Route 6 North London Line and Thameside

6 6

The Eastern Regional Planning Assessment (RPA), covering the period from 2011 to 2021, was published by the 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. Both RUSs look at options and recommendations for accommodating future growth, and some developing options are discussed in this route plan.

Route context

The North London Line is a vital part of London's transport infrastructure and a major link between key arterial routes to and from the capital. It is an 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 travel into and around London, in particular to the city, the Docklands and north London from Essex and the Thames gateway as well as the London boroughs.

The North London Line part of the route is included in the Cross London RUS. The consultation document, which unveiled seven options for meeting the demands of the increasing numbers of people using London's orbital routes up to 2016, was published on 28 November 2005.

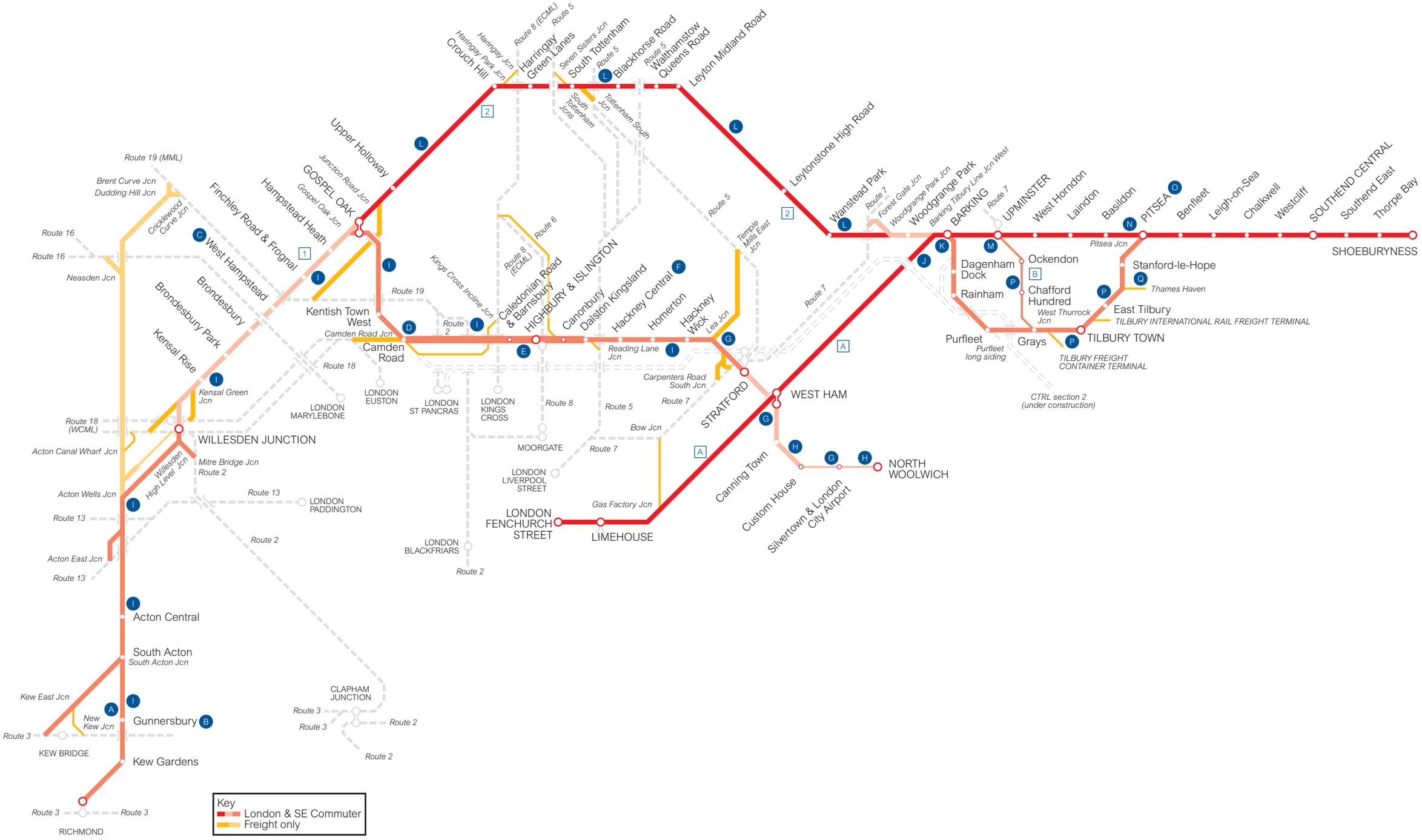
The Thameside part of the route is included in the Greater Anglia RUS, work on which started in February 2006 and will cover the period to December 2017.

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 North London Line (NLL) which comprises the Richmond to North Woolwich route (06.01, 06.06, 06.07, 06.09 and 06.11), 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, and Acton Wells Junction - 06.10) and associated connections to all of London's main radial routes; and
- the Thameside route comprises of the main line (06.02) and loop together with a line connecting Chafford Hundred station (close 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



Passenger and freight demand

Passenger demand has been growing steadily on both parts of the route. 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 as well as leisure traffic, especially to the major shopping development at Lakeside between Grays and Upminster.

Some parts of the North London Line 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.

Increasing employment is driving demand in London, especially in the City and the Docklands and rail travel in the London area generally (based on the radial routes) is growing at around 2% pa for peak and around 3% pa for inter peak services.

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 and Docklands Light Railway.

There are several interchanges along the North London Line route for onwards travel. The main interchanges at Stratford (LUL Jubilee Line, DLR and the Great Eastern 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 North London Line and employment in Docklands is expanding. Stratford itself is set to benefit from new development, and demand is set to grow.

Freight demand, especially in intermodal deep sea containers from the east coast ports at Felixstowe and Harwich is growing year on year by 4-5%. This demand will be further increased by the impending port developments at Felixstowe South (approved February 2006), and Bathside Bay (Harwich), which received minded approval from the DfT in late 2005, as well as the development of a deep sea port at Shellhaven, located on the Thames Haven branch.

