



Route 7 Great Eastern



network is already operating at or close to capacity in terms of train paths. The Greater Anglia RUS will look at options and recommendations for accommodating future growth and some developing options are discussed in this route plan.

Today's route

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

- the main line from London to Norwich (07.01, 07.02 and 07.03);
- branches to Upminster (07.09), Southend and Southminster (07.05), Braintree (07.06), Colchester Town, Clacton and Walton (07.08) and Harwich (07.07); and
- the Sudbury branch (07.10), and the remaining branch lines in Norfolk and Suffolk (07.11), including the important freight route (07.12) between Ipswich and the port of Felixstowe, which is the country's largest container port.

There is also a short freight only branch to Sizewell Power Station (07.04).

Route context

The Great Eastern main line runs from London to Norwich and has a number of branches that serve the coastal resorts of Southend, Clacton-on-Sea, Walton-on-the-Naze, Felixstowe, Lowestoft, Great Yarmouth, Cromer and Sheringham, as well as the Norfolk Broads, the east coast ports (including Harwich and Felixstowe) and the lines to Braintree, Southminster, Sudbury and Upminster. The main line competes with the primary road network and rail services penetrate into the City of London.

The route serves one of the fastest growing regions in the country with densely populated areas at its southern end and some key locations along its length, including the Essex county town of Chelmsford and the regional centres of Colchester, Ipswich and Norwich.

The main markets are commuter travel to London, in particular to the city and the Docklands, and business and leisure travellers. The route also provides the main artery for substantial freight traffic between the east coast ports of Felixstowe and Harwich and the rest of England via London.

Along with the West Anglia route, the Great Eastern route is also included in the Greater Anglia RUS, work on which started in February 2006 and will cover the period to December 2017. The Eastern Regional Planning Assessment (RPA), covering the period from 2011 to 2021, was published by the DfT on 16th February 2006. The RPA sets out scenarios of continuing growth in commuting to the centre of London and Docklands. However, the current

Passenger and freight demand

Passenger demand is growing steadily on the route especially into both central London and the Docklands, which continues to expand (the Great Eastern inner and outer suburban services 2004 peak passengers just over 1% higher than 2003). Most of the peak demand is commuter flows from the main population centres however there is also an increasing off peak leisure market driven by successful marketing campaigns from the train operators and rail partnerships.

Main line services parallel the A12 corridor southwards from Ipswich, which feeds the M25 around London and extends all the way down into the Docklands. Road traffic in and around London however is very congested at peak times and this means that the railway tends to be the first choice for commuters especially on the suburban network, which experiences high numbers in the peak due to increasing employment in central London and the Docklands.

Although the majority of the current demand is into Liverpool Street, a significant number of passengers interchange at Stratford with onwards journeys via the underground Central and Jubilee Lines, Docklands Light Railway and the North London Line. Stratford is the gateway to the Docklands from the Great Eastern main 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 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 on the Thameside route (Route 6). This is further explored in the capability and capacity sections below.

Current services

Passenger services on the route are operated by One, with a small number of services into Liverpool Street operated by c2c. EWS, Freightliner and GB Railfreight operate freight services on the route.

Figure 1 contains the morning peak (08:00 to 09:00 arrivals) and off peak tph frequencies into Liverpool Street:

*Harwich Town has 1 tph peak connecting service to Liverpool Street at Manningtree

Figure 1 Current train service level (trains per hour)

Originating station	tph to Liverpool Street
Ilford	1 peak/0 off peak
Gidea Park	7 peak/0 off peak
Shenfield	6 peak/6 off peak
Southend	7 peak/3 off peak
Southminster	1 peak/0 off peak (see table below)
Chelmsford	2 peak/0 off peak
Braintree	1 peak/1 off peak
Colchester Town	1 peak/0 off peak
Clacton	4 peak/1 off peak
Harwich Town	0 peak*/1 off peak
Ipswich	1 peak/0 off peak
Norwich	4 peak/2 off peak

