Route Plans 2009
Route 6
North London Line
and Thameside

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Route 6 North London Line and Thameside

Section 1: Today's railway

Route context

The North London Line (NLL) is a vital part of London's transport infrastructure and a major link between key arterial routes to and from the capital. It is a nationally important freight route and provides a key urban passenger service around London with connections to/from every arterial route north, east and west of London.

The Thameside route runs from London Fenchurch Street to Shoeburyness, with a loop line between Barking and Pitsea via Tilbury and a branch between Upminster and Grays, which carries a mixture of commuter and leisure traffic, and substantial freight movements to and from North Thameside.

The main markets are commuter and leisure journeys into and around London, in particular to the City, Docklands and North London from Essex and the Thames gateway (as well as the London boroughs).

The NLL part of the route is included in the Cross London Route Utilisation Strategy (CL RUS), which was published by Network Rail in August 2006 and established by the Office of Rail Regulation on 30 October 2006. The CL RUS proposed a range of measures for meeting growth on London's orbital routes up to 2016.

The Thameside part of the route is included in the Greater Anglia Route Utilisation Strategy (GA RUS), which was published by Network Rail in December 2007 and established by the Office of

Rail Regulation on 18 February 2008. The GA RUS covers the period to 2021, but also includes a longer term view of the strategy for meeting continued growth.

The Eastern Regional Planning Assessment (RPA), covering the period from 2011 to 2021, was published by the Department for Transport (DfT) on 16 February 2006. The RPA sets out scenarios of continuing growth in commuting to the centre of London and Docklands. However parts of the current NLL and Thameside route are already operating at or close to capacity in terms of train paths.

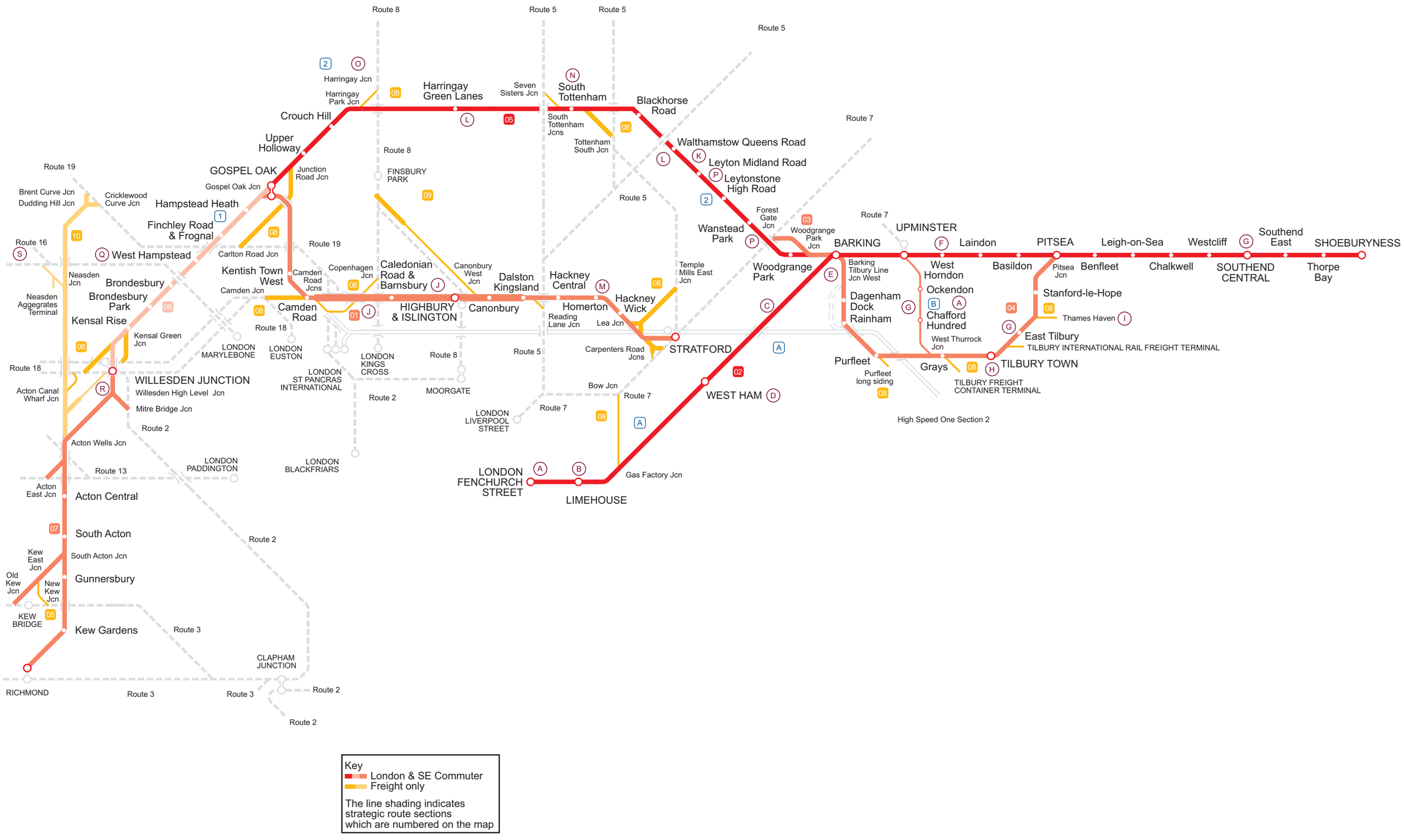
The CL RUS looked at options and recommendations for accommodating future growth, and options proposed by the CL RUS have been further developed for implementation under the North London Route Improvement Project (NLRIP). The GA RUS has looked at options and recommendations for accommodating future growth on the Thameside part of the route and these recommendations are being taken forward in Control Period 4 (CP4) to meet the capacity metrics set by the Department for Transport in their High Level Output Specification (HLOS) published in July 2007.

Today's route

The two principal elements of the NLL and Thameside route are described below. The relevant Strategic Route Section is shown in brackets:

- the NLL which comprises the Richmond to Stratford route (06.01, 06.06, 06.07 and 06.09), the Gospel Oak to Barking route (06.03 and 06.05), the Dudding Hill lines (the freight route between Cricklewood, on the Midland Main Line (MML), and Acton Wells Jn – 06.10) and associated connections to all of London's main radial routes
- the Thameside route comprises the main line between Fenchurch Street and Shoeburyness (06.02), and the Tilbury Loop together with a line connecting Chafford Hundred station (adjacent to the Lakeside shopping complex) with Upminster and Grays (06.04). There is also a freight only branch line to Thames Haven (part of 06.08).