Aggregates are the most significant bulk commodity crossing London and 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 North London Line, particularly to key yards such as Acton due to major construction initiatives including the construction of the CTRL Stage 2 and the Olympic venues.

This will increase demand for train paths across the North London Line & Thameside route and is further explored in capability and capacity sections below.

Current services

Passenger services on the North London Line are operated by Silverlink, while those on the Thameside route are operated by c2c. EWS, Freightliner and GB Railfreight operate freight services.

The service structure on the core North London Line offers 4tph between Richmond and Stratford Low Level and 2tph onwards to North Woolwich. In the peaks these are supplemented by two additional services between Stratford Low Level and Camden Road/Clapham Junction to relieve overcrowding.

Figure 1 contains the tph frequencies on the North London Lines (excluding additional peak services between Stratford Low Level and Camden Road/Clapham Junction).

Figure 1 Current train service level (trains per hour)

Service	tph
Richmond to North Woolwich	2
Richmond to Stratford Low Level	2
Gospel Oak to Barking	2

On the Thameside route the service structure is complicated by the complexity of the network and the different stopping patterns. There is 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; and
- to Fenchurch Street via the Tilbury Loop from Grays and Pitsea.

Figure 2 contains the morning peak arrivals at Fenchurch Street between 08:00 and 09:00.

Figure 3 contains the off peak tph frequencies into Fenchurch Street:

The North London Line provides a vital cross London link for several long distance freight flows, from the East Coast ports of Felixstowe and Harwich and from Tilbury on Thameside. The route also sees significant volumes of freight to local terminals and yards, including aggregates and mixed commodities.

Current traffic

The route carries mixed traffic, with significant variations in speed, acceleration and stopping patterns. On many corridors this involves a complex mix of freight trains, both AC and DC inner and outer passenger suburban electric multiple units (up to 75 mph on Thameside but restricted up to a maximum of 45 mph around the North London Line) and passenger diesel multiple units. The only segregation between freight and passenger traffic is on the North London Line between Dalston and Camden Road.

Figure 2 Current train service level

Service Origin and route	No. of services
Grays via Tilbury Loop	1
Laindon via main line	4
Pitsea via Ockendon	3
Pitsea via Tilbury Loop	3
Shoeburyness via main line	6
Stanford-le-Hope via Ockendon	1
Thorpe Bay via main line	2

Figure 3 Current train service level (trains per hour)

Service	tph
Grays via Tilbury Loop	2
Shoeburyness via main line	4
Southend Central via Ockendon	2

Figure 4 Tonnage

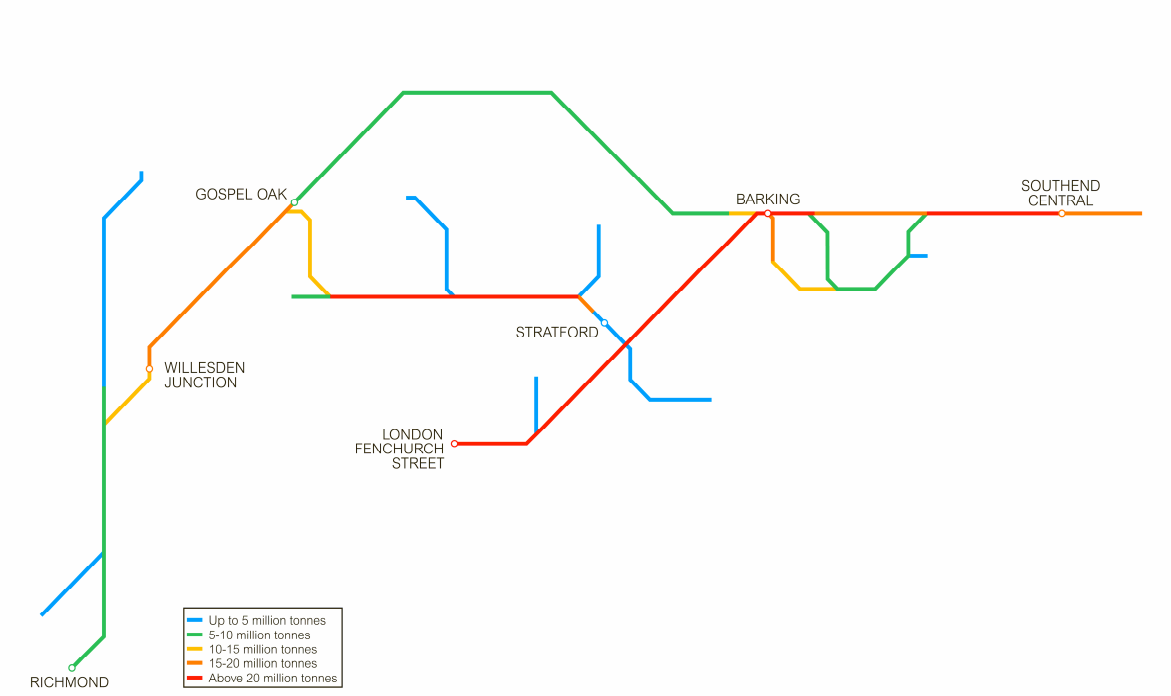


Figure 4 shows the tonnage levels on the route.

Traffic volumes are summarised in Figure 5.

Figure 5 Current use

	Passenger	Freight	Total
Train km per year (millions)	8	1	9
Train tonne km per year (millions)	1931	600	2531

Current infrastructure capability
The following maps set out the capability of the current network.

