

# LONDON INFRASTRUCTURE PLAN 2050

by John Hawkins

A draft of the London Infrastructure Plan was released for a three-month public consultation on 30 July 2014. This ambitious plan considers the infrastructure investment required to meet demand over more than a third of a century. London's population is already near to its previous peak of 1939 and is forecast to continue to grow by over a third to 2050. Current water supply will be insufficient within two years, and electricity supply can only cope with growing demand for around ten years. Demand for Underground rail services is expected to grow by 60% and on Network Rail services by 80% over this period. Other areas considered include roads, river crossings, flood protection, housing, schools, communications, and airport capacity.

The plan concludes that current investment levels will need to more than double, with half of this required for transport and housing. This will see even stronger competition for scarce dollars throughout the Nation. No doubt TfL will need to make the case for each rail improvement even better than they have in the past. Amongst many supporting documents is one of 156 pages detailing transport plans incorporated into the main document. In its introduction is the sentence: Any vision for London's future must have transport at its heart. Its final appendix provides details of rail schemes and therefore provides information on current thinking within TfL, and also by omission may indicate schemes no longer being pursued. Details are decidedly vague the further into the future that projects are listed.

## LONDON UNDERGROUND

2016 sees the Victoria Line going from 33tph to 36tph with all trains reaching Walthamstow to provide 9% more capacity. A similar upgrade on the Jubilee Line will cost up to seven times as much and be delivered in 2019 with an increase from 30tph to 34-36tph giving 13% to 20% capacity growth. The Northern Line upgrade 2 will cost near to three times the Jubilee Line amount and is not expected until 2022. The post upgrade 1 service of 24tph will become 30 to 36tph, a capacity increase of 25 to 50%. The higher levels probably require a line split at Camden Town, with the lower increase more likely according to the TfL notice of April (see *Underground News* June 2014, page 351). These three upgrades benefit 200, 214 and 252 million passengers respectively.

Interestingly there is no mention of the sub-surface railway upgrade, capacity increases promised for 2018 being dependent on a new resignalling contract. The next detailed upgrade is again labelled the Deep Tube Programme, with the Piccadilly Line going from 24tph to between 33 and 36tph, an increase of 60%. This is shown as a two stage process, with conventional automatic operation from 2026 and driverless operation from 2029. This presumably leaves time for all current trains to be withdrawn and platform edge doors to be fitted (see below).

A similar upgrade to the Central Line has dates of 2029 and 2032, increasing peak services from 30tph to between 33 and 36tph, an increase of 15% to 25%. There is no mention of the Waterloo & City Line.

### Continued from page 510.

However, the Bakerloo Line upgrade is only to provide conventional automatic operation from 2035, with a peak increase from 22tph to 27tph, a 30% increase. These three upgrades benefit 210, 261 and 111 million passengers respectively, perhaps explaining the lower priority and restricted automation of the latter. There is no mention of these new high-capacity trains reaching the Jubilee, Northern or Victoria lines after the Bakerloo Line.

A Bakerloo Line southern extension is not expected before 2040, with an extension via Old Kent Road, New Cross and Lewisham to Hayes and Beckenham Junction operating a peak service frequency of 27tph as far as Catford Bridge, with 15tph to Hayes and 6tph to Beckenham Junction to relieve services into London Bridge, bringing 200 million passengers to the line. A diagram shows an alternative route via Peckham to Lewisham avoiding the first two stations, but also linking beyond Beckenham to Bromley and Grove Park. Of course the Fleet Line once had aspirations to reach Hayes and Addiscombe some third of a century back! This extension would lead onto a Bakerloo Line upgrade 2 in 2045 to introduce driverless operation taking peak service from 27tph to between 33 and 36tph, an increase of 22% to 33%. There is no mention of the Battersea extension, but

Northern Line extension phase 2 could reach Clapham Junction by 2045, dependent on the Crossrail 2 case.

Network-wide platform edge doors are not considered value for money, but are considered essential for driverless automatic train working on the Piccadilly and Central lines. They are also considered to be justified for the central sections of the Victoria and Jubilee lines and at some other high demand platforms, and may be justified by frequency increases on other lines permitted by auto-reversing. Further research is to be undertaken, including impact on advertising revenues, platform flows and usable width, impact on dwell times and the feasibility of their use on the DLR.