Route 6 North London Line and Thameside



Key
- London & SE Commuter
- Freight only

The line shading indicates strategic route sections which are numbered on the map

Current passenger and freight demand

Passenger demand has been growing rapidly on the NLL (peak loadings rose by 7.8 percent between 2005 and 2006) and passenger numbers on Thameside have increased by around 5 percent over 2006. The North London Line serves local communities and provides both journey to work as well as all day business, leisure and shopping travel. The Thameside route sees a large volume of commuter traffic into central London and the Docklands (29,000 peak passengers a day were recorded in the autumn 2007 counts) as well as leisure traffic, especially to the major shopping development at Lakeside between Grays and Upminster.

Some parts of the NLL compete with alternative modes of public transport such as bus and tube as well as car journeys on a congested road network, although in other sections rail has little competition in terms of journey time. The Thameside route competes with the A127, A12 and A13 highways, which extend right through Docklands and into central London.

On the NLL demand is driven by increasing employment and population in Stratford, Docklands, north east and west London. On the Thameside route demand is driven by employment in the City and Docklands and future growth will be driven by the projected increases in housing stock in the Thames Gateway area.

Although the majority of the current demand from Thameside is into Fenchurch Street, a significant number of passengers interchange at West Ham with onwards journeys via the underground Jubilee Line.

There are several interchanges along the NLL route for onward travel. The main interchanges are at Stratford (LUL Jubilee and Central lines, DLR and the Great Eastern national rail route), Blackhorse Road (LUL Victoria Line), Highbury & Islington (LUL Victoria Line) and West Hampstead (LUL Jubilee Line and Thameslink/ Midland Main Line stations are nearby). Stratford is the gateway to the Docklands from the NLL and employment in Docklands is expanding. Stratford itself is set to benefit from new development now under construction, and demand is set to grow.

The Freight Route Utilisation Strategy was published by Network Rail in March 2007 and established by the Office of Rail Regulation in May 2007. A key input to the strategy was a set of ten year demand forecasts that were developed and agreed by the industry through the RUS Stakeholder Management Group. Freight demand, especially in intermodal deep sea containers from the Port of Felixstowe is growing year on year by 4-5 percent. This demand will be further increased by the impending port developments at Felixstowe South (work commenced in 2008), and Bathside Bay, Harwich (approved March 2006) on the Great Eastern route (Route 7), as well as the development of a deep sea port on the Thameside route, London Gateway Port (Shell Haven), which has also received approval. These forecasts in the Freight RUS show that Felixstowe could generate around 26 additional trains per day (over and above the 2004/05 base year), but that this figure could fall to around 18 additional trains per day when the London Gateway Port is developed. The Freight RUS predicts that London Gateway Port itself is forecast to generate around 8 trains per day in CP4.

Aggregates are the most significant bulk commodity crossing London. In terms of volume growth has been the most successful bulk rail business over the last 5 -10 years. Demand is set to see steady growth across the NLL and Tilbury Loop due to major construction initiatives, including the provision of additional housing in the London Gateway and the East of England, the growth of the City and Docklands, as well as continuing construction of the Olympic venues.

The High Speed 1 interchange sidings at Ripple Lane for freight services to-from Channel tunnel are now operational.

As a result there is increasing demand for train paths across the NLL & Thameside route and this is further explored in the capability and capacity sections.

Figure 1 Current train service level (Peak/Off-peak)

Station	tph
Richmond	4 Peak/4 off-peak
Stratford	upto 6 Peak/4 off-peak
South Tottenham	3 Peak/2 off-peak

Current services

Passenger services on the NLL were operated by Silverlink up to November 2007 when Transport for London took over responsibility for the NLL concession rights. Train services are now run by London Overground (LOROL). Passenger services on the Thameside route are operated by c2c. DB Schenker, Freightliner Limited, Direct Rail Services (DRS) and First GBRf operate the main freight services.
The passenger service operated by LOROL on the core NLL offers 4 trains per hour (tph) between Richmond and Stratford. In the peaks the orbital service is supplemented by additional services between Stratford and Camden Road/Clapham Jn to relieve overcrowding. LOROL also operates 2tph on the Gospel Oak – Barking route.

Figure 1 contains the tph frequencies on the NLL (excluding additional peak services between Stratford Low Level and Camden Road/Clapham Jn).

On the Thameside route the passenger service operated by c2c is affected by the complexity of the network and the different stopping patterns. There is a variety of peak and off peak services:

- to Fenchurch Street via the main line from Laindon, Shoeburyness and Thorpe Bay
- to Fenchurch Street via the Ockendon branch from Pitsea, Southend Central and Stanford-le-Hope
- to Fenchurch Street via the Tilbury Loop from Grays and Pitsea.

The NLL provides a vital cross London link for several long distance freight flows, from the ports of Felixstowe and Harwich and from Tilbury on Thameside. The whole route also sees significant volumes of freight to local terminals and yards including aggregates (Dagenham and Purfleet), sand (Dagenham) and bulk commodities such as waste (Dagenham), automotive (Tilbury & Dagenham), petroleum (Thameshaven) MOD (Shoeburyness) and Olympics construction (Bow). There are also some underground infrastructure services to Barking and Gunnersbury.

Figure 2 contains the off peak tph frequencies into Fenchurch Street.

Figure 2 Current train service level (Off Peak)

Station	tph
Basildon	4
Grays	4
Ockendon	2
Shoeburyness	4
Southend Central	6

Figure 3 Current train service level (Peak)

Station	No. of services
Basildon	4
Grays	8
Ockendon	4
Shoeburyness	6
Southend Central	9

Figure 3 contains the morning peak arrivals at Fenchurch Street between 08:00 and 09:00.

Figure 4 Tonnage

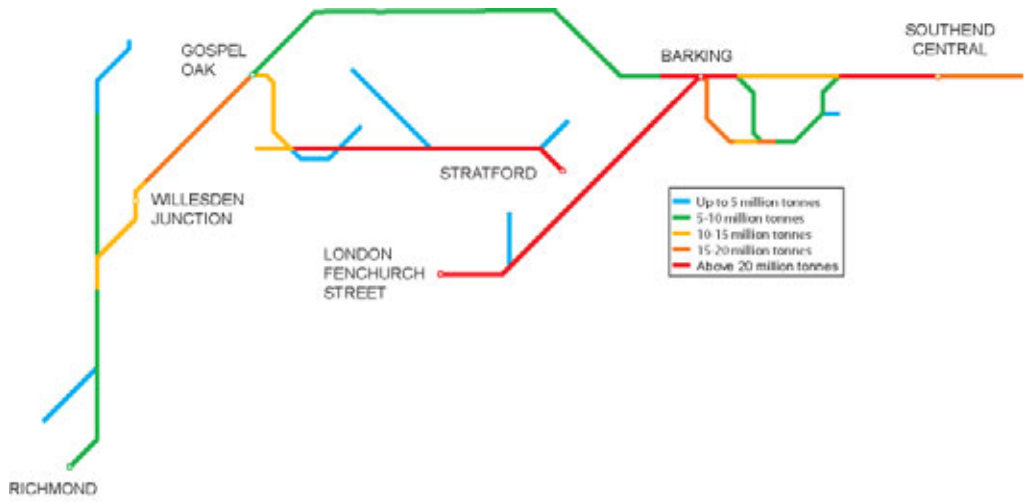


Figure 4 shows the total annual tonnage levels on the route.