Figure 6 Linespeed

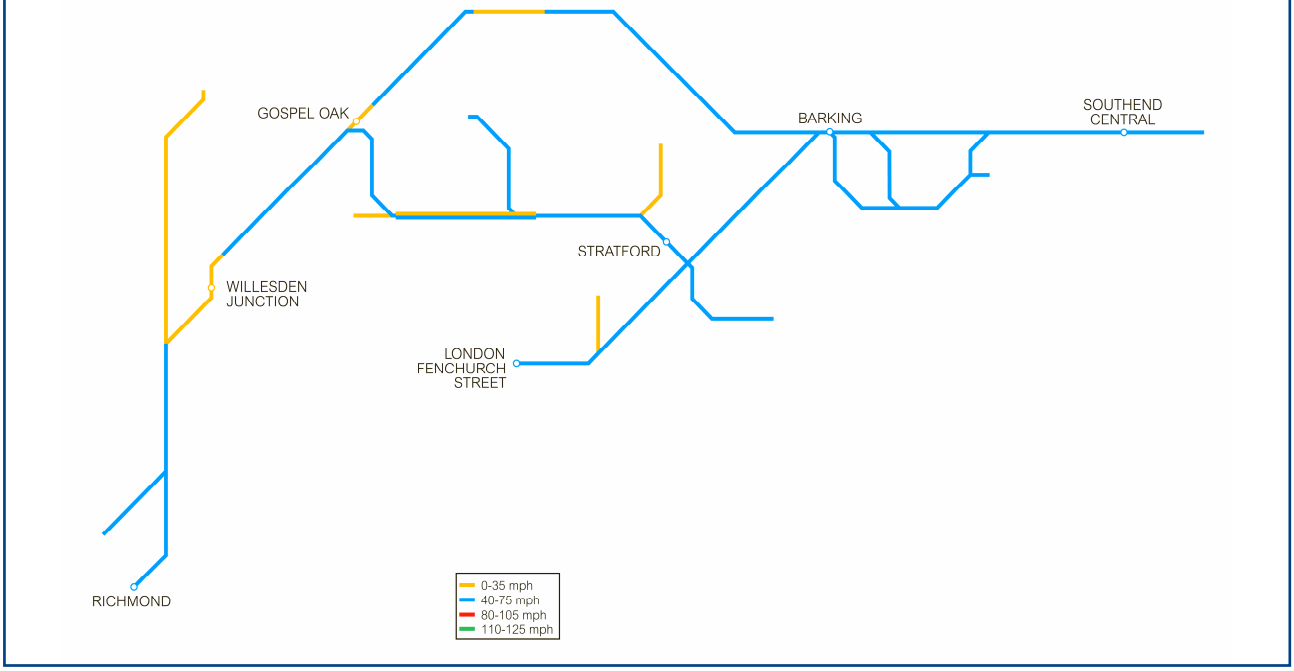


Figure 7 Electrification

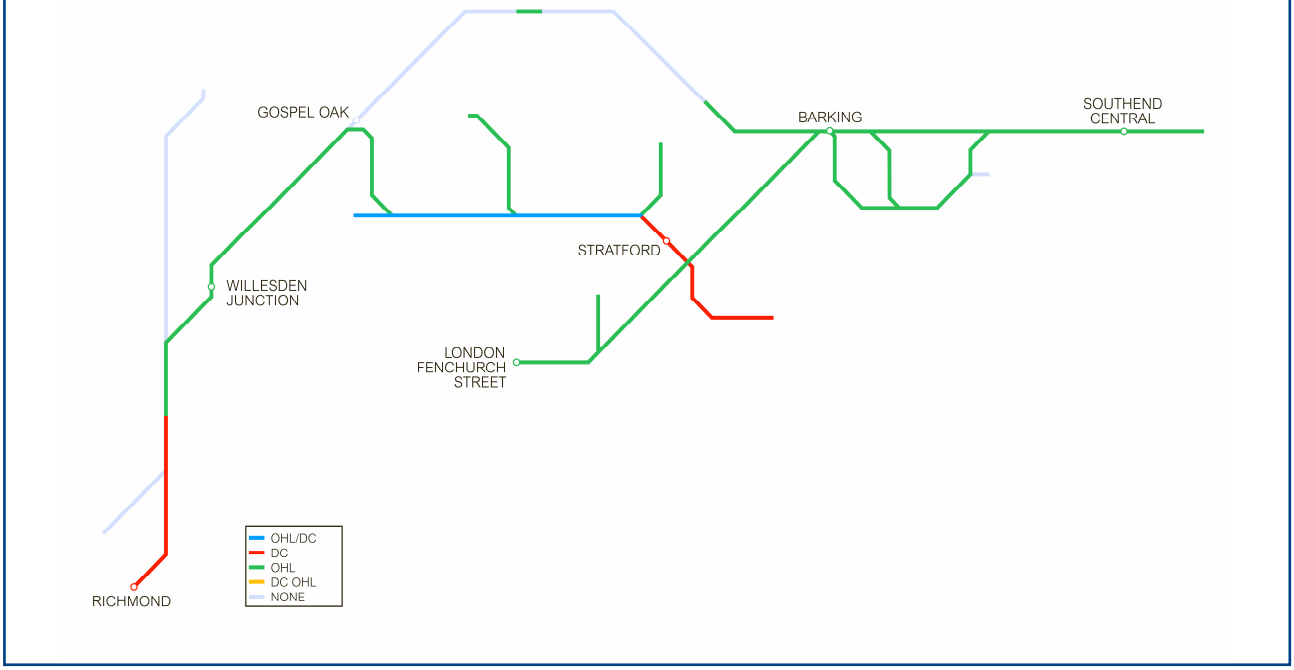


Figure 8 Route availability

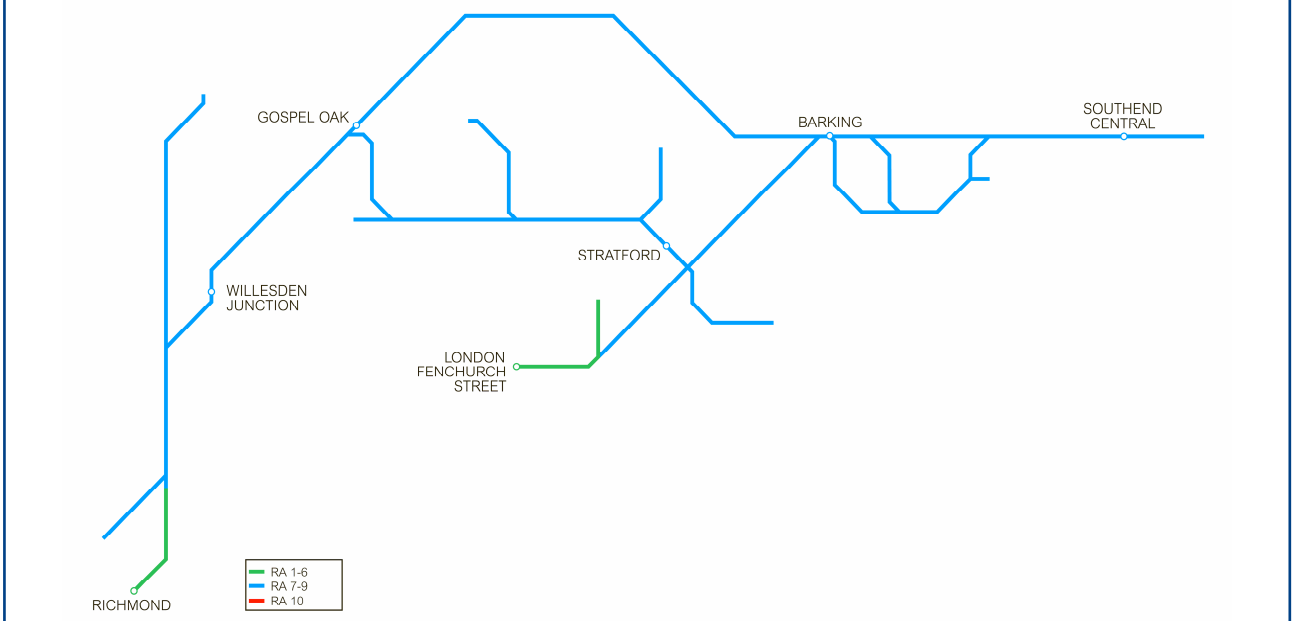
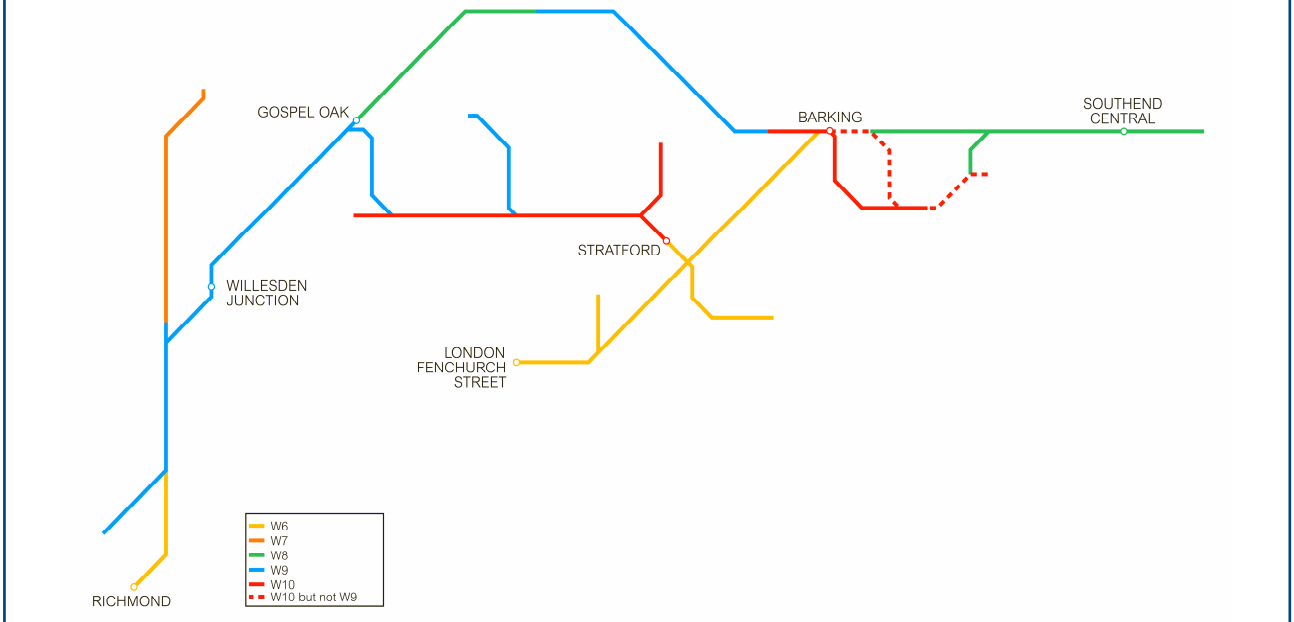


Figure 9 Gauge



Current capacity

The North London Line capacity issues are documented in the Cross London RUS and are therefore only mentioned briefly below. However, the whole North London Line & 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 North London lines;
- long signalling headways, low speeds and the large number of junctions on the North London Line;
- 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 North London Line 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 DLR and the underground as passenger numbers here have increased since the opening of the Jubilee Line; and
- Lack of a W10 diversionary routes for container traffic.

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	
North Woolwich to Stratford Low Level	2
Stratford Low Level to Camden Road	6
Gospel Oak to Willesden Junction High Level	5
Willesden Jcn High Level to Willesden HL Jcn (inc. 3 Clapham Jcn services)	8
Gunnersbury to Richmond (inc. LUL services)	12
Shoeburyness to Thorpe Bay	6
Thorpe Bay to Pitsea	8
Tilbury Town to Grays	7
Ockendon branch	4
West Horndon to Upminster	12
Upminster to Barking	16
Grays to Barking	4
Barking to West Ham	20

Figure 11 Current PPM MAA (2005/06)

TOC	MAA	As at period
c2c	93.1%	10
Silverlink	89.3%	10

Current performance

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

The metro passenger train services on the North London Line are operated by Silverlink. Silverlink's Public Performance Measure above also includes their County services that they operate on the southern end of the West Coast Main Line. The passenger train services on Thameside are operated by c2c.

