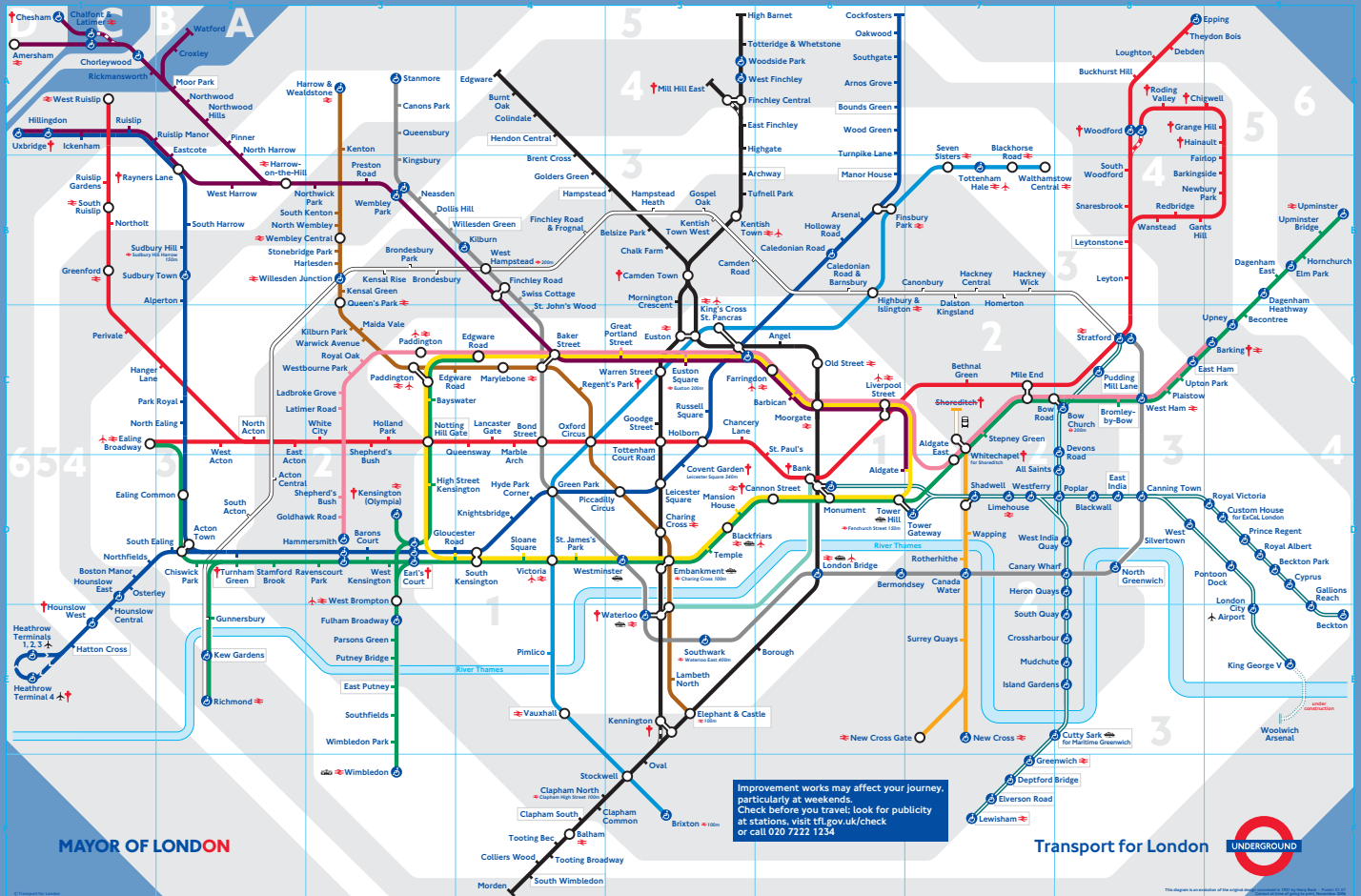


Photo courtesy Suzanne Knights



The new Canary Wharf station is already renowned for its breathtaking design - both its exterior and interior.

somewhere along its journey.

The Jubilee Line's arrival at the Canary Wharf station was designed to relieve ridership pressure from the London Docklands Light Rail service – which is connected to the line and station via underground shopping malls. Located in London's Docklands area, the Canary Wharf station was officially opened in September of 1999 by London Mayor Ken Livingstone and is a showpiece for the Jubilee extension.

The Canary Wharf station began as a major engineering feat – an 80-foot deep and nearly 900-foot long excavation in a drained arm of a former dock. Built using a similar style to the Underground's traditional cut-and-cover method that characterized its early subway construction, noted architect Sir Norman Foster's unique design features two above-ground curved-glass canopies at the east and west ends of the station. These striking canopies, with a public park between, offer little hint at the enormity of what lies beneath. The station's spacious concourse and ticket hall is illuminated by sunlight filtering through the glass canopies.

Serving the local business district, which is currently experiencing tremendous growth, the number of passengers using the Canary Wharf station is reaching 50,000 daily. Ironically, the station which was built to relieve pressure will soon be in need of relief itself and plans are underway to extend other rail lines into the Canary Wharf area.

Some of the newest London Underground cars run on the Jubilee Line – those of the 1996 Stock manufactured by Alstom. With internal displays and automated stop announcements, the new equipment came on-line not long

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Photo courtesy Adrian Pingstone



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after the Jubilee Line extension was completed in 1999. The 1996 Stock, more than 400 cars in total, run exclusively on the Jubilee Line. In 2005, the line's consists were entirely converted from six to seven cars, and four new complete consists were added – resulting in a more than 15 percent increase in peak period capacity. The entire Jubilee Line was closed for three days to facilitate this service augmentation.

### The Jubilee-Olympic Connection

Having won an intense international competition, London will host the Games of the 30<sup>th</sup> Olympiad in 2012. Construction is already well underway on, among other venues, the Olympic Village, the Olympic Stadium and an Olympic Zone in Stratford in East London. The Jubilee line, which terminates at Stratford, will be

Jubilee Line stations feature sliding platform doors (above) combine with Thales' SelTrac signalling technology to improve safety and efficiency on the route.



Photos courtesy Richard Randall

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counted on to transport hundreds of thousands of Olympic tourists and participants with its direct connection to downtown London, including the newly refurbished Wembley Stadium which will host the football competition finals.

And as is the system's history, expansion has afforded an opportunity to introduce new technology. Earlier this year, the London Underground began installing Thales' SelTrac S40 automatic train management and block signalling system on the Jubilee and Northern Lines. According to system officials, the new signaling and communications system should increase train speeds and frequency which will be key to smooth transportation during the Olympic Games and beyond.

When the installation is complete, it will allow the Underground to run more than 30 trains per hour on both the Jubilee and Northern lines. When combined with the longer trains now running on the Jubilee, the SelTrac system will increase capacity by an astonishing 40 percent on the lines.

"Very simply," say Thales officials, "it will allow the Underground the ability to run more trains at higher speeds, safely."

### Conclusion

London's Underground system has long been a passenger rail operation that has grown and changed with the community it serves – that is its history. Few transit agencies in the world can point to more than 140 years of continuous service and fewer still provide as many daily rides nor impact the lives of as many local residents as does the Tube for Londoners. And as the city has shifted and changed, so too has its subway service – the Jubilee Line is merely the latest example of a dynamic rail service seeking out new communities all the while incorporating the latest technologies and innovations to improve the service. 



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