Figure 5 summarises the Traffic volumes.
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Figure 5 Current use

	Passenger	Freight	Total
Train km per year (millions)	9	1	10
Train tonne km per year (millions)	2,073	533	2,606

Current infrastructure capability

Figure 6 set out the capability of the current network.

Figure 6 Linespeed

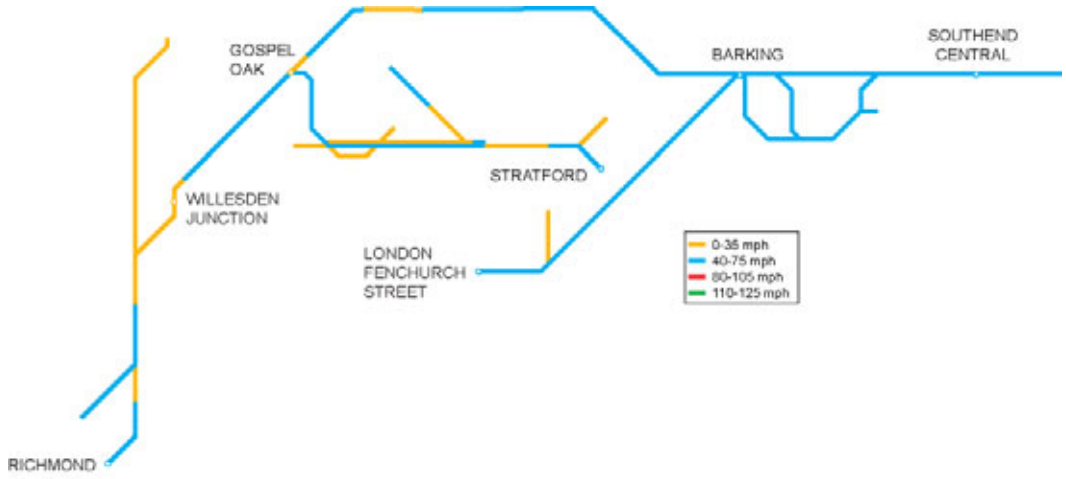


Figure 7 Electrification

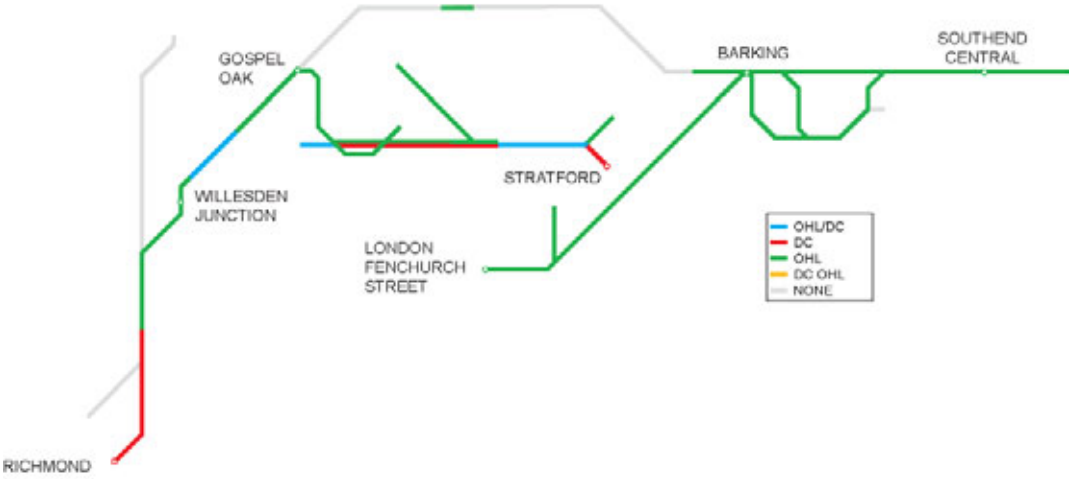


Figure 8 Route availability

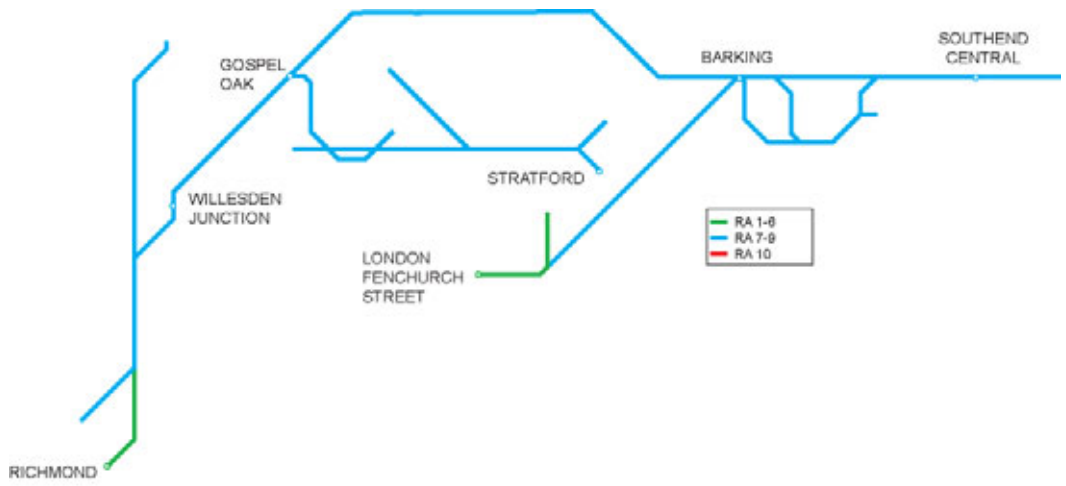
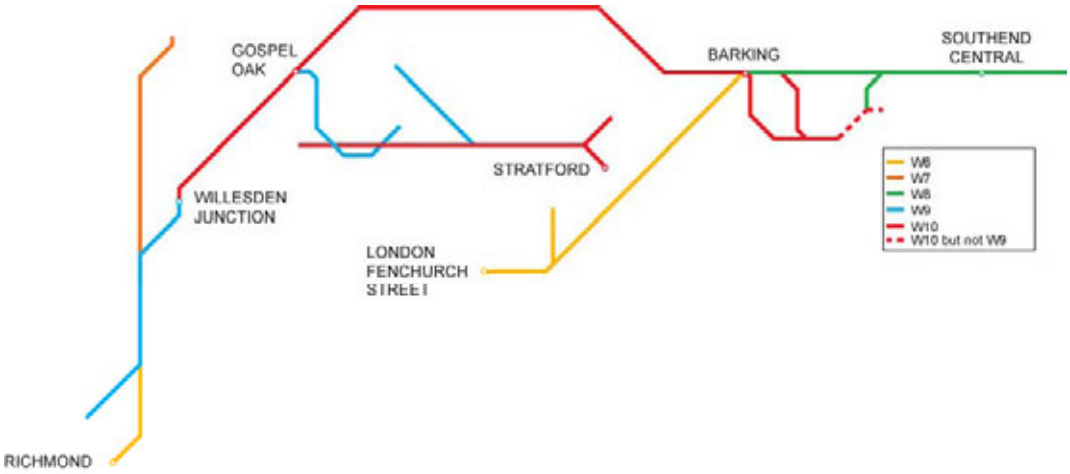