As a result of the route operating at close to track capacity for most of the day, there are difficult performance issues. The current mix of fast and stopping services, passenger and freight services on the North London Line 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 the performance figures for 2005 shows the main problems on the North London lines to be broken rails and track faults (the most significant of these at Dalston in October), points failures, track circuit failures and vegetation obstructing the infrastructure.

On the Thameside lines analysis of the performance figures for 2005 shows the main problems to be track circuit failures and overhead line faults (the largest of which was a dewirement at Southend Central in November).

Services on both parts of the route have been affected by trespass incidents, particularly from children/youths.

Measures to further improve performance over the route are outlined in the future performance section below.

Future requirements

Strategic direction

We expect that the route will continue to see high levels of passenger and freight growth especially in the Thames Gateway area. The main drivers of this will continue to be growth in commuting to central London and the Docklands, and the increased leisure market. Stratford continues to expand with the development of 'Stratford City', the interchange with the CTRL, the new DLR link to London City Airport and as the main centre for the Olympic Games in 2012. On the North London Line developments will also be tied in with TfL's longer term proposals for the route. Port developments at Felixstowe, Bathside Bay and Shellhaven would bring significant demand for increased freight services across the route, which will make providing diversionary routes for W10 gauge freight traffic a high priority if overall capacity is not to be compromised. Construction of further phases of the ELL via Dalston would add additional journey opportunities.

Future demand

The emerging Regional Spatial Strategy focuses housing development in the Thames Gateway and continued growth is expected into central London and Docklands where employment is expanding.

Stratford is likely to see the most development including construction of the interchange station with the CTRL. The DLR has recently opened up an extension to the London City Airport and One has started a new direct rail service in December 2005 between Stratford and Stansted Airport.

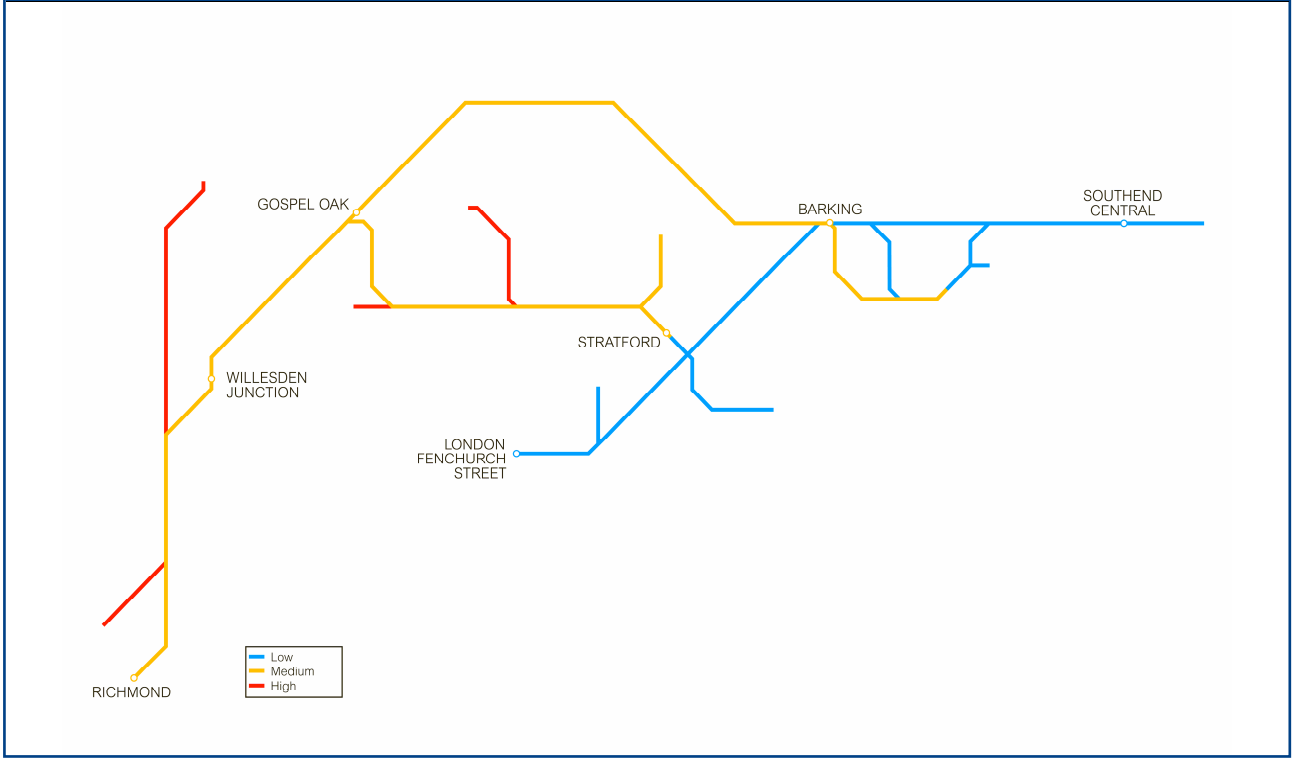
London has been chosen as the host city for the 2012 Olympics and development work has already started that has identified a number of potential improvements that could be made in order to ensure that the increased demand for travel to Stratford is met during the course of the games. A detailed specification of what is required for the games is awaited.

Deep sea container traffic continues to grow and this will fuel a demand for freight paths from the east coast ports and Shellhaven. Aggregates will see steady growth around the North London Line fuelled by major construction initiatives such as the ongoing CTRL Stage 2 and further growth may be influenced by the construction of the Olympic venues/Lower Lea Valley Development, Thames Gateway and Crossrail.

