

Route Plans 2008  
Route 5  
West Anglia



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## Route 5 West Anglia



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### Section 1: Today's railway

#### Route context

The West Anglia route carries main line services to the London terminals of Liverpool Street and Kings Cross, supports a busy suburban network in North London, Essex and Hertfordshire, rural services in Cambridgeshire, Norfolk and Suffolk, and inter-regional services from East Anglia to the Midlands and the North of England. The main line south of Cambridge largely parallels the M11 and rail services penetrate right to the heart of London. The route serves one of the fastest growing regions in the country with densely populated areas at its southern end and two significant traffic generators at Cambridge and Stansted Airport. The main markets are commuter travel to London, in particular to the city and the Docklands, and leisure travel,

especially to Stansted Airport. The route provides an important corridor for freight services to and from the East Coast Main Line (ECML) and the east coast ports of Harwich and Felixstowe. The route is included in the Greater Anglia Route Utilisation Strategy (RUS), which examines future growth and how it will be met over a time period of ten years commencing from the RUS Establishment date (expected to be December 2007). A draft document for consultation is due to be published in April 2007. 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 and continued growth to Stansted Airport. However, the current network is already operating at or close to capacity in terms of train paths.

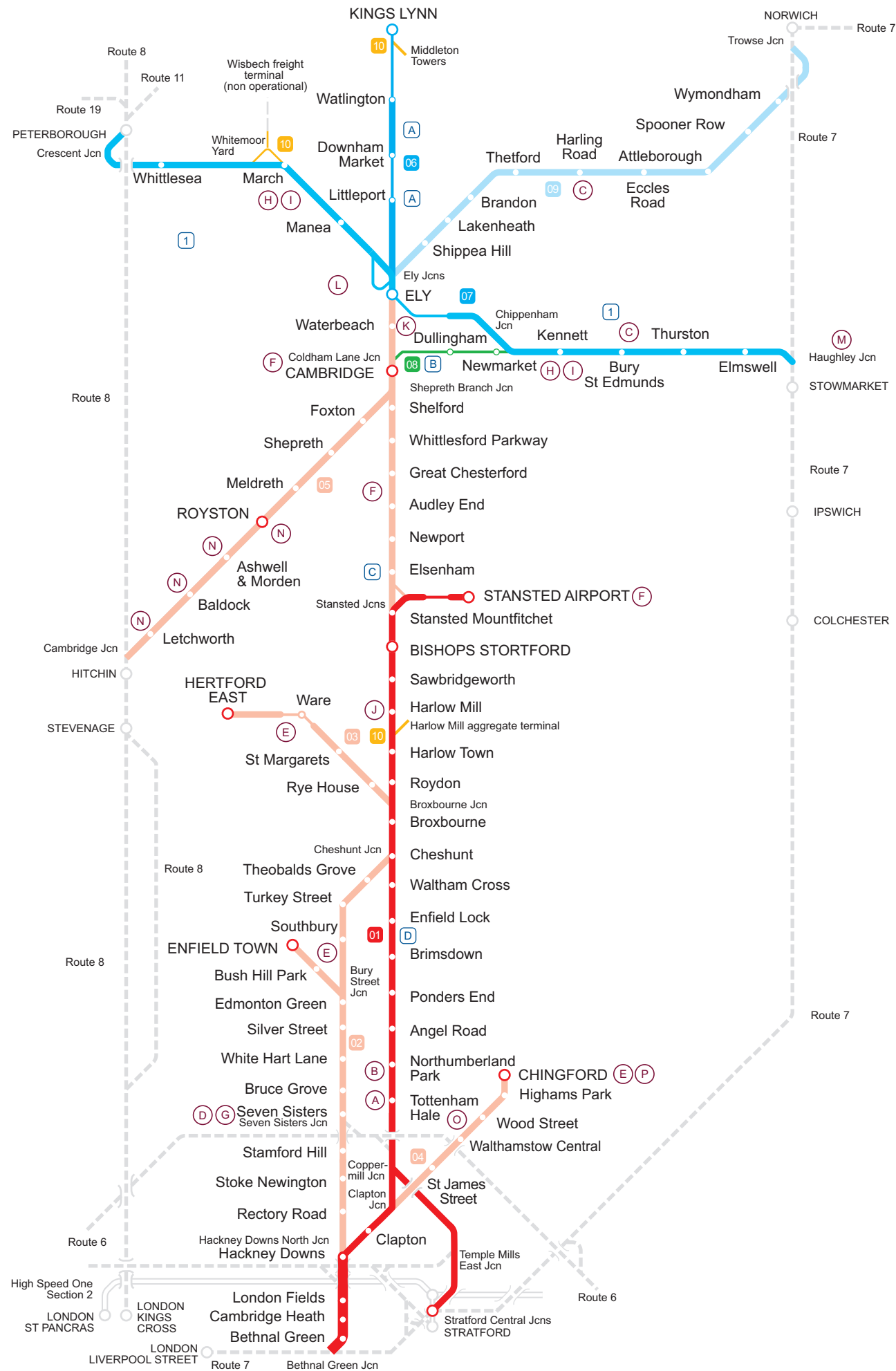
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## Today's route

The principal elements of the West Anglia route are described below. The relevant Strategic Route Section is shown in brackets:

- the West Anglia Main Line (05.01, 05.02, part of 05.05 and 05.06), which runs from Kings Lynn to London and includes the two routes between Liverpool Street and Cheshunt, one via Tottenham Hale (the Lea Valley) and one via Seven Sisters (the Southbury Loop). It also includes the branch to Stansted Airport;
- the cross country lines from Norwich to Peterborough via Ely, and Haughley Junction (on the Great Eastern route) to Cambridge and Ely (05.07, 05.08 and 05.09); and
- West Anglia inner and outer suburban branches, to Chingford (05.04), Enfield Town (part of 05.02), Hertford East (05.03) and to Hitchin (part of 05.05). There is also a short freight line from Kings Lynn to Middleton Towers (05.10).

# Route 5 West Anglia



**Key**

- Secondary
- London & SE Commuter
- Rural
- Freight only

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

### Current passenger and freight demand

Passenger demand is increasing on the route (for example autumn 2006 peak passenger count was 2percent higher than in 2005) especially into central London and increased by another 2.8percent by spring 2007. The route also now serves Docklands (direct services from West Anglia to Stratford), which continues to expand. This nascent market has performed well despite very limited service frequency during peak hours. Most of the peak demand is commuter flows from the main population centres. There is also a fast growing leisure market driven by increased low cost flights from Stansted Airport and successful marketing campaigns from the train operators.

Main line services compete with the M11 corridor, which extends down into the eastern approaches to the city. Road traffic from the end of the M11 to the City is very congested at peak times and this means that the railway tends to be the first choice for commuters. In spring 2007 there were approximately 10,000 passengers per day travelling into London on the main line peak services.