A graph on page 74 shows that peak demand currently matches that back in 1971. However, off-peak demand is around double that of past years. Off-peak service levels are expected to reach 27tph to 33tph by the mid-2020s. The Night Tube frequencies will also grow to between 6tph to 10tph, perhaps including Thursday nights and be extended to the sub-surface lines, the Overground and DLR. This would place more demand on equipment whilst leaving reduced time for maintenance, and put more heat into tunnels requiring additional cooling capacity.

The current station upgrade programme includes Tottenham Court Road and Vauxhall (2017), Bond Street (2018), Victoria (2019), Elephant & Castle Northern Line (2020), Bank (2022), Holborn (2023) which now includes a new entrance north of High Holborn (since *Underground News*, March 2014), and Camden Town (2024). Phase 2 is looking at Old Street (2021), Paddington Bakerloo (2024) and South Kensington. Beyond that, stations requiring enhancement by 2035 are Baker Street, Piccadilly Circus, Moorgate, Liverpool Street, High Street Kensington and Harrow-on-the-Hill. Also listed for attention before 2050 are Waterloo, Earl's Court, White City, Green Park, Warren Street, Walthamstow and Embankment. Wherever possible, these schemes will include step-free access as may other commercial developments. Maybe another 12 to 15 discreet accessibility schemes in remaining critical gaps will permit significant additional numbers to travel, to potentially achieve 40% of possible trips by 2040.

## **CROSSRAIL & DOCKLANDS**

It is surprising that the current Crossrail works are not listed since they are not fully operational until late 2019. The initial service will include 14tph reversing back eastbound from Paddington. The extension of some of these trains to Watford Junction and Tring in 2026 to provide relief at Euston for HS2 is the first improvement, whilst the merger of Heathrow Express services in 2030 would allow a 6tph semi-fast service to Terminal 5, a 50% improvement. Anticipated longer trains are mentioned in a graphic, but the table shows that a frequency increase in 2029 could provide 30tph, a 25% capacity increase allowing additional destinations on the West Coast Main Line. 2030 could also see an extension to Dartford/Ebbsfleet and perhaps to a new inner Thames estuary airport. Crossrail 2 is only expected to operate 24tph from the early 2030s.

The DLR is expecting 30 more railcars in 2022 for capacity enhancements for new developments at Royal Albert Dock and Silvertown Quays. These will double capacity on the Beckton branch to 15tph, add a fifth to Woolwich branch capacity with all 3-car trains, and increase capacity on the Stratford International branch to 15tph which is three times the current service, providing more direct trains between Stratford and Royal Docks. In this connection, station upgrades will also take place at Custom House, Canning Town, Royal Albert, Beckton Park and at Pontoon Dock. Station capacity upgrades to deal with new developments, such as the expansion of the Canary Wharf tall buildings cluster towards Poplar and Crossharbour, may also be necessary.

A new station at Thames Wharf, between Canning Town and West Silvertown, is expected in the 2020s, when new over-night services are also expected, starting with the Bank to Lewisham and Woolwich routes. Off peak service levels will also be incrementally enhanced until they match peak service levels of 15tph. The DLR will become all 3-car trains in 2026, providing a 50% increase on the Stratford to Canary Wharf services beyond the 2015 improvement.

Meanwhile, in 2024, the B92 stock replacement programme will see new faster fixed-formation trains offer up to 10% more capacity, perhaps in the style of the Paris Métro line 14 which was linked with DLR trains in the Crossrail 2 Metro option consultation. By 2031 further increases in capacity and frequency on cross-river services from Woolwich and Lewisham to Stratford, and also from Beckton to Stratford will bring up to 15tph on each route, enhancing Crossrail feeder services and serving further developments. There are no extensions being pursued, but there is a long-term aspiration to

close Tower Gateway to enable all City services to reach Bank, serving a new station linked with Tower Hill. This would enable the Bank service to grow from 23tph to 30tph by 2050.

## **CROYDON TRAMLINK**

The only upgrades are listed for 2023-26. On the western branch they go beyond the current works, with doubling on the Wandle flyover and the Phipps Bridge, additional trams, a westbound stop at Reeves Corner and a South Wimbledon spur. This could allow an increase from 12tph to 18 to 24tph, supporting significant new housing around South Wimbledon, Mitcham and Purley Way. The eastern package is simpler, exploiting the Dingwall Road loop which is already privately funded to potentially double the Beckenham Junction service to 12tph. Off peak services are expected to gradually increase to match peak service levels. The only new route to remain from earlier proposals is an extension to Sutton in 2030 offering 8tph to 12tph between there, St Helier and Morden including Merton.