Figure 2 Current train service level (trains per hour)	
Regional/Rural Services	tph
Romford to Upminster	1
Southminster to Shenfield	1
Walton-on-the-Naze to Colchester via Colchester Town	1
Sudbury to Marks Tey	1
Harwich Town to Manningtree	1
Ipswich (starts at Liverpool Street) to Peterborough	1 every 2 hours
Ipswich (starts at Liverpool Street) to Lowestoft	1 every 2 hours
Ipswich to Felixstowe	1
Ipswich to Cambridge	1
Norwich to Cambridge	1
Norwich to Liverpool/Nottingham	1
Norwich to Lowestoft/Great Yarmouth/Sheringham	1 to each destination

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

There are also boat train services between Liverpool Street and Harwich International.

The route provides the main artery for long distance freight flows, from the east coast ports of Felixstowe and Harwich to the rest of England via north London as well as varying volumes of freight to local terminals and yards, especially aggregates.

Current traffic

The Great Eastern network carries a mixture of traffic types with significant variations in speed, acceleration and stopping patterns. On many corridors this involves a complex mix of freight trains (both electric and diesel hauled), electrically hauled inter city trains between Norwich and London, inner and outer passenger suburban electric multiple units (capable of speeds up to 100 mph) and rural passenger diesel multiple units. There is no segregation between freight and passenger traffic on the Great Eastern routes.

Figure 3 shows the tonnage levels on the route.

Traffic volumes are summarised in Figure 4.