The suburban network also experiences a large number of passengers in the peak (17,000 in the morning peak in spring 2007) and this is due to increasing employment in central London.

Although the majority of the current demand is for travel into Liverpool Street, a significant number of passengers interchange with the underground Victoria Line at Seven Sisters, Tottenham Hale and Walthamstow Central. At Seven Sisters especially, there is limited station capacity, which causes overcrowding and suppresses demand. Stansted Airport currently handles around 24 million passengers per annum (mppa) and BAA Ltd expects the maximum permitted throughput of 25 mppa to be achieved during 2008.

There are already five off peak Stansted services per hour into London – four fast to Liverpool Street and one slow to Stratford – plus one northward to Birmingham and demand is set to grow.

The introduction of an hourly passenger service between Norwich and Cambridge has been very successful and has generated increased demand between these major regional transport hubs. In addition there is healthy growth on the Interurban services from the region to the West Midlands and the North West.

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. Demand for movement of intermodal deep sea containers from the port of Felixstowe is growing year on year by 4-5 percent. This demand could be further increased by the impending port developments at Felixstowe South (approved February 2006), and Bathside Bay, Harwich (approved March 2006). The forecasts in the Freight RUS show that the developments at Felixstowe and Bathside Bay 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 trains per day if the London Gateway Port (Shell Haven) is developed. Increasing use of 9' 6" containers at the ports is raising capacity issues as the only route cleared for these larger containers on standard wagons (known as W10 gauge) is down the already congested Great Eastern Main Line and across North London. There is therefore increasing demand to run more of this traffic over the cross country route via Bury St Edmunds, Ely, March and Peterborough, this is further explored in the capability section below.

**Figure 1** Current train service level (trains per hour)

Station	tph to Liverpool Street	tph to Kings Cross
Enfield Town	4 peak/2 off peak	n/a
Chingford	4 peak/4 off peak	n/a
Cheshunt	6 peak/7 off peak	n/a
Broxbourne	9 peak/5 off peak	n/a
Hertford East (includes 2 peak to Stratford)	4 peak/2 off peak	n/a
Stansted Airport	4 peak/4 off peak	n/a
Royston	0 peak/0 off peak	6 peak/0 off peak
Cambridge	4 peak/2 off peak	4 peak/4 off peak
Kings Lynn/Ely	1 peak/0 off peak	2 peak/1 off peak

### Current services

The passenger services are operated by National Express East Anglia (NXEA), First Capital Connect (FCC), East Midlands Trains and CrossCountry TOCs, with freight services operated by English Welsh and Scottish Railway (EWS), Freightliner and GB Railfreight (First GBRf).

Figure 1 contains the morning peak (08:00 to 09:00 arrivals) and off peak passenger trains per hour frequencies into the London terminals.

Figure 2 contains the tph frequencies for the regional/rural passenger services.

The West Anglia network carries a mixture of traffic types with significant variations in speed, acceleration and stopping patterns.

The passenger services above are operated by a mix of inner and outer suburban electric multiple units, 90mph main line electric multiple units and diesel multiple units on the rural sections of the route.

As well as an intensive passenger network the route provides an important cross country link for several long distance freight flows, including that from the port of Felixstowe to the north east of England that would otherwise have to be routed down the already congested Great Eastern Main Line and across London. The route also sees varying volumes of freight to local terminals and yards, including aggregates. There is a major

Network Rail national logistics unit depot based at Whitemoor, between Ely and Peterborough, which feeds track components, ballast and other materials around the network.

The freight services on the West Anglia route are primarily diesel hauled with a few electrically hauled services at the southern end of the route.

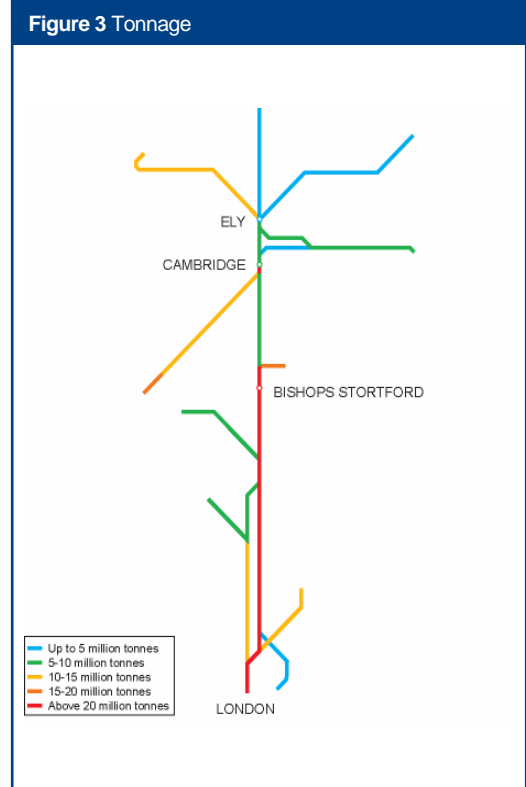
**Figure 2** Current Train Service Level (trains per hour)

Regional/Rural Services	tph
Stansted Airport/Bishops Stortford to Stratford	1
Ipswich (starts from Liverpool Street) to Peterborough	1 every 2 hours
Ipswich to Cambridge	1
Norwich to Cambridge	1
Norwich to Liverpool/Nottingham	1
Stansted Airport to Birmingham New Street	1

Figure 3 shows the total annual tonnage levels on the route.

Traffic volumes are summarised in Figure 4.

There is no segregation between freight or passenger traffic on the West Anglia Main Line or the cross country routes.