The following factors are likely to influence the growing demand on the North London Line & 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 east coast ports and development of the Shellhaven deep sea port; and
- the lack of diversionary routes for increasing W10 gauge intermodal freight services.

Figure 12 Tonnage growth



The RUSs are exploring these growing areas of demand. The Cross London RUS, which was published for consultation on 28th November 2005, has suggested a series of seven options on how demand might be tackled on the North London Line and some of these are summarised in the capacity section below. The Greater Anglia RUS, which will cover demand on the Thameside route, commenced in February 2006 and the consultation document is planned to be published in January 2007.

Figure 12 indicates the forecast percentage change in tonnage to 2015.

Future capability

Gauge

The SRA Gauging Policy published in June 2005 set out a proposed intermodal freight network cleared for the transportation of 9'6" high containers on standard wagons (known as W10 gauge). Network Rail and the SRA carried out physical works to introduce W10 gauge freight traffic along the Great Eastern route from the east coast ports of Felixstowe and Harwich to the West Coast Main Line via Ipswich tunnel, Stratford and the North London Line (via Primrose Hill). These works, which were completed in late 2004, also opened up the route from Tilbury and North Thameside, via Forest Gate Junction and Stratford, to the W10 network.

The use of 9'6" high containers is increasing and is predicted to account for the majority of current growth in the deep sea container market, however there is still no alternative diversionary route for the current W10 gauge freight traffic from the east coast ports and further expansion is proposed at both Felixstowe and Bathside Bay (near Harwich), which would bring increased W10 gauge traffic to the North London Line. The West Anglia cross country route from Ipswich to the East Coast Main Line via Bury St Edmunds, Ely, March and Peterborough has therefore been identified as one of the highest priority routes for upgrading, which would divert some freight services away from the congested North London Line. The upgrade should be secured through 'Section 106' planning commitments by the port developers.

There is no diversionary route from the Thameside route to the WCML and Shellhaven is developing a deep sea port, which will generate additional freight traffic. These services would need a diversionary route across the North London Line via Barking, Gospel Oak and Kensal Green in order to relieve the congested North London Line and Great Eastern route between Forest Gate junction and Stratford. However Hampstead Heath tunnel is a major obstacle and options to improve the gauge through this structure will need to be assessed. 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 if it is to carry long term freight. Freight routeing issues (including those relating to diversionary routes) are being considered as part of the Freight RUS.

Line speed

The signalling headways and the large number of junctions contribute to the low linespeeds of up to

45 mph around the core North London Line. Options to improve signalling headways on this section of the route, which could contribute towards additional capacity or improved performance, are currently being explored in conjunction with TfL and as part of the Cross London RUS.

Tonnage

Increased demand for freight traffic to and from the east coast ports on the Great Eastern route and Shellhaven will cause much higher tonnages to be sustained across the North London Line, 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 Junction to Camden Junction via Primrose Hill;
- Shellhaven to Barking via Purfleet; and
- Barking to Forest Gate Junction via Woodgrange Park.

Additionally the following route sections would require gauging to W10 to allow a diversionary route for Thameside freight away from the congested Great Eastern route between Forest Gate and Stratford:

- Woodgrange Park Junction to Gospel Oak; and
- Gospel Oak to Acton Wells Junction (including Hampstead Heath Tunnel).

Platform lengths

It is generally accepted that the practical approach to continued 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 North London Line growing demand is likely to require the four trains per hour passenger service either to be strengthened from the current three cars per train or additional services to be run. Longer or additional trains would require infrastructure improvements to platform lengths, power supplies and signalling. This forms part of the options that are being considered in the Cross London RUS.

Lengthening trains to twelve cars on the Thameside route to meet rising demand over the Tilbury Loop and via Ockendon would require the platforms to be lengthened as they are currently restricted to eight car operation. Twelve car operation is currently being considered by DfT.

Fragile routes

Network Rail engineers have identified a set of 'Fragile routes' across the country where the addition of any further loco hauled traffic would have a significant impact on the residual life of track and/or structures.

The rail freight industry has recently provided to Network Rail a set of 10 year traffic forecasts, and we are presently assessing their implications. The key route sections within this route that has been identified as a fragile route and has clearly defined additional tonnage/ train numbers projected by the industry are: the Dudding Hill Branch (Cricklewood – Acton Wells) and Gospel Oak – Barking.

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.

The Cross London RUS contains detailed options for increasing capacity on the North London Line and should be read in conjunction with this route plan. Below are a few of the themes that have been explored:

- introducing additional services by adjusting the train timetables and service mix (this may require additional infrastructure works being considered in conjunction with TfL);
- train lengthening, which may need to be supported where necessary by platform lengthening; and
- the introduction of new rolling stock or reconfiguring existing rolling stock layouts

The Greater Anglia RUS will explore the causes of and seek to provide solutions to the increasing capacity needs of the Thameside part of the route and some examples of areas that will be explored are:

- running longer services on the Tilbury Loop, which will need to be supported where necessary by platform lengthening;
- running longer trains on through services travelling via the Ockendon branch; and
- improved signalling between Fenchurch Street and West Ham.

Further path capacity may also be generated by changes to the train timetable and service mix. This also has a role in improving performance by improving service interaction.

Future performance

Figure 13 shows the forecast reduction in Network Rail delay minutes compared with 2005/06.

Figure 14 shows the forecast PPM for the main TOCs running along the route

The delivery of improvements in train performance is one of our key priorities. This is being progressed by ensuring that infrastructure and network management caused delays are systematically reduced. This is being addressed by the recent introduction of a fully integrated control centre for East Anglia, which is already starting to bring benefits by improving communications, streamlining the decision making process and delivering an improved service to customers.

Other improvements in performance are being achieved through Joint Performance Improvement Plans, and the use of Six Sigma continues to bring improvements to specific performance problems (see the Management Plan).