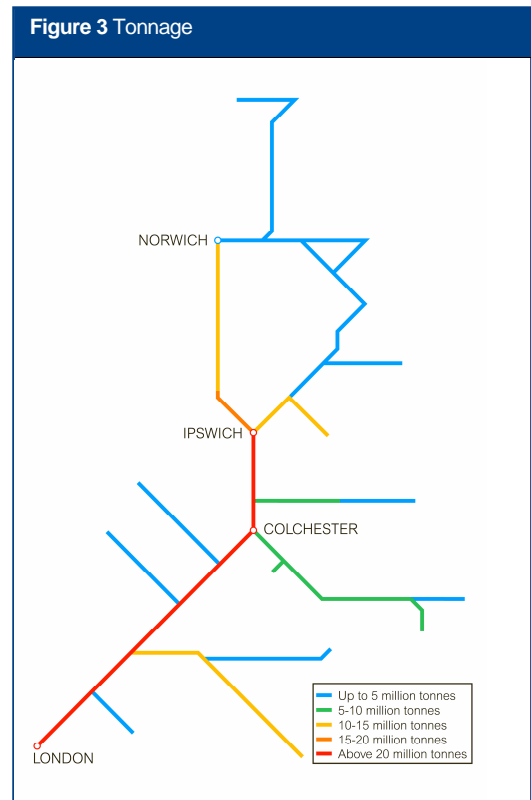
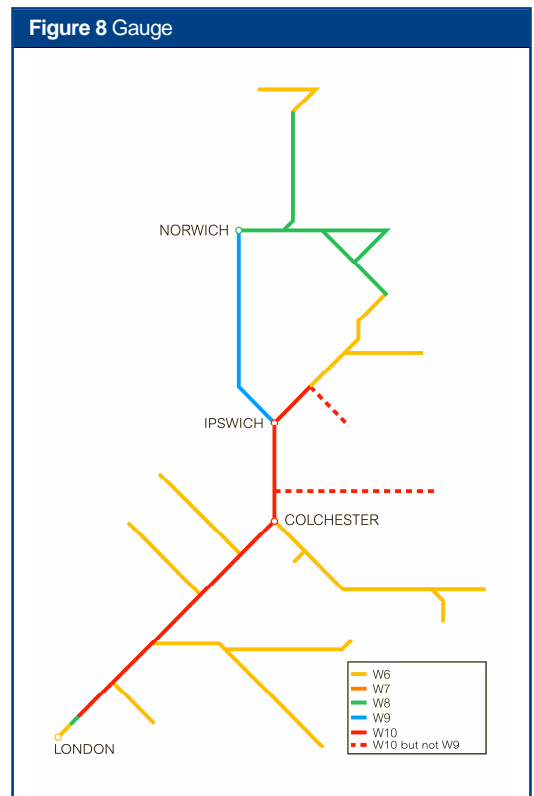
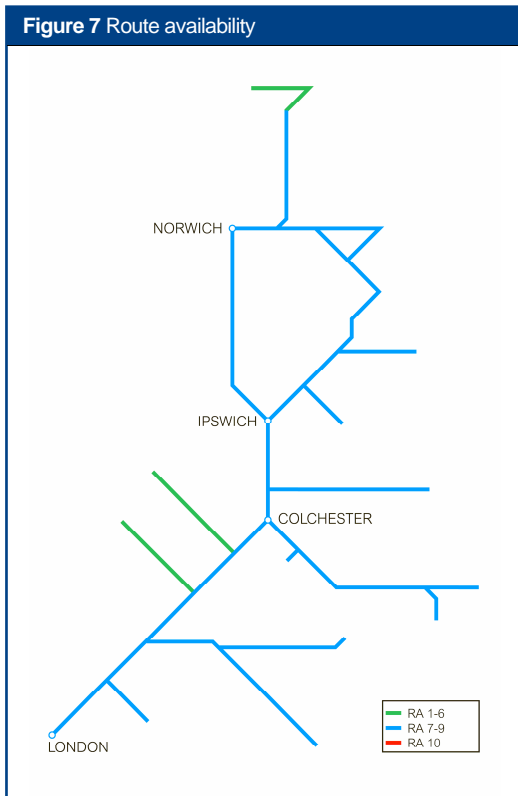
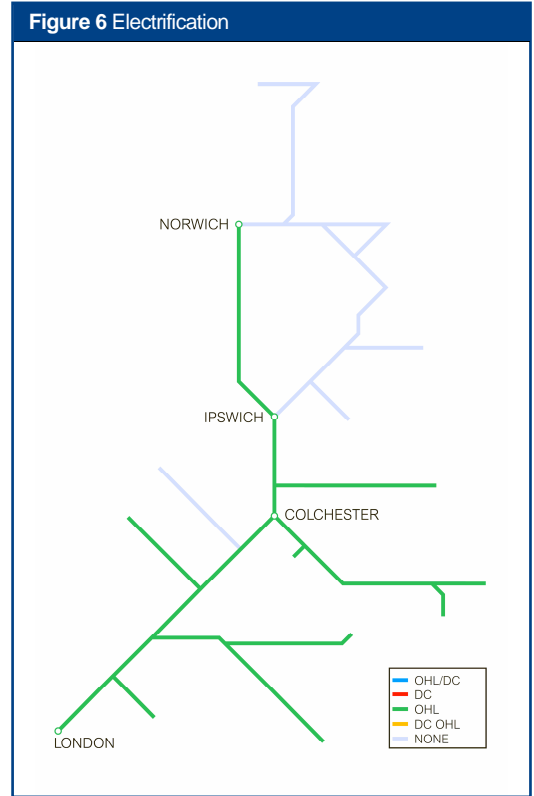
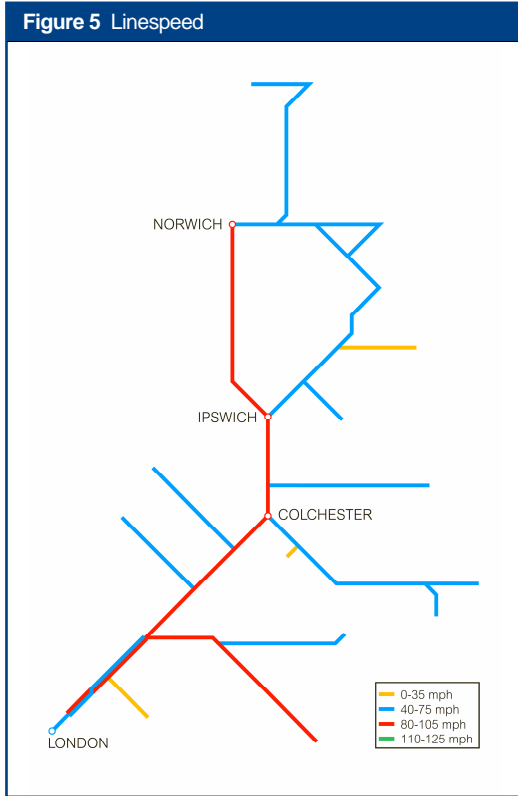