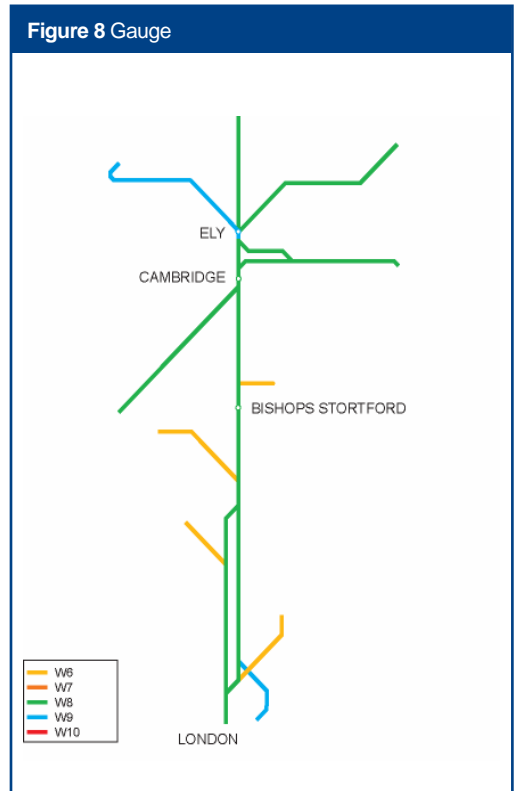
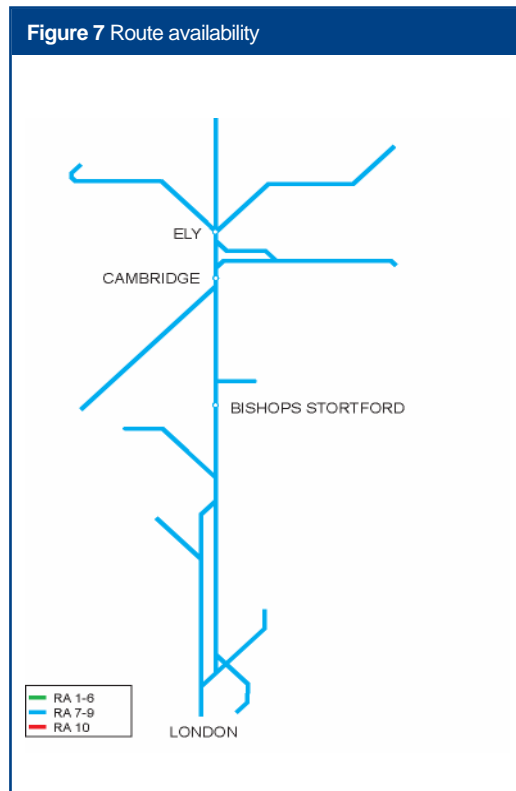
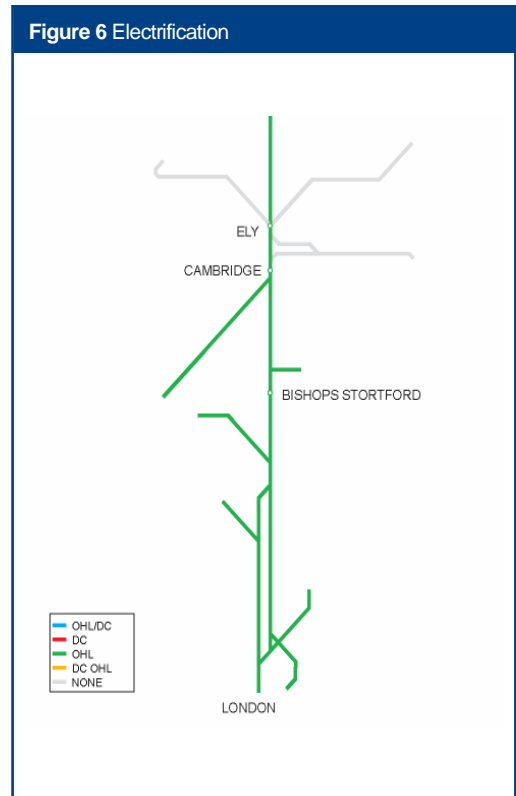
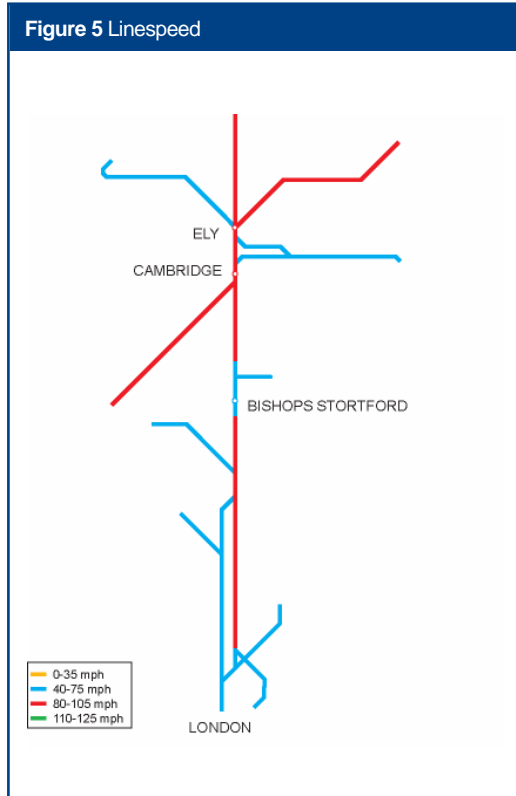


**Figure 4 Current use**

	Passenger	Freight	Total
Train km per year (millions)	16	1	17
Train tonne km per year (millions)	3,249	982	4,231

### Current infrastructure capability

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



## Current capacity

There are serious issues of capacity on the West Anglia route. This is due to the mixture of services and stopping patterns, many flat junctions and single line sections. Overall route capacity is constrained by a combination of these factors. Additionally the suburban lines into Liverpool Street are heavily used in the peak and there is little capacity to run additional trains.

Key issues on the West Anglia route are:

- the mixture of fast and stopping services on the two track Lea Valley line giving rise to congestion and performance risk through much of the day;
- lack of a W10 gauge cleared cross country route;
- any additional services on the congested Lea Valley line will impact on the length of time the level crossings are closed to road traffic;
- the layout and operation of Cambridge station including one long single platform with a scissors crossover in the middle that has to accommodate through services in both directions and which causes problems with access to and egress from the north facing bay platforms;
- intensive platform utilisation and congestion on the throat at Liverpool Street;
- the single track Stansted Airport Tunnel currently being used at capacity and single track sections north of Ely, between Ely and Soham and between Chippenham and Cambridge;
- absolute block signalling on the cross country lines coupled with long signal sections between Bury St Edmunds and Kennet;
- convergence of three lines at Ely North Junction including single lead junctions and reduced functionality;

- high congestion on the two track section between Cheshunt and Broxbourne junctions; and
- passenger overcrowding on the platforms at Cambridge, Seven Sisters and Tottenham Hale stations at peak times, constrictive passageways and large numbers of passengers transferring with LUL services at the latter stations.

Figure 9 shows the current train service level in key sections of the route.

**Figure 9** Current Train Service Level (peak trains per hour)

Route Section	
Letchworth to Hitchin	8
Royston to Letchworth	6
Cambridge to Royston	4
Seven Sisters to Hackney Downs	6
Clapton to Hackney Downs	14
Enfield Town branch	4
Chingford branch	4
Cheshunt to Tottenham Hale	12
Hertford East branch	4
Harlow Town to Broxbourne	8
Stansted Airport branch (includes 1 to Birmingham)	5
Audley End to Newport	4

### Current performance

Figure 10 shows the current PPM for the main TOCs running along the route.

The passenger train services on the route are mainly operated by NXEA, FCC, CrossCountry (running services from Stansted Airport to Birmingham) and East Midlands Trains (running services from Norwich to Liverpool/Nottingham).

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 and the intensity of the peak service means that an incident can cause a knock on effect on following services that can quickly result in large amounts of reactionary delays for what might be initially a small specific delay.