## **LONDON OVERGROUND**

The Gospel Oak to Barking line will see new faster 4-car electric trains in summer 2017, adding 68% to capacity. An extension to Barking Riverside by 2020 will require two extra trains over the current fleet of eight. A diagram shows this as a new route down to a planned district centre by the Thames. A 50% increase in capacity on this line to 6tph is expected by 2040. Phase 2 of the Overground station capacity programme should be completed by 2020.

Automatic train operation over the East London Line core section is being considered for 2024 to increase the current 16tph to 24tph. Growing off-peak service frequencies across the network are also expected. By 2026 a new Old Oak Common station is planned to link with HS2 to improve accessibility to the new line. Whilst the 5-car train lengthening programme is currently under way, plans require new 6-car trains on the North London and West London lines by 2027, and later on the East London Line from 2029 where the cost is three times higher due to platform extensions within tunnels. By 2040 the North London and West London lines could have frequencies increased from 8tph to 12tph.

## **NATIONAL RAIL**

National Rail schemes still require prioritising. Chiltern lines electrification with more 8-car trains is expected in 2024, including services to Oxford. At the same time a new hourly service from Wycombe to West Ealing via Greenford, perhaps reaching Old Oak Common, is envisaged. Western rail access to Heathrow from 2021 would permit some Crossrail services to be diverted that way, but the case depends on the future of the Airport, as does that for a south London rail link by 2030 with an extra 2tph on the Windsor lines to Waterloo. These lines could become 12-car from 2039-44, although a subsequent increase from 16tph to 20tph is shown dated 2019-24. An additional 17% peak capacity on the Wessex mainline is expected from use of Waterloo International Terminal by another 4tph in 2024. An expensive frequency increase on the Brighton Main Line from 2024 with all 12-car trains would add 15% to 20% to capacity. 10-car trains on inner-London Southern services from 2029 would add 10% to capacity. At the same time a changed route pattern for suburban routes on the Sussex lines together with extra platforms and better junctions could permit a 66% increase from 12tph to 20tph. Cascading of current trains from the Thameslink project to the south-eastern inner-suburban routes will provide more 12-car trains by 2019 giving a 20% growth in peak capacity.

Expansion of domestic high-speed services via HS1 with more 12-car trains and better use of existing stock could add 10% to 20% to capacity by 2024 with new destinations, but a link to a new Estuary Airport is also a possibility. Adding more 12-car trains to the Essex Thameside services by 2024 could add 10% to 20% to capacity, although changed interior configuration is another approach. Services from Liverpool Street to Southend could increase by 2tph with 12-car operation from 2020 providing a 10% increase in capacity. The Great Eastern mainline could also see another 2tph with 12-car operation from 2029 and remodelling of Bow Junction adding 10% to capacity. Four-tracking on the West Anglia line between Copper Mill and Broxbourne in 2024 could enable 8tph before Crossrail 2 compared with only 1 to 3tph currently. 10-car train capacity from 2034 would provide a further 25% increase. Trains on the Great Northern lines are limited to 6-car length by the deep-level stations to Moorgate, but new high-capacity trains from 2024 and 4tph increase

could provide a 14% uplift in capacity. Thameslink's 12-car capacity and increase of 8tph to 24tph will link with Cambridge.

New stations in opportunity areas by 2020 could include Beam Park, Brent Cross, Cricklewood, etc. New strategic interchanges listed are Camden Town/Camden Road, Brockley High Level, Brixton High Level, Penge, Catford and links with the Gospel Oak to Barking line at Seven Sisters, Junction Road, and with Crossrail.

Amongst long term schemes for the 2040s are Crossrail 3 on a vague east-west alignment from the Thames Estuary Airport through east and central London and beyond with 24tph taking over some existing services, and a possible outer-orbital route using existing rail lines between Hounslow, Brentford, Acton, Old Oak, Neasden, Brent Cross and beyond with a 4tph service linking with the HS2 line. A map shows the West London Line service also extending from Clapham Junction to Balham. Also without detail are continuing National Rail schemes for station congestion relief, access for all, line speed improvements to cut journey times, and improved freight capability to release passenger train capacity. The last scheme listed in HS2, with phase 1 to the West Midlands expected to lift capacity by 2026.