Figure 4 Current use			
	Passenger	Freight	Total
Train km per year (millions)	21	2	22
Train tonne km per year (millions)	5435	1229	6664

Current infrastructure capability

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



Current capacity

The Great Eastern route is mainly two track and capacity is limited by the mixture of fast and stopping passenger and freight services, complex junctions, and station occupancy. Long single line sections on a number of the rural lines exacerbate these issues. There is a four track section inwards from Shenfield, which does allow some segregation between fast and stopping passenger services but even here the demand for stopping the majority of main line peak services at Stratford means this section of the route is close to its capacity at peak times. Outside the peak the mix of current stopping patterns north of Shenfield and the growing number of freight trains from the Thameside route, which cross the Great Eastern on the flat between Forest Gate Junction and Stratford, use almost all of the available track capacity.

Key issues on the Great Eastern route are:

- a mixture of fast and stopping services on the two track Great Eastern main line between Colchester and Shenfield;
- the high volumes of freight traffic from Thameside, which has to weave across the Great Eastern route from the electric lines to the main lines on the flat between Forest Gate Junction and Stratford to access the North London Line;
- a lack of long freight loops between Haughley Junction and Stratford;
- a lack of diversionary routes with W10 loading gauge capability to offer routes away from the Great Eastern for the predominantly intermodal freight traffic;

- intensive platform utilisation and congestion on the throat at Liverpool Street station;
- the long single line track sections on the East Suffolk Line;
- the long single line Felixstowe Branch, which is a constraint to increasing traffic at the Port of Felixstowe;
- the three track throat to Norwich station; and
- passenger capacity is an issue at Stratford station on the route due to increasing passenger numbers at peak times and high levels of transfers to the underground and Docklands Light Railway.

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

Current performance

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

One's Public Performance Measure below also includes the services that they operate on the West Anglia route.

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 intensity of the peak service 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 route to be track circuit failures (especially at Liverpool Street, Bethnal Green and Maryland), broken rail/track faults (at

Figure 9 Current train service level (peak trains per hour)

Route Section	tph
Norwich to Diss	4
Ipswich to Manningtree	5
Thorpe le Soken to Hythe	5
Colchester to Marks Tey	10
Braintree branch	1
Witham to Hatfield Peverel	11
Chelmsford to Ingatestone	13
Southend Victoria to Wickford	7
Wickford to Shenfield	8
Shenfield to Gidea Park (electric line)	6
Gidea Park to Romford (electric line)	14
Ilford to Stratford (electric line)	15
Shenfield to Stratford (main line)	20

Figure 10 Current PPM MAA (2005/06)

TOC	MAA	As at period
One	86.7%	10

Colchester and Westerfield) and point failures at Liverpool Street, Maryland and the Ilford area. The route also suffers badly from OHL problems between Liverpool Street and Shenfield and the inner suburban service has been affected by suicides and trespass incidents, particularly from children/youths.

Measures to 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. The main drivers of this will continue to be growth in commuting to central London, and the Docklands, however Stratford continues to expand with local development, ongoing construction of the interchange with the CTRL, a new DLR link to London City Airport and as the main centre for the Olympic Games in 2012, which will further fuel demand. Port developments at Felixstowe, Bathside Bay and Shellhaven would bring significant demand for increased freight services across the route. This would also raise the issue of provision of diversionary routes for W10 gauge freight traffic. One area of uncertainty remains Crossrail and its impact on the various developments discussed in this route plan will need careful consideration.