Analysis of recent performance shows the main problems on the route to be track circuit failures and trespass incidents, particularly affecting the inner suburban services.

**Figure 10** Current PPM MAA (2007/08)

TOC	MAA	As at period
National Express East Anglia	90.4%	12
First Capital Connect	90.4%	12
CrossCountry	86.9%	12
East Midlands	87.1%	12

## Section 2: Tomorrow's railway

### HLOS output requirements

**Figure 11** Total demand to be accommodated by Strategic Route

Routes	Annual passenger km forecast in 2008/09 (millions)	Additional passenger km to be accommodated by 2013/14 (millions)
West Anglia	1,561	482

**Figure 12** 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 (%)
Blackfriars	21,900	3,500	67	11,200	1,200	76
Euston	23,800	3,400		10,600	1,600	
Fenchurch Street	26,000	2,500		13,900	1,600	
Kings Cross	18,300	2,300		8,000	1,100	
Liverpool Street	74,300	10,600		36,700	4,900	
London Bridge	127,600	12,600		65,200	7,800	
Marylebone	9,100	1,000		4,600	600	
Moorgate	13,000	700		7,400	400	
Paddington	24,100	2,900		11,500	1,400	
St. Pancras	25,900	10,900		13,100	5,700	
Victoria	58,700	5,300		29,300	2,800	
Waterloo	74,300	9,200		36,800	4,900	

### Future demand

The M11 corridor has been targeted by the government as an area key to the accommodation of future housing growth in the South East.

Cambridge is a location of national importance in knowledge-based industries and a key tourist destination. This makes it an attractor of a considerable volume of rail trips as well as having high numbers of resident London commuters. Capacity constraints are primarily driven by peak commuter demand for travel to London. Because of the anticipated housing growth, the West Anglia route has the highest rate of background demand growth predicted for all routes serving London. The number of trips in the morning peak is predicted to rise by around 3-3.5 percent a year on average over the next ten years. This could be considerably exceeded if route capacity is increased to relieve on-train crowding, improve performance and reduce journey times.

Air passenger numbers at Stansted Airport continue to rise rapidly. Throughput of passengers has nearly tripled over the last five years. This has been driven by the rapid expansion of low-cost airlines. Passenger numbers are predicted to rise to 35 million passengers a year by 2012. The government white paper into the future of air travel proposed the construction of a second runway at Stansted which would increase capacity at the airport to 70-80mppa and so accommodate future predictions of growth there. The proposed strategy for meeting growth up to 35mppa involves the operation of 12-car trains to London. However to cater for the demand created by a second runway, changes to the infrastructure will be necessary and the Secretary for State has recently announced that Network Rail should develop and bring forward proposals for enhancing the West Anglia Main Line incorporating consideration of line and route improvements including a potential four-tracking option from Tottenham Hale to south of Cheshunt. A direct service between Stansted Airport and Stratford was introduced in December 2005.

London has also been chosen as the host city for the 2012 Olympic Games and Paralympic Games (the Games) and Network Rail is now working with the Olympic Delivery Authority on the development 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.

The Greater Anglia RUS, which was established in February 2008, explored growth on the corridor and proposed a series of strategies for meeting growth based on a combination of train lengthening, new

rolling stock and infrastructure enhancements to allow the operation of additional services. The following factors are likely to influence the growing demand on the West Anglia route:

- expansion of the ports of Felixstowe and Harwich and the increased use of 9' 6" containers (on standard wagons) on expanding intermodal freight services means that providing a W10 cleared cross country route is a high priority;
- Cambridge to London demand has doubled since 1996 and is likely to increase further over the next 10 years due to housing growth around Cambridge and employment growth in London and Docklands;
- peak commuting to central London, the Docklands and regional centres is increasing;
- major housing and employment led regeneration in the Lea Valley;
- there are significant planned developments at Cambridge and Chesterton;
- the Cambridge guided bus project is likely to bring increased numbers of passengers from outlying areas to interchange at Cambridge station; and
- growing demand between the regional centres of Norwich, Cambridge and Ipswich.

### Section 3: Proposed strategy

Figure 13 summarises 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 13 Summary of proposed strategy milestones			
Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
2009 - 2012	9-car trains to Chingford, Enfield Town, Cheshunt, Hertford East, plus Cheshunt – Seven Sisters shuttle	Platform extensions at a number of stations plus signalled turnback and de-congestion works at Seven Sisters	Increased peak capacity
2012 - 2014	Introduce new high capacity rolling stock on Chingford, Enfield, Cheshunt and Hertford East branches	Works for new rolling stock	Increased peak capacity
2009 - 2012	12-car operation on the Liverpool St – Cambridge/ Stansted Airport services	Platform extensions plus island platform at Cambridge.	Increased peak capacity.
2016	Additional services: 2tph Stansted – Liverpool St, 2tph Stansted – Stratford, 2tph Hertford – Stratford.	4-track the Lea Valley route Note: May introduce a Tottenham Hale – Stratford shuttle prior to the Games	Increased peak and all day capacity.
2012	Facilitate the operation of high cube container traffic on the cross country route.	Gauge clearance plus intermediate block signals	W10 capability and cross country freight growth
2016	Further increase in cross country freight services	Cross country capacity enhancements	Increased freight capacity
2016	Introduce hourly Ipswich – Peterborough service	Standardise timetable so that Ipswich – Peterborough service can run hourly following cross country capacity enhancements	Increase capacity and attractiveness of cross country services
2009	Strengthen Stansted – Birmingham services	Lengthen Stansted – Birmingham services to 4-car and lengthen bay platform at Stansted Airport	Increase capacity

### Strategic direction

Network Rail expects that the route will continue to see high levels of passenger and freight growth. The main drivers of this will continue to be growth in commuting to central London and Docklands, together with the increased leisure travel due to growing expansion at Stansted Airport. Port developments at Felixstowe and Bathside Bay on the Great Eastern route will bring significant demand for increased freight services, which will make providing additional routes for W10 gauge freight traffic across the West Anglia cross country route a high priority if capacity is not to be compromised on the congested Great Eastern route via London.

It is believed that the solution to passenger growth and future capacity requirements can be met by a combination of several generic initiatives:

- changes to the timetable structure to reduce the mix of different train types and the number of conflicting moves;
- 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, enable specific increases in train paths and facilitate timetable restructuring;
- provision of additional passenger capacity at key stations; and
- a review of car parking and other modes of transport at stations to look at ways of improving access to the network.

To accommodate the high levels of growth on the West Anglia route additional peak services and train lengthening are required to meet passenger growth. This will require infrastructure works including longer platforms and additional tracks. More details can be found in the capacity section below.

### Future train service proposals

The Greater Anglia RUS explored options for meeting growth through additional and lengthened train services.