Figure 9 Gauge



Current capacity

The NLL capacity issues are documented in detail in the CL RUS and are therefore only mentioned briefly below. However, the whole of the NLL & Thameside route is governed by the mixture of services and stopping patterns, complex junctions, and station occupancy. These issues are often interlinked and overall route capacity is constrained by a combination of these factors. Additionally on the Thameside section the opening of West Ham station and introducing an extra stop on a fast section of line has restricted the track capacity into Fenchurch Street and makes it difficult to run additional trains.

Key issues on the route are:

- current and future levels of both passenger and freight services on the NLL
- lack of a W9 and W10 diversionary route to WCML for intermodal freight traffic
- lack of alternative electrified route for freight traffic from North Thameside (London Gateway Port is due to open 2011)
- long signalling headways and the large number of junctions on the NLL
- weight restrictions for freight trains on the Gospel Oak-Barking line
- constraints on westbound services off of the Gopel Oak-Barking line at Gospel Oak Jn
- lack of an alternative electrified route for freight services away from the Great Eastern between Forest Gate and Stratford
- limited signalling capacity to allow additional trains to stop at West Ham, which reduces the available capacity between Fenchurch Street and Barking
- the single line track section between Upminster and Grays that has only one passing loop
- passenger overcrowding at a number of stations on the NLL including Blackhorse Road, Highbury & Islington, Dalston Kingsland and Homerton at peak times and high levels of transfers to/from the underground. On the Thameside section passenger crowding is an issue at West Ham owing to interchange with the underground as passenger numbers here have increased since the opening of the LUL Jubilee Line.

Figure 10 shows the current train service level on key sections of the route.

Figure 10 Current train service level (peak trains per hour)

Route Section	
Stratford Low Level to Camden Road	6
Gospel Oak to Willesden Jn High Level	5
Willesden Jn High Level to Willesden HL Jn (inc. 3 Clapham Jn services)	7
Gunnersbury to Richmond (inc. LUL services)	12
Shoeburyness to Thorpe Bay	6
Thorpe Bay to Laindon	8
Pitsea to Stanford-le-Hope	6
Stanford-le-Hope to Grays	7
Ockendon branch (Grays to Upminster)	4
Laindon to Upminster	12
Upminster to Barking	16
Grays to Barking	4
Barking to Fenchurch Street	20

Current performance

Figure 11 shows the current PPM for the main TOCs running along the route.

The passenger train services on the NLL are operated by LOROL. The passenger train services on Thameside are operated by c2c.

As a result of both routes operating at close to track capacity for most of the day, there are difficult performance issues. The current mix of stopping passenger and freight services on the NLL and intensity of the peak service on the Thameside route means that when a problem occurs there is a knock on effect on following services that can quickly cause large amounts of reactionary delay for what might be initially a small specific incident.

Analysis of recent performance shows the main problems on the NLL to be broken rails and track faults, points failures, track circuit failures, trespass and vegetation obstructing the infrastructure.

On the Thameside lines analysis of recent performance shows the main problems to be level crossing failures, possession overruns and external impacts; trespass and vandalism.

Figure 11 2008/09 PPM

TOC	Forecast MAA	As at period
c2c	95.4%	10
London Overground	92.7%	10

Section 2: Tomorrow's railway: requirements

HLOS output requirements

Figure 12 Total demand to be accommodated by Strategic Route

Routes	Annual passenger km forecast in 2008/09	Additional passenger km to be accommodated by 2013/14
NLL/ Thameside	1,047	118

Figure 13 Peak Hour Arrivals to be accommodated by Strategic Route

London Terminals	Peak three hours			High- peak hours		
	Forecast demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)	Forecast demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)
Fenchurch Street	26,000	2,500	67	13,900	1,600	76

Future demand in CP4

The Regional Spatial Strategy focuses housing development in the Thames Gateway and continued growth is expected into central London as well as Docklands where employment is expanding. London Plan predictions for increased housing and jobs in east, north east and west London will also fuel rising demand on the orbital services.

Passenger demand is predicted to increase by 1 to 1.5 percent a year during the morning peak across the North London and Thameside routes in our RUSs. More recent government predictions for house building imply that passenger numbers would increase at about double that rate on the Thameside route and unless capacity is increased, the level of on-train crowding could suppress demand growth. On the NLL, on the morning peak services into Stratford, passenger numbers are predicted to increase twice as fast as those in the westbound direction.

Stratford is likely to see the most development including the opening of a new interchange station with the High Speed 1 line. The DLR has opened up an extension to London City Airport (and has now commenced construction of a new link to Stratford International station. There is also a direct rail service between Stratford and Stansted Airport.

The Freight RUS set the demand for freight services in CP4, which was reinforced in the GA RUS.

London is the host city for the 2012 Olympic Games and Paralympic Games (the Games) and Network Rail is now working with the Olympic Delivery Authority (ODA) on the development and ongoing construction of facilities to meet the needs of the Games taking account of the requirement for such schemes to have a legacy value by supporting the long term development of Stratford City and improved access to Docklands. During this time there will be an additional demand for freight services to support construction of the Olympic venues. Network Rail is working with the ODA to ensure that the increased demand for travel to Stratford is met during the course of the Games.

Deep sea container traffic continues to grow and this will fuel a demand for freight paths from Felixstowe, Bathside Bay and London Gateway Port (Shell Haven). Aggregates will see steady growth around the NLL driven by major construction initiatives such as the Olympic venues/Lower Lea Valley Development, Thames Gateway and Crossrail. At Ripple Lane potential future gauging works would allow UIC (European) gauge traffic running from the Continent access to Dagenham & Barking railheads via the High Speed 1 line.