Future demand

The emerging Regional Spatial Strategy focuses housing and employment development across the route including the A12 corridor to Ipswich, around the east coast ports and the South Essex end of the Thames Gateway. However, continued growth is also expected into central London, Stratford and Docklands as described above.

The continued development of Stratford and the Docklands including the recent completion of the DLR link to the new London City Airport station and a new direct service from Stratford to Stansted Airport is likely to lead to an increased interchange at Stratford.

Other developments on the route include potential new stations to serve a new leisure park and housing development near Claydon (north of Ipswich) and a growing housing development north of Chelmsford. There are also plans to expand Southend airport, which include the potential construction of a new station between Prittlewell and Rochford.

A growth of freight traffic particularly in light of developments at the east coast ports and Shellhaven is expected.

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.

The Greater Anglia RUS will explore these growing areas of demand and will provide a series of options on how these might be tackled. The draft for consultation is planned to be published in January 2007. The following factors are likely to influence the growing demand on the Great Eastern route:

- peak commuting is growing to central London, the Docklands and regional centres;
- the Stratford City development;
- developments in the Docklands;
- potential new stations;
- potential expansion of the east coast ports, and Shellhaven;
- the lack of diversionary routes for increasing W10 gauge intermodal freight services; and
- the potential effects of Crossrail.

Figure 11 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 Great Eastern route. Also there is currently no alternative diversionary route for W10 gauge freight traffic from the Thameside route. This traffic will also increase as permission has recently been granted to develop a deep sea container port at Shellhaven on the Thames Haven branch.

The West Anglia cross country route from Ipswich to the East Coast Main Line via Bury St Edmunds, Ely, March and Peterborough (part of Route 5) was identified by the SRA as one of the highest priority routes for upgrading, which should be secured through 'Section 106' planning commitments by port developers. However options to increase the gauge and upgrade the route from Barking to Gospel Oak (part of route 6) for Thameside freight traffic will also need to be explored.

Consequently the Freight RUS is examining routing issues and studies are continuing into ways of increasing the future gauge specification for these routes to W10, which if completed could offer welcome relief to track capacity along the Great Eastern route and improve opportunities for weekend engineering works.

Linespeed

Modest improvements to linespeeds on some rural routes could give longer turn round margins at origin and destination stations, which would improve operation and performance as well as increasing demand, however this may only be possible in conjunction with increased infrastructure.

Tonnage

Increased demand for freight traffic to and from the east coast ports will cause much higher tonnages to be sustained across the Great Eastern route, 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:

- Felixstowe port to Ipswich Yard (includes the whole of the Felixstowe branch and part of the East Suffolk Line between Westerfield and East Suffolk Junction);
- Bathside Bay to Manningtree Junctions (Harwich branch);
- Ipswich Yard to Stratford; and
- Ipswich Yard to Haughley Junction (to access the ECML via the West Anglia cross country route – Route 5).

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.

Most of the outer suburban and main line Great Eastern stations can already accommodate twelve car EMUs and loco hauled rolling stock of up to eleven coaches. The inner suburban line stations with the exception of Shenfield and Stratford can only accommodate eight car formations and there are few opportunities for extending platforms

without extensive infrastructure works, which would be very expensive. In the long term Crossrail (if implemented) is looking to provide 10 coach formations with the use of selective door opening as a possible option where necessary.

Published capability

As part of the ongoing work that Network Rail is committed to in relation to Infrastructure Capability, we have included 'category 1' capability routes in our investment processes in order to resolve discrepancies between actual capability and published capability, i.e. for the Ipswich Griffin Wharf line within this route.

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.

Most of the Great Eastern main line is already operating at, or very close to, capacity and currently 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 two track section between Shenfield and Colchester is particularly constrained by a difficult current mix of both fast and stopping services as well as freight traffic. This section will come under intense pressure from increasing demand for commuting and due to the effects of developments at Stratford, the Docklands and the east coast ports.