#### *WA inner services*

On the Chingford and Hertford East branches the operation of 9-car trains is proposed (requiring some local platform works even though 9-car trains used the routes previously). Between 2012 and 2014 the replacement of Class 315 EMUs with high capacity units is planned. It is assumed that the Class 315 units would be life expired by 2014.

On the Enfield Town/Cheshunt services trains have recently been lengthened to 8 cars. It is proposed to run 9-car trains (again requiring local platform works), together with the operation of a 2tph peak hour shuttle between Cheshunt and Seven Sisters. Between 2012 and 2014 replacement of the existing units with high capacity units is proposed.

The GA RUS assumes 9-car operation can be achieved by the provision of additional vehicles that can continue to be berthed at Chingford, which is suitable for 9-car operation (subject to checking modern standards). Longer term it is assumed that new metro-style high capacity EMUs will be deployed on the WA inner services.

#### *WA outer services*

On the Stansted Airport and Cambridge services the operation of 12-car trains on all high peak services is envisaged. Beyond 2016 it is assumed that the Lea Valley will be 4-tracked and additional services will then operate between Stansted Airport and Liverpool St and between Stansted Airport/ Hertford East and Stratford.

The GA RUS assumes that new units will replace the current Class 317 units, which will be cascaded to other services. It is assumed that these will be berthed in the Cambridge area, which will require around 8 additional 12-car sidings to be built. If space is not available for all sidings then it is assumed that additional sidings will be constructed at Orient Way (or elsewhere on the route).

#### *Other services*

On the cross country services, if paths are standardised following proposed capacity enhancements then an hourly Ipswich – Peterborough service could be introduced.

On the Birmingham–Stansted service, CrossCountry proposes to strengthen the service by introducing 4-car trains on this route. CrossCountry are also considering running

additional late evening services to and from Stansted Airport.

The freight operators have emphasised the need for freight paths to depots on the West Anglia Main Line to be protected and also support development of the cross country freight route. The FOCs provided input to the industry wide freight forecasts, which have formed the input to the RUSs.

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

Figure 14 indicates the forecast percentage change in tonnage to 2017.

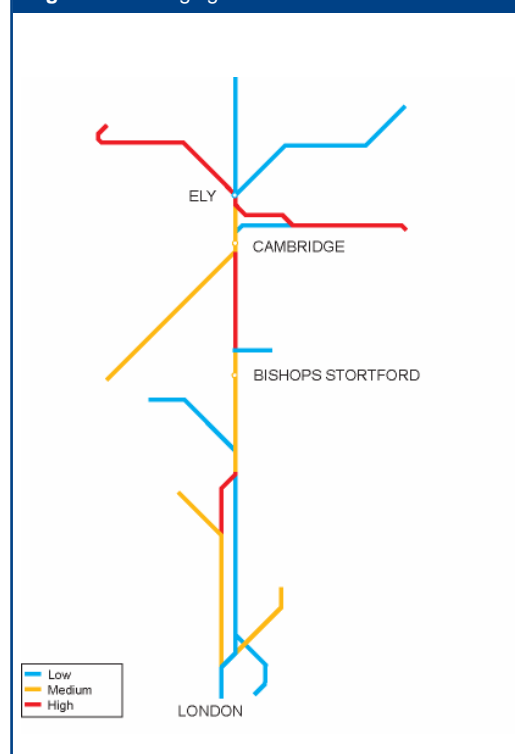
### Future capability

#### 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 September 2004, also opened up the route from Tilbury and north Thameside (on the Thameside route), via Forest Gate 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 route to absorb the growth in W10 gauge freight traffic from Felixstowe, and further expansion is proposed at both Felixstowe and Bathside Bay (near Harwich). The 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 gauge enhancement. Consequently work will be undertaken to improve the gauge between Felixstowe/Bathside Bay and Yorkshire, funded by the ports' developer under a Section 106 agreement. This work also includes capacity improvements on the Felixstowe branch and to Ipswich Yard. The DfT has approved funding for gauge improvements across to Nuneaton and the WCML from the Transport Innovation Fund (TIF) and development of the gauging works will commence shortly. Funding has also been received for some further capacity improvements and it is anticipated that further bids will be submitted for additional capacity works on the cross country route within the next 12-18 months. In addition improvements, including doubling Haughley Junction and commissioning bi-directional signalling on Ely West Curve, are to be taken forward for development using NRDF funding.

Figure 14 Tonnage growth



#### Linespeed

Modest improvements to linespeeds on the cross country route between Newmarket and Cambridge could give longer turn round margins at Cambridge station, which would improve operation and performance as well as increasing demand, however this may only be possible in conjunction with increased infrastructure and could be funded from the NRDF provided that a successful business case can be made. Other routes being considered for local speed improvements in conjunction with the track renewals are Ely – Norwich, together with the East Suffolk Line and the Sudbury branch (both on Route 7).

A scheme is being developed to examine the causes of speed restrictions on heavier freight vehicles across the cross country route between Ipswich and Peterborough and to determine the works required to raise speeds.

Target linespeeds will be set for each main route section, so that when assets are renewed any historic restrictions can be removed where practical.

#### Tonnage

Increased demand for freight traffic to and from the east coast ports of Felixstowe and Bathside Bay will cause much higher tonnages to be carried across the West Anglia strategic route section, Peterborough–Ely–Haughley Jcn, due to the need to provide an alternative route for W10 gauge freight to the WCML away from the congested

Great Eastern route between Ipswich and Stratford (Route 7). The additional traffic will bring capacity issues on this strategic route section, which will need to be upgraded to remove the restrictions on heavy trains and those trains conveying 9' 6" containers on standard wagons. The following parts of the route are predicted to see the highest increases of freight tonnage carried:

- Haughley Junction to Ely Dock Junction; and
- Ely North Junction to Crescent Junction (Peterborough).

### 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.

As part of its franchise commitment FCC is looking to run 12-car trains from Kings Cross to Cambridge on their fast services, which will entail platform extensions on the GN route. Subsequently the Thameslink programme includes plans to extend the platforms of Meldreth, Shepreth and Foxton stations, on the Hitchin to Cambridge route section, to accommodate 8-car trains.

The GA RUS considered growth on West Anglia services and recommended platform extensions at stations served by the outer services, so that growth can be met on the Stansted and Cambridge corridors. Additional rolling stock, berthing and power will also be required, as well as a new 12-car island platform at Cambridge.

On the inner services some platforms will need to be extended to accommodate 9-car trains throughout the inner suburban network.

CrossCountry are considering running 4-car trains from Birmingham to Stansted Airport, which will require the extension of the bay platform at Stansted Airport.

### 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.

Currently most of the West Anglia Main Line is already operating at, or very close to, capacity and there are few options for increasing the number of train paths available at peak times (or, on some corridors, for changing the stopping patterns) without providing additional infrastructure.