The following factors are likely to influence the growing demand on the NLL & Thameside route:

- peak commuting is growing to central London, the Docklands and around the orbital route
- the Stratford City development
- developments in the Docklands
- expansion of the Port of Felixstowe, development of the ports of Bathside Bay and the deep sea London Gateway Port (due to open in 2011)
- the lack of diversionary routes for increasing W9 and W10 gauge intermodal freight services.

The RUSs explored these growing areas of demand. The CL RUS contains a number of capacity improvements which are now being developed by Network Rail with funding from TfL (the Concessionaire for the London Overground services). The GA RUS covers demand on the Thameside route and recommends train lengthening. These improvements are summarised in the capacity section below.

Future demand beyond CP4

Increases in passenger demand will continue to be generated through CP5 by the Stratford City development and employment in Docklands and the City of London. There will also be a permanent increase following the redevelopment of the Olympic site after the Games.

The demand for freight paths is forecast to increase on the route as the ports of Felixstowe, Bathside Bay and London Gateway Port continue to grow. It is expected that aggregates volumes will continue to rise as the level of construction work for house building increases and Crossrail; this too has been taken into account in the industry forecasts contained in the GA RUS.

Section 3: Tomorrow's railway: strategy

Figure 14 summaries the key milestones during CP4 in delivering the proposed strategy for the route. Further explanation of the key service changes and infrastructure enhancements are set out in the following sections.

Figure 14 Summary of proposed strategy milestones

Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
2011	NLL Route Improvements	Track remodelling, platform extensions, resignalling, closure of Signal boxes and OLE works to deliver reduced headways and freight loops	Longer and more frequent trains with additional peak and all day capacity
2011	Willesden High level Turnback	Motorised, signalled turnback	Increased capacity
2010	Shrubland Road Bridge	Bridge strengthening	Increased capability
2009	Gospel Oak-Barking Resignalling	Resignalling	Increased capacity
2011	12-car trains on c2c main line	DOO equipment	Increase in peak capacity
2011	12-car trains on Tilbury Loop and Ockendon branch	Platform extensions and DOO equipment	Increase in peak capacity

Figure 15 Capacity enhancements to meet HLOS peak capacity in CP4

Description	Additional vehicles involved	Station served	0700 – 0959 Capacity Impact	0800 – 0859 Capacity Impact
Thameside 12-car running on main line	20	Fenchurch Street	2,400	1,600
Thameside 12-car running on Tilbury Loop	28	Fenchurch Street	3,200	2,000

Figure 16 shows how the HLOS load factor targets for locations on the route are met by the proposed strategy.

The measures will also allow the total additional passenger KM to be accommodated.

Figure 16 Impact on HLOS peak capacity metric

London Terminals and regional Hubs	Peak three hours				High peak hours			
	Demand end CP4	Capacity start CP4	Capacity end CP4	Load factor end CP4	Demand end CP4	Capacity start CP4	Capacity end CP4	Load factor end CP4
Fenchurch Street	28,500	36,900	42,500	64%	15,500	17,300	20,900	74%
Other London Termini*	533,400	707,100	839,400		266,800	306,700	360,700	

* the load factor requirement in the HLOS applies as an average across 12 London stations.

Strategic direction

Network Rail believes that the solution to passenger growth and future capacity requirements can be potentially met by a combination of several generic initiatives:

- train lengthening, supported by platform lengthening and other rolling stock changes, which will require a complete review of the available traction power supply
- incremental introduction of additional services
- incremental enhancements delivered as improvements to planned track and signalling renewals together with stand alone enhancements. These will improve performance (necessary for growth), enable increases in train paths and facilitate timetable restructuring
- provision of additional passenger capacity at key stations.

Port developments at Felixstowe, Bathside Bay and London Gateway Port will bring significant demand for increased freight services across the route, which will make providing diversionary routes for W9 and W10 gauge freight traffic a high priority if overall capacity is not to be compromised.

To accommodate the high levels of growth the current capacity and capability of the NLL will need to change, which is currently planned to include headway improvements and remodelled tracks between Camden and Dalston. Construction of further phases of the East London Line via Dalston will add additional journey opportunities.

More details on the infrastructure enhancements that are needed can be found in the capacity and gauge sections.

Figure 17 Tonnage growth

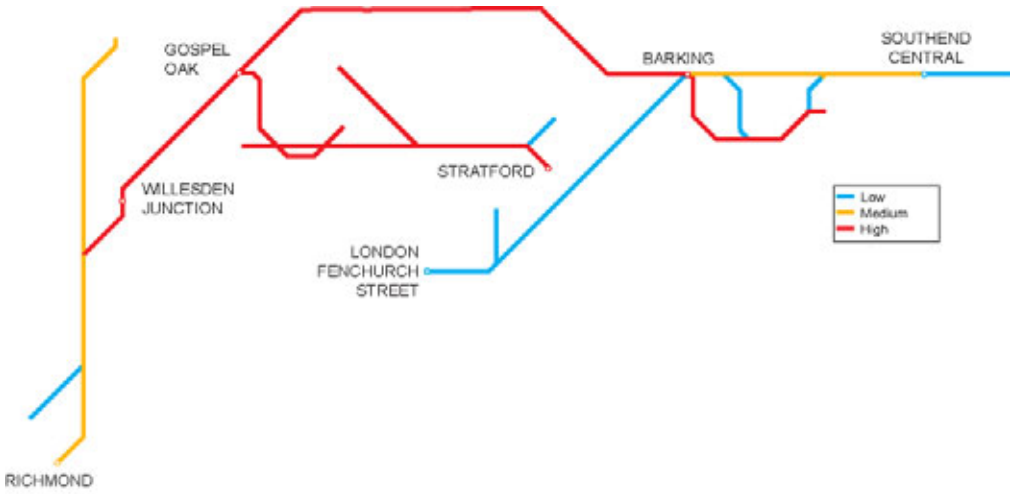


Figure 17 indicates the forecast percentage change in tonnage to 2017.

Future train service proposals

Network Rail has been working with c2c, LOROL, TfL and the DfT on developing plans for meeting growth in CP4.

London Overground

To meet peak demand on these services new rolling stock, covered by TfL's order for Class 378 EMUs and LOROL's order for Class 172 DMUs, is due to be introduced on the NLL in conjunction with revised service patterns and remodelled infrastructure. The Service Level Commitment (SLC) train service pattern being developed is:

- 4 tph Stratford to Richmond
- 2 tph Stratford to Clapham Jn
- 8 tph East London Line to Highbury & Islington
- 4 tph Gospel Oak to Barking
- 2 tph Clapham Jn to Willesden
- additional peak services Stratford to Camden Road

The new trains are proposed to be berthed at existing locations as well as potentially berthing some trains at Orient Way (near Stratford).

c2c

On Thameside train lengthening will meet forecast passenger growth and this will require platform lengthening on the Tilbury Loop and Ockendon branch.