As mentioned above, providing alternative routes for W10 gauge freight trains is a key area to capacity issues on the Great Eastern route. This is coupled with the potential expansion of the east coast ports (which would bring increased freight traffic down the Great Eastern main line south from Ipswich), and Shellhaven on the Thameside route (which will bring additional freight traffic to the already congested Great Eastern route between Forest Gate Junction and Stratford).

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

- the constrained two track section between Shenfield and Colchester;
- train lengthening, where appropriate, and the use of new and reconfigured rolling stock;
- the potential effects of Crossrail on the four track section between Shenfield and Liverpool Street;
- improving linespeeds to facilitate reduced journey times and allow rail to better compete with road;
- doubling the track on part of the Felixstowe branch;
- provision of long loops for freight services; and
- increasing the W10 gauge network to parts of the West Anglia and North London Line routes.

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.

Figure 12 Forecast reduction in delay minutes

	2006/07	2007/08	2008/09
% reduction in delay minutes	10%	20%	26%

Figure 13 Forecast PPM MAA

TOC	2006/07	2007/08	2008/09
One	88.4%	88.9%	89.3%

Future performance

Figure 12 shows the forecast reduction in Network Rail delay minutes compared with 2005/06.

Figure 13 shows the forecast PPM for the main TOC 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 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.

We will continue with our programme of component replacement of the OHL, however most of the OHL problems are caused by fixed termination equipment, much of which is of a very old design, and needs to be seasonally re-tensioned according to the weather. We are currently considering options for replacement of the fixed termination overhead line equipment located between Liverpool Street and Chelmsford/Southend Victoria with a modern, high reliability system. The existing fixed termination system design currently leads to the application of temporary speed restrictions (TSRs) during periods of high temperatures. In addition, a major dewirement occurred at Bow in the spring of 2005,

closing Liverpool Street station and its approaches for 31 hours. The proposed scheme would remove these design deficiencies and provide a simpler, easier to maintain, quicker to repair, modern, automatically tensioned system. There are a number of other factors which have an impact on the business case for such a scheme, including developments emerging in the Stratford area such as the North London Line conversion to Docklands Light Railway, East London Line Extension (phase 1), Crossrail and London 2012, as well as the 2007 opening of CTRL phase 2 generating additional local traffic on GE from Stratford International. In addition, upcoming closures of the route for other works present a unique opportunity to undertake these rewiring works which require multi-track access.

As part of our 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 in the past there has been difficulty in gaining access for maintenance and renewals work. As a result a cyclic maintenance regime was introduced that allows weekend maintenance possessions on a twelve week cycle at our key junctions and locations. Additionally Liverpool Street and Shenfield have weeknight possessions of varying frequencies and we are also sustaining working time equivalent to seventeen 54-hour possessions per year in order to carry out the track renewals programme.

In conjunction with the local operator, a Sunday service using only a two track railway between Bethnal Green and Shenfield was introduced, which allows us to take full possessions on any two tracks of the four track section.

Although the introduction of cyclical access onto the Great Eastern 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. Also we are continuing to work with operators on improving weeknight maintenance on the two track Shenfield to

Haughley Junction section of the main line, on which access is restricted due to the requirements of freight traffic. We will look at options for improvement in this area as part of the Greater Anglia RUS.

Also we will be investigating the practicalities of:

- improved gauging on the West Anglia cross country route, which would allow a diversionary route for W10 gauge freight trains and may free up space on the congested Great Eastern main line north of Shenfield for increased weeknight maintenance;
- undertaking more work for other disciplines in existing possessions planned for track renewals; and
- taking long blockades rather than frequent smaller possessions.

Opportunities and challenges

We anticipate that accommodating growth in commuting to central London and the Docklands will be a significant challenge on the route, together with continued developments around Stratford including the CTRL interchange, the expanding DLR network and the Olympics in 2012. This combines with the east coast ports expansion and freight from Shellhaven as well as the potential effects of Crossrail on parts of the Great Eastern main line and other sections of the route that are already operating at, or very close to, capacity.