The Greater Anglia RUS explored a number of options for improving future capacity and on each main service the proposed strategy includes the following:

- platform extensions on the Cambridge/Stansted Airport corridor. Post 2016 additional services will require additional infrastructure, including the closure and replacement of at grade level crossings with off-grade crossings, in the Lea Valley and up the route to Stansted Airport;
- to operate 9-car trains on the Chingford and Hertford East branches followed by the replacement of the existing units with high density rolling stock; and
- on the Cheshunt/Enfield Town routes a shuttle service from Cheshunt to Seven Sisters at peak times is envisaged, together with the deployment of 9-car trains. This will be followed by the introduction of high capacity units.

To facilitate increased services to regional locations upgrading the cross country route would be required in conjunction with the Felixstowe – Nuneaton freight scheme.

The cross country freight proposals put forward to meet the growth contain the following:

- with the existing infrastructure together with the first phase of enhancements (i.e. those contained in the HPUK section 106 and the TIF bid works) around 5 additional paths can be found on the cross country route to Nuneaton in addition to the 9 paths to/ from South Yorkshire;
- with additional infrastructure proposed in a second phase of enhancement works, it is possible to path the additional Yorkshire trains as well as 14 additional services to/from Nuneaton; and
- reviewing the existing cross country freight and passenger services to see if additional freight services could be pathed.

The development of this strategy is to continue with refinement of the timetable and infrastructure works. Further funding may then be sought.

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.

Discussion with the relevant train operator and the DfT around the detailed implementation plan, timing (linked with the release of rolling stock in particular) and specific timetable solutions related to the above passenger capacity proposals are now underway. It

**Figure 15** Forecast PPM MAA- CP4 plan

	2009/10	2010/11	2011/12	2012/13	2013/14
East Midlands	88.3%	89.1%	89.9%	90.4%	90.8%
National Express East Anglia	91.8%	92.4%	93.1%	93.6%	94.0%
First Capital Connect	89.9%	90.4%	90.7%	91.1%	91.4%
CrossCountry	87.9%	88.7%	89.7%	90.4%	90.9%

**Figure 16** Forecast PPM MAA - proposed local commitments

	2009/10	2010/11	2011/12	2012/13	2013/14
East Midlands	87.2%	88.0%	88.9%	89.4%	89.8%
National Express East Anglia	90.9%	91.5%	92.2%	92.7%	93.1%
First Capital Connect	88.9%	89.4%	89.6%	90.0%	90.4%
CrossCountry	86.7%	87.4%	88.4%	89.1%	89.7%

is therefore likely that variations to these proposals, including alternative timetabling solutions, may be developed as these discussions progress.

### Future performance

Figure 15 sets out the planned PPM for each train operator. Figure 16 sets out the trajectory we propose as local commitments with each 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.

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

Broken rails/track faults and track circuit failures are being addressed by the renewal programmes and other improvements in performance are being achieved through Joint Performance Improvement Plans. Network Rail are also working with NXEA on the Challenge 91 performance improvement programme.

The Challenge 91 programme follows on from the Challenge 90 initiative and includes action plans, which have introduced regular infrastructure monitoring and improved reliability of the rolling stock, as well as monitoring/improving the level of right time departures.

Work also continues on the annual programmes of targeted performance improvement schemes across the route. Other improvement measures and initiatives include an improved possession strategy to maintain track circuits at key locations, fencing renewals to prevent trespass and vandalism and a rolling programme of tamping to improve track faults.

### National Express East Anglia

The performance of National Express East Anglia (previously known as 'one') is 90.4 percent and joint plans exist to improve performance to 91.2 percent by the end of March 2009. The JPIP is supported by the Challenge 91 initiatives which have been implemented by the TOC and our Anglia route this continues to focus on the elimination of small consistent problems which tend to drive down performance even on the good days.

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

- the need to accommodate more and longer freight trains associated with traffic growth from the ports of Felixstowe and Tilbury;
- the impact of the rolling stock cascade promoted by the HLOS capacity requirements;
- the need to improve the condition of the overhead line to reduce the need to impose heat related speed restrictions;
- focus on performance delivery for the Olympics;
- timetable review for the Great Eastern services;
- working with the TOC to minimise the impact on performance of overcrowding;
- autumn management;
- remote condition monitoring both on the infrastructure and on the fleet;
- upgrade of signalling modules and work to isolate power problems to a single running line.

Network Rail and the TOC have drafted a Long Term Performance Plan and propose to continue to

work on this during the Summer. Performance is forecast to reach 94.0percent PPM by the end of 2013/14 however at present this is not fully backed up by funded plans and the TOC therefore remains concerned by its deliverability although the figure is in line with its aspirations.

### **First Capital Connect**

First Capital Connect operates the suburban train routes into London Kings Cross and the cross London Thameslink route. The performance of the TOC is currently 90.4 percent and this is planned to rise to 90.7 percent by the end of March 2009 due as a result of the action included within the Joint Performance Plan. There is a significant level of change in service patterns driven by the Thameslink works throughout CP4 and the likelihood that some services will be jointly operated with South Eastern. This together with relatively major changes to fleet resources will result in some challenges to maintain performance.

The key performance issues and opportunities identified for this TOC include:

- minimising the operational impact of the Thameslink programme; to date modelling work has only been focussed on Key Output 0 and there is a degree of uncertainty around the full impact of the work programme;
- uncertainty over the impact of the ELL extension and planned rewrite of the South London and Brighton Mainline timetables;
- impact of passenger growth;
- the impact of enhancements on the East Coast – especially around Kings Cross, Finsbury Park and Hitchin;
- specific concerns over seasonal variation and the likely benefits of Remote Condition Monitoring;
- maintenance of journey times;
- the impact of fleet changes – and stabling arrangements.

The TOC is currently concerned by the lack of a detailed plan to deliver performance improvements on this route especially due to the large amount of uncertainty. We will work with the TOC to produce a long term performance plan during the Summer and the expectation is that this will result in a forecast level of performance of 91.4percent by the end of 2013/14 (including the impact of the Thameslink works).

### **Other Operators**

The other operators on this route are CrossCountry and East Midlands Trains. The future performance section for CrossCountry can be found in the plans for Routes 8, 12, 13, 17, 18, 19 and 20, and the future performance for East Midlands Trains can be found in the plan for Route 19.

### **Engineering access**

The high level of capacity utilisation on the route has meant that there has been difficulty in gaining access for maintenance and renewals work.

Safety requirements are compounded by overhead line arrangements that limit possession flexibility. As a result a cyclic maintenance regime was introduced that allows a regular number of weeknight, Saturday and Sunday night possessions over different sections of the line on 12 or 24 week cycles.

Although the cyclic maintenance strategy delivered both improved maintenance and performance in most areas it soon became apparent that even greater synergy was needed. A review of the strategy has been undertaken by Network Rail working together with the train operators and as a result a revised set of cyclic possessions, which allow a better balance between the train operators' requirements and Network Rail's requirements for maintaining the track, were introduced in March 2006. A further review of access on the corridor has enabled better access to Stansted during weeknights.