The DfT Rolling Stock Plan assumes that Class 321 EMUs will be cascaded from London Midland following delivery of their new rolling stock. The additional 4-car units could be berthed at the existing East Ham and Shoeburyness depots.

Freight services

The following parts of the route are predicted to see higher freight flows due to expansion at the east coast ports and the development of London Gateway Port:

- London Gateway Port to Barking via Purfleet
- Barking to Gospel Oak
- Stratford to WCML via Camden and Primrose Hill
- Gospel Oak to Acton.

More detail on future services has been incorporated into the capacity section.

Future capability

Gauge

Until 2008 the primary route for W9 and W10 gauge freight traffic in the region was along the Great Eastern route from the east coast ports of Felixstowe and Harwich to the WCML via Ipswich tunnel, Stratford and the NLL (via Primrose Hill).

The use of 9' 6" high containers continues to increase; from 28 percent of all deep sea containers in 2002 to 40 percent in 2006. Expansion of the Port at Felixstowe (Route 7) has already commenced and with development of a new port at Bathside Bay (near Harwich – also Route 7) and the proposed London Gateway Port, it is of utmost importance that alternative W9 and W10 routes are developed.

The West Anglia cross country route from Ipswich to the ECML via Bury St Edmunds, Ely, March and Peterborough has therefore been cleared for W9 and W10 gauge freight services during 2008 and further clearance works between Peterborough and Nuneaton will be undertaken during CP4 to give a cleared route from the haven ports through to the WCML. In conjunction with this, capacity works will be developed through the Strategic Freight Network that will allow additional freight services to operate. In advance of this, capacity improvements are planned on the Felixstowe branch and to Ipswich Yard as well as improving signalling between Kennett and Bury St Edmunds. In addition improvements, including doubling Haughley Jn will be taken forward for development using NRDF funding. These works will absorb most of the freight growth from the east coast ports and relieve the congested Great Eastern and NLL routes. Freight management between Anglia and WCML is critical if freight is to flow smoothly across the NLL.

The TIF programme is funding the upgrading of the Barking to Willesden (via Gospel Oak) line for Thameside freight traffic. This has included W10 gauging works including through Hampstead Heath tunnel, which was a major obstacle. Also the Barking to Gospel Oak route, which runs mainly on viaducts and embankments, may need to be moved to a higher track maintenance band due to increased tonnages. Freight routeing issues (including those relating to diversionary routes) were considered as part of the Freight RUS.

Line speed

An option to improve line speed on part of the Thameside route, which could contribute towards additional capacity or improved performance, is currently being considered. Speed improvements on the Gospel Oak–Barking route are also being assessed in conjunction with the structures work bank.

Tonnage

Increased demand for freight traffic to and from the east coast ports on the Great Eastern route and London Gateway Port will cause much higher tonnages to traverse the NLL, which will bring both capacity issues and the need for additional maintenance due to increased wear and tear on the assets. The following parts of the route are predicted to see the highest increases of freight tonnage carried:

- Stratford Central Jn to Camden Jn via Primrose Hill
- London Gateway Port to Barking via Purfleet
- Barking to Acton via Gospel Oak and Willesden.

Platform lengths

It is generally accepted that the practical approach to continued passenger growth is the incremental lengthening of trains, especially as this solution is flexible, caters for the wide range of different growth scenarios and makes better use of scarce and high value paths.

On the NLL platforms are to be extended to allow the operation of longer trains, and SDO is still being considered for some locations. On the Thameside route growing demand will require additional mainline trains to be extended to 12-cars. On the Ockendon branch and Tilbury Loop, as the housing developments are built, platforms will need to be extended to permit the operation of 12-car trains.

Future capacity

The forecasts of significant further growth, as detailed in the future demand section above, pose significant problems and are driving a requirement for additional capacity.

Network Rail has been working with c2c, LOROL, TfL and the DfT on delivering capacity improvements in CP4 and is continuing to develop proposals for CP5 and beyond.

Network Rail has been working with TfL and LOROL on the North London Route Improvement Project (NLRIP), which will increase capacity on the NLL as well as developing a programme of upgrades to the Gospel Oak – Barking line and these are briefly detailed below:

- on the NLL in the short term, new high capacity rolling stock is to be introduced, followed by the construction of the platform extensions mentioned previously (CP4)
- extensive route remodelling between Dalston and Camden to allow the SLC (as described earlier) to be delivered, including the link to the East London Line, (CP4). This enhanced capacity also allows for freight growth across the route
- on the Gospel Oak – Barking line in the short term higher capacity diesel trains are to be introduced (CP4)
- In the medium term TfL are considering upgrades to both the route and train services
- The growth of London Gateway Port requires the upgrade of the route as discussed above.

The GA RUS examined the growth and capacity issues on the Thameside route and recommended running longer services on all routes. Network Rail is working with c2c and the DfT to deliver platform extensions to support the introduction of 12-car trains on the Tilbury Loop (CP4) and developing the case for infrastructure improvements to permit more trains to call at West Ham (CP4). In the longer term the single line Ockendon branch may have to be addressed if additional services are required via this route.

Future performance

Figure 18 sets out the planned PPM for each train operator. These are lower than planned given the need for flexibility in achieving the HLOS targets and to reflect the greater uncertainty and risk associated with projecting performance at a disaggregated level. Reasonable requirements will finally be established for CP4 in our 2009 Business Plan. In some cases the services covered by the franchises will change; this means that the forecast PPM figures are not directly comparable with the current PPM figures.

c2c

The performance of the c2c franchise is currently 95.4 percent PPM and this is forecast to continue at approximately this level through to April 2009 as an outcome of the 2008/09 Joint Performance Improvement Plan (JPIP).

The key performance issues and opportunities for this route have been identified as:

- accommodating more and longer freight trains associated with traffic growth from the port of Tilbury
- improving the condition of the overhead line through campaign changes of expired components
- reduction in the impact of trespass, vandalism and fatalities
- reduction in the impact of cable theft, focusing on protection of the return conductor
- initiation of a 'Right Time Every Time' project focusing on sub-threshold delays, the second largest cause of PPM failure
- timetable review to cater for passenger growth, focusing on the Tilbury services and increasing seating capacity country side of Pitsea
- faster repair of switches and crossovers
- improved protection of the 650v signalling supply which is prone to rodent damage in urban areas
- integrated Train Planning System is being trialled on c2c route, which will help to unlock capacity on the network that may be constrained by the current planning environment. The system plans at a lower level of granularity and it is anticipated that during the development of timetables it will improve efficiency of processes and timetable accuracy.