We are continuing with our day to day maintenance and our policy of targeting our enhanced maintenance and renewals at performance hotspots. This includes our annual programmes of targeted performance improvement schemes across the route. Other improvement measures and initiatives include portable CCTV cameras to monitor trespass and vandalism hotspots and better vegetation management to improve signal sighting, reduce adhesion problems and prevent interference with the overhead line equipment.

As part of our Cross London and Greater Anglia RUS work we will be looking at junction margins and allowances, and the potential for timetable improvements.

Engineering access

The high level of capacity 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 has been agreed for the North London Line comprising of 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.

On the Thameside part of the route, twelve week cyclic maintenance is sustained on weeknights over the main line between Fenchurch St and Shoeburyness. On the Tilbury Loop maintenance is carried out in twelve 27-hour annual possessions over the whole line between Barking and Pitsea.

Although the introduction of cyclical access onto the North London Line & Thameside route is delivering improved maintenance and performance in most places, the need to run ever increasing services to cater for rising demand in both passenger and freight and a corresponding desire for greater access for regular maintenance to address the resulting wear and tear on our assets may require a revision of the current regimes. Options for improvement in this area will be explored as part of our RUS work.

Also we will be investigating the practicalities of:

- undertaking more work for other disciplines in existing possessions planned for track renewals; and
- taking long blockades rather than frequent smaller possessions.

Figure 13 Forecast reduction in delay minutes

	2006/07	2007/ 08	2008/09
% reduction in delay minutes	6%	9%	15%

Figure 14 Forecast PPM MAA

TOC	2006/07	2007/08	2008/ 09
c2c	93.0%	93.2%	93.5%
Silverlink	90.0%	90.6%	90.8%

Opportunities and challenges

We anticipate that accommodating growth in commuting to central London and the Docklands, together with developments around Stratford, will be a significant challenge on the parts of the core North London Line and other sections of the route, which are already operating at, or very close to, capacity.

We believe that the solution to passenger growth and future capacity requirements can be potentially met by a combination of several initiatives:

- train lengthening, often supported by platform lengthening and other rolling stock changes that would require a complete review of the available traction power supply;
- incremental enhancements (which can be delivered as improvements to planned track and signalling renewals in many cases) and certain limited stand alone enhancements. These have the potential to improve performance (necessary for growth), enable specific increases in train paths and facilitate timetable restructuring;
- changes to the timetable structure to reduce the mix of different train types and the number of conflicting moves; and
- provision of additional passenger capacity at Stratford station.

Suggested options for improving passenger and freight growth and future capacity requirements on the North London Line are discussed in detail in the Cross London RUS and links to this document can be found on our website www.networkrail.co.uk. In addition we are working with TfL on a number of enhancements to improve capacity both for the Olympics and to meet TfL's longer term aspirations as part of their North London Railway franchise. This is likely to require the NLL resignalling project to be brought forward to 2010.

For Thameside, different scenarios will be explored in the Greater Anglia RUS and we will be seeking significant input from our stakeholders.

Suggested initiatives and options for provision of the capacity and performance improvement required from the North London Line & Thameside network are set out below and where not already committed will be thoroughly assessed by the RUSs.

Delivering future requirements

Expenditure

Figure 15 shows the planned level of expenditure on renewals on this route over the next three years. However, the precise timing and scope of renewals remains 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.

Figure 15 Forecast expenditure

£m (05/06 prices)	2006/07	2007/08	2008/09
Renewals			
Track			
Plain Line	19	17	16
S&C	6	7	6
Drainage	0	0	0
Track Total	26	24	22
Civils			
Underbridges	6	3	2
Overbridges	1	0	0
Bridgeguard 3	–	2	0
Footbridges	0	–	–
Earthworks	–	2	0
Retaining walls	0	0	–
Other	1	1	–
Civils Total	8	9	3
Signalling			
Minor works/other	0	1	–
Signalling Total	0	1	–
Electrification			
AC Systems			
HV switchgear	1	5	1
Booster transformers	0	–	–
OHL re–wiring	2	2	0
OHL campaign changes/refurbishment	0	1	1
OHL structures	0	0	0
Other	1	0	0
DC Systems			
Transformers/rectifiers	0	0	0
Conductor rail	0	0	0
Other	0	1	0
Electrification Total	5	9	3

Telecoms			
Concentrators: small	0	0	–
CIS systems	–	0	1
Other	0	0	–
Telecoms Total	0	1	1
Plant and machinery			
Fixed plant	–	0	1
Signal supply point	–	–	–
Point heating	0	0	0
Plant Total	0	0	1
Operational property			
Stations	1	2	1
Lineside buildings	0	–	–
Operational property Total	1	2	1
Total Renewals	40	44	32
Enhancements (funded by)			
Network Rail (RAB)			
Other	0	–	–
Network Rail (RAB) Total	0	–	–
Other Third Party			
DLR/North London Line Conversion	0	1	0
Other	1	0	0
Other Third Party Total	1	1	1
Total Enhancements	1	1	1

Figure 16 Forecast volumes

	2006/07	2007/08	2008/09
Track			
Rail (km)	14	14	13
Sleepers (km)	14	13	13
Ballast (km)	14	13	13
Switches & crossings (no.)			
Complete renewal	13	15	15
Drainage (km)	0	0	0
Civils			
Underbridges (square metres)	2,930	2,066	638
Overbridges (square metres)	154	1,002	105
Footbridge (square metres)	30	–	–
Embankments (square metres)	–	83,350	530
Retaining walls (square metres)	73	98	–
Electrification			
AC Systems			
HV switchgear (CBs)	5	33	8
OHL re–wiring (tension length)	22	70	74
OHL structures (no.)	2	–	6
DC Systems			
Transformers/rectifiers (no.)	1	–	1
Conductor rail (km)	1	0	2
Telecoms			
Concentrators: small (no.)	–	2	0
Voice recorders (no.)	–	2	0
CIS systems (stations)	–	–	13
Plant and machinery			
Signal supply point (no.)	–	–	1
Point heating (point end)	3	6	30

The planned volume of renewals is detailed in Figure 16.