The Greater Anglia RUS has explored how possession regimes can be improved and continuing workstreams include investigating the practicalities of:

- increased use of single line working (where practical and safe) to reduce the disruption to operators;
- separate OLE feeds to depots, so that the depot can still operate when it is adjacent to a possession of the running line;
- using the upgraded cross country route as a diversionary route during works on the GE Main Line and vice versa are being explored;
- undertaking more work for other disciplines in existing possessions planned for track renewals;
- taking longer blockades rather than frequent smaller possessions; and
- looking at better use of high output equipment so that once major renewals have been undertaken the system can move towards becoming a '7 Day Railway'.

## Long term opportunities and challenges

Network Rail anticipate that accommodating growth in commuting to central London and the Docklands and continued growth in Stansted Airport demand will be a significant challenge on parts of the West Anglia Main Line and other sections of the route, which are already operating at, or very close to, capacity.

Many scenarios were evaluated in the Greater Anglia RUS in conjunction with stakeholders. Strategies for provision of the capacity and performance improvements needed are largely centred on gaining the benefits from 4-tracking the Lea Valley and the potential to close and replace the at grade Level Crossings in the Lea Valley with off grade bridges or subways. In addition when Crossrail is built it is assumed that the additional services using the 4-tracking will be able to run on from Stratford into Liverpool St.

The development of Crossrail on the Great Eastern route and the service increases on the North London Line mean that the Ipswich–Ely–Peterborough route must be upgraded to absorb freight growth; especially the growth in maritime container traffic.

The Greater Anglia RUS proposed a half hourly peak service between Norwich and Cambridge to improve the links between the two cities, as well as provide an additional commuter service into the cities from their surrounding towns, however timetable work has shown that additional infrastructure will be required to operate the service making it a longer term opportunity. Such a service would also provide connections into the Peterborough services at Ely.

A further important area, which was covered in the greater Anglia RUS, is access to the network. The following four areas were considered: station capacity, station facilities, car parking and new stations to serve developments.

Most stations with identified capacity issues already have schemes in development to address the problem; however, Seven Sisters has been identified for a separate study. Station facilities have been improved over the years and Network Rail and the operators will be working on station improvements using several funding mechanisms, including the National Station Improvement Programme, to develop the station environment.

Car park extensions are proposed at a number of stations including Audley End, Broxbourne, Bury St Edmunds, Chingford, and Harlow Town. There are

also potential car parking schemes associated with developments at Bishops Stortford, Cambridge, Chesterton and Walthamstow Central. A recent 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 the way to their final destination.

The growth identified in the Regional Spatial Strategy included developments on the edge of existing settlements and thus new stations are being considered at locations such as Chesterton (near Cambridge).

## Enhancements to be completed by end of CP3

Figure 17 CP3 enhancements					
Implementation date	Project	Project description	Output change	Funding	GRIP stage
2009/10	Ⓐ Tottenham Hale station improvements	Improvement to the station circulation as part of the Tottenham Hale development programme	Station capacity improvements	TfL/ Developer	–
2009/10	Ⓒ Rural linespeed improvements	Linespeed improvements between Ipswich and Cambridge, between Ely and Norwich (and on the Sudbury Branch on Route 7).	Improve journey time and performance	Network Rail Discretionary Fund	1

## Proposed enhancements in CP4

**Figure 18** Proposed enhancements in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2009/10	Ⓔ Lea Valley Level Crossings	Replacement of level crossings with off grade bridges or subways – GRIP 1-3 feasibility only CP3	Reduce risk and improve performance/ capacity	Network Rail	–
2010/11	Ⓓ Seven Sisters Improved access.	Improve access to Seven Sisters on the upside – GRIP 1-3 feasibility only in CP3	Improved passenger circulation	Periodic Review 2008	–
2010	Ⓒ Seven Sisters tumbuck	Provide tumbuck for shuttle service	Improve capacity and performance	Periodic Review 2008	–
2009 - 2012	Ⓔ Introduce 9-car trains on the WA Inner services.	9-car platform extensions at various stations.	Capacity increase	Periodic Review 2008	–
2012 - 20 14	Ⓔ Introduce high capacity rolling stock on the WA inner services.	Works to introduce new stock	Capacity increase	Periodic Review 2008	–
2009 - 2012	Ⓕ 12-car trains to Cambridge and Stansted.	12-car platform extensions, Cambridge island platform and works to track circuits	Capacity increase	Periodic Review 2008	1
2012	Ⓗ Gauge clearance to W10 and initial capacity works	Gauge clearance and capacity improvements between Felixstowe and Nuneaton/South Yorkshire.	Gauge and capacity improvement	Transport Innovation Fund	6
2012 - 2016	Ⓖ Ipswich to Nuneaton capacity increase	Capacity enhancements at various locations between Ipswich and Nuneaton	Freight and passenger capacity improvement	Periodic Review 2008/ Third Party	1
2009 - 2012	Ⓚ Power Supply Enhancement	Improve power supply north of Cambridge	Increased capacity	Periodic Review 2008	1

## NRDF candidate schemes in CP4

Figure 19 Candidate NRDF schemes in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2010/11	Ⓛ Ely West Curve	Commission bi-directional signalling operation over the West Curve and remove double blocking/make the Down Peterborough line reversible.	Reduced mileage/resourcing for freight services, improved performance	Network Rail Discretionary Fund	1
2010/11	Ⓜ Haughley Junction	Double the single lead at Haughley Junction	Improved capacity and performance	Network Rail Discretionary Fund	3
2010	Ⓝ Royston, Letchworth, Baldock and Ashwell & Morden	Platform extensions	Increased capacity	Network Rail Discretionary Fund	–
2010	Improve access to the network	Station interchange and car parking	Increased ridership	Network Rail Discretionary Fund	–
2010	Motorise ground frames	Motorise ground frames to improve setting up SLW.	Improve performance and safety	Network Rail Discretionary Fund	–
2011/12	Ⓞ Walthamstow Central turnback	Signal turnback	Improve performance	Network Rail Discretionary Fund	–
2010	Ⓟ Supply at Chingford depot during isolations	Provide shore supply to trains during line isolation	Improve performance	Network Rail Discretionary Fund	–
2010	Ⓠ Improve maintenance access	Provide bi-directional signalling between Broxbourne and Stansted	Improve maintenance access and overnight capacity	Network Rail Discretionary Fund	–

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### **Maintenance and renewals activity**

Figure 20 shows the estimated maintenance and renewal costs and activity volumes.