Figure 18 Forecast PPM MAA – CP4 plan

	2009/10	2010/11	2011/12	2012/13	2013/14
c2c	94.8%	95.1%	95.2%	95.3%	95.3%
London Overground	92.5%	93.1%	94.0%	94.4%	94.6%

The route plan is being developed around these key points and the desire to focus on maintaining current levels of performance through mitigation against major incidents. The plan therefore only shows a slight PPM improvement during CP4 to 95.3 percent PPM on c2c by April 2014. This includes an allowance for passenger/traffic growth. This figure has been discussed with the TOC and although c2c has no franchise commitment on PPM this figure is in line with their aspirations.

London Overground

The performance of the TOC is currently 92.7 percent PPM MAA and this should reach 91.7 percent by the end of March 2009. The TOC will undergo considerable change over the forthcoming years including a large increase in the number of services run, the introduction of a through service on the East London Line, and the investment in new rolling stock. The North London Route Improvement Project will provide much needed additional infrastructure and facilitate the increased level of train services.

The key performance issues and opportunities for this TOC have been identified as:

- major uncertainty on the performance of the ELL service and how it will interact with Southern trains in South London
- risk of enhanced service on the Gospel Oak and North London lines
- freight growth – and the potential increased use of the North London Line
- better information on small delays through better data capture and analysis
- passenger growth, especially until the new rolling stock has bedded in
- new rolling stock and a predicted large decrease in the miles between casualties
- increase in the speed of response and getting engineers to the site of a failure
- regulation and timetable resilience work
- reduction in the amount and impact of trespass, vandalism and fatality incidents
- introduction of GSM-R.

The route plan is being developed around these key points and currently suggests that performance on London Overground will be around 94.9 percent by April 2014. This includes an allowance for passenger/traffic growth and an increase in engineering work. The TOC and Network Rail are developing a more detailed 5 year plan as part of the JPIP.

Network availability

The high level of capacity utilisation on the route has meant that there has been difficulty in gaining access for maintenance and renewals work. As a result a pattern of cyclical possessions had been agreed for the NLL comprising five to six hour possessions each weeknight, for the maximum lengths of line that the overnight freight service will permit, on a twelve weekly cycle grouped into convenient lengths. However due to extensive remodelling works being undertaken to upgrade the route and accommodate the East London Line extension, the current cyclical arrangements will need to be reviewed with the train operators following completion of the works.

On the Thameside part of the route, 12 week cyclic maintenance is sustained on weeknights over the main line between Fenchurch St and Shoeburyness, with other specific cyclicals for signalling and telecommunications on a 24 and 52 week pattern. On the Tilbury Loop maintenance is carried out in six 27-hour annual possessions over the whole line between Barking and Pitsea, although these are split to offer access to Grays where possible. There is also a weeknight cyclical to the east of Thames Haven Jn which occurs on a 12 weekly cycle.

Although the introduction of cyclical access onto the NLL & Thameside route is delivering improved maintenance and performance in most places, the need to run increasing services to cater for rising demand may require a revision of the current regimes. Options for improvement on the NLL are being developed as a result of the CL and GA RUSs and completion of gauge enhancements on the NLL, Gospel Oak – Barking and cross country routes will greatly enhance the ability to divert trains at nights/weekends to improve maintenance opportunities. On Thameside the use of simplified bi-directional signalling to allow services to operate during single line possessions has now been introduced, which is bringing the route closer towards becoming a ‘Seven Day Railway’.

Long term opportunities and challenges

The work undertaken in the RUSs identifies key challenges that the rail industry will face in the long term, and through analysis and optioneering the most appropriate methods to resolve these issues will be determined. A key element of this work is to understand the issues that cross the RUS boundaries, and this work will then inform planning in CP5 and beyond.

Network Rail anticipates that accommodating growth in commuting to central London and the Docklands, together with developments around Stratford, will be a significant challenge. Similarly, on the parts of the core NLL and other sections of the route, enhancements will be required if additional services are to be operated on lines, which are already operating at, or very close to, capacity.

The suggested strategy for improving passenger and freight growth and future capacity requirements on the NLL are being developed through the NLRIP project. In addition Network Rail is working with TfL and LOROL on a number of enhancements to improve capacity both for the Games and to meet TfL's longer term aspirations as part of its North London Railway concession, which could potentially include future electrification of the Gospel Oak – Barking route. Electrification of this route would allow an electrified diversionary route across London for Thameside freight as well as providing capacity relief between Forest Gate Jn and Stratford on the Great Eastern route (Route 7).

For Thameside, different scenarios were explored in the GA RUS with significant input from stakeholders and the capacity being delivered by the train lengthening in CP4 will need to be reviewed against future demand across the route that could materialise from further house building in the Thames Gateway in CP5.

A further important area, which was covered in the GA RUS, is public access to the network. The following four areas were considered:

- station capacity
- station facilities
- car parking
- new stations to serve developments.

Network Rail is working with the train operators in developing schemes to address station capacity issues and improve station facilities using a number of funding mechanisms including the National Station Improvement Programme (NSIP).

Car park extensions are proposed at a number of stations including Benfleet, Leigh-on-Sea and Grays to improve access to the network. A study by Passenger Focus showed that if parking is deterred due to lack of capacity, rail patronage will be reduced as customers either drive further to alternative stations or drive all they way to their final destination.

The Regional Spatial Strategy identified the Thames Gateway as a key growth area and a new station is being considered to serve new developments in the Rainham – Dagenham corridor.

Links to RUS documents can be found on Network Rail's website www.networkrail.co.uk

Infrastructure investment in CP4

Figure 19 Proposed enhancements in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2009	Ⓑ Limehouse Interchange	Interchange link between National Rail and DLR	Improved station facilities	Third Party	5
2009	Ⓒ East Ham S&C renewal	S&C renewal	Renewal	Network Rail	5
2012	Ⓕ Platform extensions on the Tilbury Loop and Ockendon branch	12-car platform extensions	Capacity Enhancement	Periodic Review 2008	2
2011	Ⓖ Traction Power Supply Upgrade	Provide power supply to support longer trains on Thameside route	Capacity Enhancement	Periodic Review 2008	1
2011	Ⓗ Tilbury Power Station rail link	New connection to Tilbury Power Station	New Freight Connection	Third Party	1
2011	Ⓘ Thameshaven track doubling	Doubling of track for London Gateway Port development	Capacity Enhancement	Third Party	3
2011	Ⓙ NLL capacity enhancements	Track remodelling, improved headways, platform extensions and loops	Capacity Enhancement	Periodic Review 2008/ Third Parties	4
2011	Ⓚ Shrubland Road bridge	Bridge strengthening	Capacity Enhancement	Network Rail	1
2009	Ⓛ Gospel Oak-Barking Capacity improvements	Resignalling	Capacity Enhancement	Network Rail/Third Party	3
2009	Ⓜ Victoria Park S&C renewal	S&C renewal	Renewal	Network Rail	3
2010	Ⓝ South Tottenham S&C renewal	S&C renewal	Renewal	Network Rail	3
2009	Ⓞ Harringay Park S&C renewal	S&C renewal	Renewal	Network Rail	3
2010	Ⓟ T&H bridge reconstructions	Bridge reconstructions at Skeltons Lane, Acacia Road, Lansdowne Road, Sansome Road, Harrow Road, Montague Road	Renewal	Network Rail	3