It should be noted that in order to manage the deliverability of our Civils, Signalling & Electrification plans we have included an element of overplanning 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.

Maintenance

Figure 17 shows the planned level of expenditure on maintenance on this route over the next three years.

Figure 17 Forecast expenditure

£m (05/06 prices)	2006/07	2007/ 08	2008/09
Maintenance	18	16	15

Infrastructure investment

Figure 18 highlights committed schemes that are planned for completion in the financial year shown.

Figure 18 Planned infrastructure investment

Project	Scope	Enhancement or output change	Main asset type(s)	Third Party funding	GRIP stage	Completion year
A Gunnersbury S&C (06.07)	Like for like renewal in a 9 day blockade, which will also cover a signal interlocking renewal	Improved asset condition and performance	Track	None	1	2006
D Camden Road West Junction S&C (06.06)	Like for like renewal	Improved asset condition and performance	Track	None	1	2007
E Caledonian Road and Highbury Sewer renewal (06.01 and 06.09)	Improvement works to prevent flooding of track bed	Improved asset condition and performance	Structures	None	1	2006-2008
G Hackney Wick to North Woolwich (06.01 and 06.11)	Works to cover the construction of the Western Subway at Stratford (for DLR); may also include various renewals and maintenance activities	Increased capacity, improved asset condition and performance	Station and track	DLR (for Western Subway)	1	2007/08
I North London Line Signalling Life Extension (06.01, 06.06, 06.07 and 06.09)	Life extension works prior to full resignalling project	Improved asset condition and performance	Signals	None	4	2006/07
I North London Line Resignalling (06.01, 06.06, 06.07 and 06.09)	Like for like resignalling scheme	Improved asset condition and performance. May be brought forward to 2010 in conjunction with TfL enhancement proposals, currently subject to discussion	Signalling	None	1	2013
J Katherine Road Bridge strengthening (06.02)	Strengthen bridge to take 40 tonne lorries	Maintain safety and improve asset condition	Structures	None	3	2007

Figure 18 Planned infrastructure investment

Project	Scope	Enhancement or output change	Main asset type(s)	Third Party funding	GRIP stage	Completion year
K Barking S&C (06.02)	Like for like renewal	Improved asset condition and performance	Track	None	1	2006
M Upminster S&C (06.02)	Life extension works	Improved asset condition and performance	Track	None	1	2007/08
N Timberlog Lane Cutting (06.02)	Like for like renewal	Improved asset condition and performance	Structure	None	1	2007/08
O Pitsea OHL (06.02)	Contact wire renewal	Improved asset condition and performance	E&P	None	4	2006/07

Infrastructure investment

Figure 19 highlights uncommitted schemes under development.

Figure 19 Infrastructure investment under consideration

Project	Scope	Enhancement or output change	Main asset type(s)	Status
B Gunnersbury Chiswick park development (06.07)	Station improvements	Improved asset condition	Station	Potential developer funded scheme
C West Hampstead station (06.06)	Station improvements	Improved asset condition and interchange	Station	Potential TfL and developer funded scheme
E East London Line extension (phase 2)	New connection between ELL and North London Line	Allows extension of East London Line Services to Highbury & Islington	All asset types	Awaiting TfL funding
F Hackney Central to Hackney Downs Pedestrian link (06.01)	New pedestrian link between stations on routes 6 and 5	Improved interchange between two stations	Station	Potential TfL funded scheme
H North London Line conversion to DLR (06.11)	DLR to takeover NLL between Stratford and North Woolwich. Provide two new terminating high level platforms for NLL services	New assets and interchange links. Release of North Woolwich branch assets removes current maintenance liability	All asset types	TfL funded scheme in development
L Gospel Oak to Barking freight upgrade (06.05)	Provide a W10 gauge diversionary route for Thameside freight. Improvements to earthworks, bridges, track and signalling	To facilitate new services from the new deep sea port at Shellhaven and relieving capacity on the Great Eastern route (route 7) between Forest Gate and Stratford	Structures, track, signalling	Early stages of development
P Tilbury Loop 12 car trains (06.04)	Platform lengthening on Tilbury Loop between Pitsea and Upminster via Ockendon to take 12 car formations	Improved passenger capacity to accommodate growth	Station	DfT funded scheme in development

Figure 19 Infrastructure investment under consideration

Project	Scope	Enhancement or output change	Main asset type(s)	Status
Thames Haven branch doubling (06.08)	Conversion of single track line to double track	Improved capacity to facilitate services to a new deep sea port at Shellhaven	Signals, track	At early stages of development. Shellhaven has recently received approval from DfT

Non infrastructure developments

The following significant timetable schemes for the route are under development.

Figure 20 Timetable development

Description	Key issues	Actions or options being developed	Benefits	Target timetable implementation
Cross London RUS	Overcrowding and freight capacity	Final options under development	Improved capacity and performance. Reduced overcrowding.	December 2007
Greater Anglia RUS	Overcrowding, freight capacity and regional growth	Early stages of option development	Improved capacity and performance. Reduced overcrowding.	December 2008

Figure 21 Other projects

Description	Key issues	Actions or options being developed	Benefits	Start date
London 2012	To deliver increased capacity to meet demand.	Numerous schemes in development to facilitate passengers travelling to and from the Olympic venues.	Improved capacity.	Ongoing.
Smartcard introduction	Revenue protection and flexible ticketing	TfL/ATOC to take forward	Revenue increase and potentially demand management improvements.	

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	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 mins	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	W8 (W9)	8	various	None (25kv AC)	TCB (AB)	various	2
06.06	NLL: Willesden Jn – Gospel Oak	BOK2 (BOK3)	London & SE	DfT	No	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

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	No of Tracks
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
06.11	NLL: Stratford – North Woolwich	DWW2	London & SE	DfT	No	W6	8	45 (25)	Third rail DC	TCB	various	2 (1)

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).