The precise timing and scope of renewals will remain subject to review to enable us to meet Network Rail's 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 Network Rail's Civils, Signalling & Electrification plans an element of over planning in the work banks has been included. As a consequence the sum of the route plans exceeds the 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 20** Summary of estimated maintenance & renewals costs and activity volumes

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	Control Period Totals			
						CP4	CP5	CP6	CP7
<b>Maintenance expenditure</b>									
Track	13	12	12	12	11	60	53	50	50
Signalling	6	6	6	6	5	29	26	25	25
Electrification	1	1	1	1	1	7	6	6	6
Telecoms	2	2	2	2	2	9	8	7	7
Plant and Machinery	1	1	1	0	0	3	2	2	2
Other (overheads / indirect)	9	9	8	8	8	42	38	36	36
<b>Total</b>	<b>32</b>	<b>30</b>	<b>29</b>	<b>29</b>	<b>28</b>	<b>149</b>	<b>133</b>	<b>126</b>	<b>126</b>
<b>Renewals</b>									
Track	19	20	16	18	16	89	73	62	70
Signalling	7	4	5	7	14	36	66	34	68
Civils	7	7	6	6	6	32	30	29	28
Operational Property	6	6	6	6	5	28	27	27	27
Electrification	2	2	2	2	2	9	9	9	8
Telecoms	10	6	5	3	1	25	12	10	13
Plant and Machinery	4	3	2	2	1	12	12	12	13
<b>Total</b>	<b>54</b>	<b>46</b>	<b>42</b>	<b>43</b>	<b>46</b>	<b>232</b>	<b>230</b>	<b>182</b>	<b>228</b>
<b>Renewals Volumes</b>									
Rail (KM)	13	13	14	13	13	65	95	60	59
Sleepers (KM)	18	18	18	18	18	88	81	84	123
Ballast (KM)	19	19	19	19	19	94	94	103	142
S&C Units	21	26	15	24	20	106	70	71	47
SEUs commissioned	50	0	0	0	0	50	300	59	423

## Appendix

**Figure 21** Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference, RA is Route Availability. OTIS: One Train In Section												
SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
05.01	Bethnal Green – Stansted Airport	BGK (TLA)	London & SE	DfT	No	W8 (W6)	8	various	25kv AC	TCB	3	2 (4)
05.02	Hackney Downs – Cheshunt	HDT (ENT)	London & SE	DfT	No	W8 (W6)	8	50 (60)	25kv AC	TCB	3	2
05.03	Hertford East Branch	HEB	London & SE	DfT	No	W6	9	60 (various)	25kv AC	TCB	4	2
05.04	Chingford Branch	CJC	London & SE	DfT	No	W6	7	50	25kv AC	TCB	3	2
05.05	Cambridge Lines	BGK (SBR)	London & SE	DfT	No	W8 (W9)	8	various	25kv AC	TCB	3 (4/5)	2
05.06	Ely – Kings Lynn	BGK	Secondary	DfT	No	W8 (W9)	8	90 (various)	25kv AC	TCB	various	1 (2)
05.07	Peterborough–Ely–Haughley Jn	EMP (CCH)	Secondary	DfT	No	W9 (W8)	8	75 (various)	None	TCB (AB)	various	2 (1)
05.08	Coldham Lane Jn – Chippenham Jn	CCH	Rural	DfT	No	W8	8	60	None	TCB (TB)	OTIS	1
05.09	Ely – Norwich	ETN	Secondary	DfT	No	W8	8	75 (90)	None	AB (TCB)	AB	2
05.10	Freight Lines	various	Freight	DfT	No	various	8 (6)	various	various	OTW (TCB)	4 (OTIS)	various

**Capacity and operational constraints**

- A Littleport – Downham Market & Watlington – Kings Lynn: Single track sections limit capacity
- B Cambridge station: Single through platform
- C Stansted Airport Tunnel: Single track
- D Tottenham Hale – Broxbourne: Mixed use of fast and slow services constrains capacity and potential journey time reductions

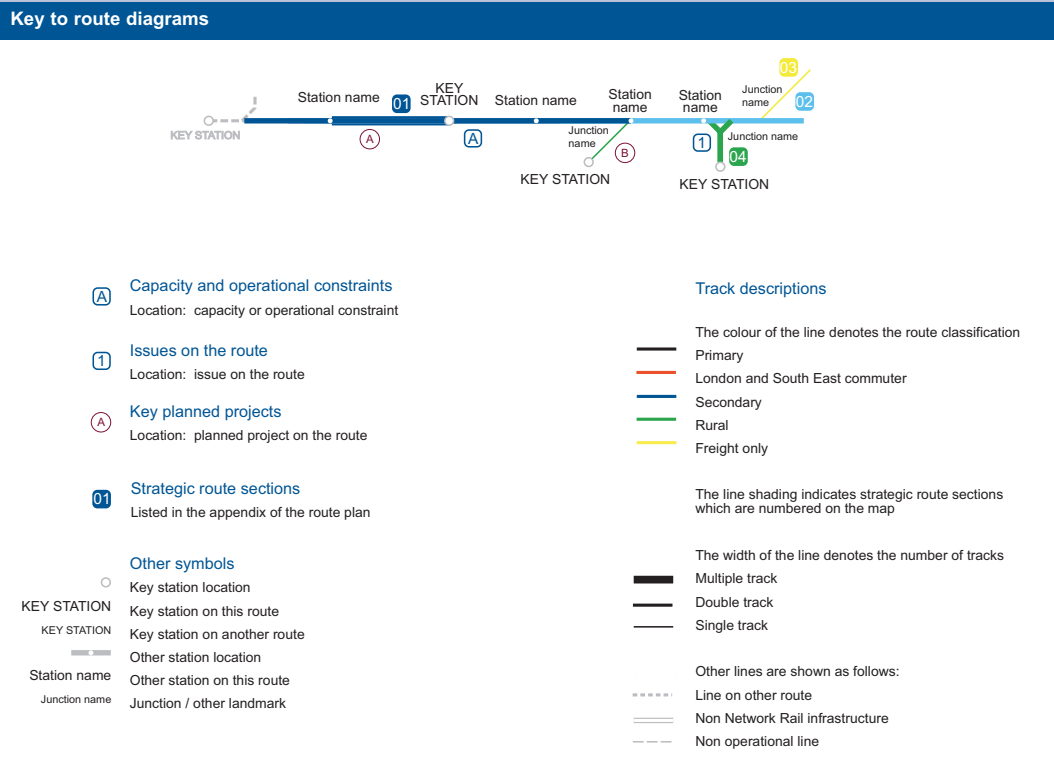
**Other issues on the route**

Potential strategic freight route would require an upgrade to this section

## Note

This Route Plan forms part of the April 2008 update of Network Rail's Strategic Business Plan. The Route Plan supersedes the version published on 1 November 2007.

Other documents in the Strategic Business Plan can be found on the Network Rail website [www.networkrail.co.uk](http://www.networkrail.co.uk)



**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

**This Route Plan is part of a set.  
To view or download the others  
visit [www.networkrail.co.uk](http://www.networkrail.co.uk)**

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CDS001/April 2008