Figure 19 Proposed enhancements in CP4 continued

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2010	Ⓠ West Hampstead station improvements	Station improvements and improved links between stations	Capacity Enhancement	Third Party	–
2009	Ⓢ Neasden S&C renewal	S&C renewal	Renewal	Network Rail	3

NRDF candidate schemes in CP4

Figure 20 Candidate NRDF schemes in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2012	Ⓐ Fenchurch St and Chafford Hundred passenger circulation	Improve circulation	Capacity Enhancement	Network Rail Discretionary Fund	–
2011	Ⓓ West Ham resignalling	Alterations to signalling headways and check on station capacity - Increased capacity and improved interchange with the DLR and District Line/JLE	Capacity Enhancement	Network Rail Discretionary Fund	3
2011	Ⓔ Barking–Upminster linespeeds	Improve speeds between Barking and Upminster - Linespeed increase to reduce journey time/ improve performance buffer	Performance Improvement	Network Rail Discretionary Fund	3
2011	Ⓡ Willesden High Level Turnback	Turnback siding	Capacity Enhancement & Performance Improvement	Network Rail Discretionary Fund	1

Renewals activity

Figure 21 shows the estimated renewals costs and activity volumes.

The precise timing and scope of renewals will remain subject to review to enable us to meet our overall obligations as efficiently as possible consistent with the reasonable requirements of operators and other stakeholders.

It should be noted that in order to manage the deliverability of our Civils, Signalling & Electrification plans we have included an element of over planning in our work banks. As a consequence the sum of our route plans exceeds our plan for the network as a whole. It is likely that a small proportion of the activities in these areas will slip to subsequent years.

Figure 21 Summary of estimated renewals costs and activity volumes

£m (2009/10 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
Renewals						
Track	14	10	9	17	13	62
Signalling	2	5	21	4	1	33
Civils	8	17	6	6	6	43
Operational property	6	8	8	3	3	28
Electrification	1	2	1	2	2	7
Telecoms	0	1	0	1	1	3
Plant and machinery	0	0	0	0	1	2
Total	**32**	**42**	**46**	**32**	**25**	**178**
Renewals volumes						
Track						
Rail (km)	9					
Sleeper (km)	6					
Ballast (km)	8					
S&C (equivalent units)	6					
Signalling						
SEUs (conventional)	0	0	141	0	0	141
SEUs (ERTMS)	0	0	0	0	0	0
Level crossings (no.)	0	0	0	0	0	0

Appendix

Figure 22 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference, RA is Route Availability

SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
06.01	NLL: Gospel Oak – Stratford	various	London & SE	DfT	No	W10 (W9)	8	various	25kv AC (Third rail DC)	TCB	Various	2
06.02	Fenchurch Street – Shoeburyness	FSS2 (FSS1 & 3)	London & SE	DfT	No	W8 (various)	8 (3)	75 (various)	25kv AC	TCB	3 (2)	2
06.03	Forest Gate Jn – Barking	various	London & SE	DfT	No	W10 (W6)	8	45 (25)	25kv AC	TCB	3	2
06.04	Barking – Pitsea	TLL (UPG)	London & SE	DfT	No	W10 (W8)	8	70 (60)	25kv AC	TCB	3 (OTIS)	2 (1)
06.05	Gospel Oak – Woodgrange Park	TAH (GOJ)	London & SE	DfT	No	W10 (W9)	8	various	None (25kv AC)	TCB (AB)	various	2
06.06	NLL: Willesden Jn – Gospel Oak	BOK2 (BOK3)	London & SE	DfT	No	W10 (W9)	8	45 (20)	25kv AC	TCB	various	2
06.07	NLL: Richmond/Old Kew Jn – Willesden Jn	various	London & SE	DfT	No	various	8 (6)	various	various	TCB	various	2
06.08	Other Freight Lines	various	Freight	DfT	No	various	various	< 40	various	TCB (OTW)	various	2 (1)
06.09	NLL: No1 Lines	various	Freight	DfT	No	W10 (W9)	8	20 (15)	25kv AC	TCB	various	2 (1)
06.10	Dudding Hill Line	CAW (BDH)	Freight	DfT	No	W7 (W9)	8	30	None	AB (TCB)	AB (5)	2

Capacity and operational constraints
A Fenchurch Street – Barking: Trains stopping at West Ham reduce available capacity
B Upminster – Grays: Single line track section with only one passing loop

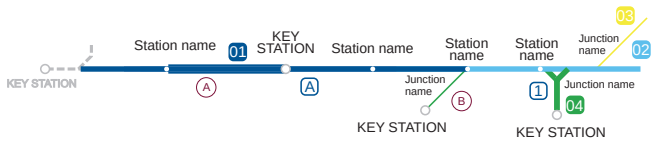
Other issues on the route
1 Hampstead Heath tunnel Freight gauging issue prevents the use of 9’ 6” containers on standard wagons
2 Route section would need an upgrade to allow a diversion of strategic freight flows (to release Forest Gate – Stratford capacity, see route 7)

Note

This Route Plan forms part of the Control Period 4 (CP4) Delivery Plan and supersedes the version published in April 2008.

Other documents in the Delivery Plan can be found on the Network Rail website www.networkrail.co.uk

Key to route diagrams



Capacity and operational constraints
Location: capacity or operational constraint

Issues on the route
Location: issue on the route

Key planned projects
Location: planned project on the route

Strategic route sections
Listed in the appendix of the route plan

Other symbols

KEY STATION — Key station location
KEY STATION — Key station on this route
KEY STATION — Key station on another route
Station name — Other station location
Station name — Other station on this route
Junction name — Junction / other landmark

Track descriptions

The colour of the line denotes the route classification
- Primary
- London and South East commuter
- Secondary
- Rural
- Freight only

The line shading indicates strategic route sections which are numbered on the map

The width of the line denotes the number of tracks
- Multiple track
- Double track
- Single track

Other lines are shown as follows:
- Line on other route
- Non Network Rail infrastructure
- Non operational line

GRIP stages

1 Output definition
2 Pre-feasibility
3 Option selection
4 Single option selection
5 Detailed design
6 Construction, test and commission
7 Scheme hand back
8 Project close out

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