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

- measures to spread the peak demand and smooth the high peak requirements. A number of possible measures will be explored in the Greater Anglia RUS. However, we do not believe that this will be sufficient to cater for all forecast peak demand growth;
- train lengthening, possibly 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 measures could include improved signalling headways and junction margins, the construction of long loops or additional tracks and junction remodelling. These have the potential to improve performance, 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.

Many 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 Great Eastern network are set out in the future requirements section and where not already committed will need to be thoroughly assessed by the Greater Anglia RUS.

Delivering future requirements

Expenditure

Figure 14 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 14 Forecast expenditure

£m (05/06 prices)	2006/07	2007/08	2008/09
Renewals			
Track			
Plain Line	38	33	31
S&C	3	3	3
Drainage	0	0	0
Track Total	42	37	34
Civils			
Underbridges	2	4	7
Overbridges	2	2	0
Bridgeguard 3	1	0	–
Footbridges	0	0	–
Earthworks	7	15	2
Culverts	0	–	–
Retaining walls	0	0	–
Other	0	0	0
Civils Total	12	22	9
Signalling			
Resignalling	6	33	26
Minor works/other	5	3	2
Signalling Total	10	36	28
Electrification			
AC Systems			
HV switchgear	3	3	0
Booster transformers	0	0	–
OHL re-wiring	0	1	1
OHL campaign changes/refurbishment	0	2	2
OHL structures	1	1	0
Other	0	1	0
DC Systems			
Other	0	0	0
SCADA	1	–	–
Electrification Total	6	8	4

Telecoms			
Concentrators: large	1	0	0
Voice recorders	0	–	–
CIS systems	0	0	0
Other	1	1	0
Telecoms Total	3	2	0
Plant and machinery			
Fixed plant	1	1	1
Signal supply point	–	0	0
Point heating	0	1	1
Plant Total	1	1	2
Operational property			
Stations	3	1	0
Light maintenance depots	1	–	0
Lineside buildings	0	–	–
Operational property Total	5	1	0
Total Renewals	78	107	78
Enhancements (funded by)			
Network Rail (RAB)			
Colchester – Mark's Tey Bi-directional signalling	1	0	2
Network Rail (RAB) Total	1	0	2
Other Third Party			
Beaulieu Park new station	0	0	1
Ipswich – Felixstowe freight upgrade	0	5	36
Stratford Regional station upgrade	0	2	2
Other	1	0	1
Other Third Party Total	1	7	40
Total Enhancements	2	8	42

Figure 15 Forecast volumes

	2006/07	2007/08	2008/09
Track			
Rail (km)	57	54	54
Sleepers (km)	56	53	53
Ballast (km)	56	53	53
Switches & crossings (no)			
Complete renewal	2	2	2
Partial renewal/reballasting	7	8	8
Drainage (km)	1	1	1
Civils			
Underbridges (square metres)	2,031	3,447	3,990
Overbridges (square metres)	700	4,873	10
Footbridge (square metres)	12	–	–
Embankments (square metres)	21,312	127,787	15,090
Culverts (square metres)	9	–	–
Retaining walls (square metres)	29	152	–
Signalling			
Resignalling (SEUs)	–	103	188
Electrification			
AC Systems			
HV switchgear (CBs)	16	16	1
Booster transformers (no)	–	18	–
OHL re-wiring (tension length)	–	278	243
OHL structures (no)	20	16	12
Telecoms			
Concentrators: large (no)	2	1	–
Voice recorders (no)	3	–	–
CIS systems (stations)	–	64	–
Plant and machinery			
Signal supply point (no)	–	2	1
Point heating (point end)	35	56	94

The planned volume of renewals is detailed in Figure 15.

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

Figure 16 Forecast expenditure

£m (05/06 prices)	2006/07	2007/08	2008/09
Maintenance	44	41	38

Infrastructure investment

Figure 17 highlights committed schemes that are planned for completion in the financial year shown:

Project	Scope	Enhancement or output change	Main asset type(s)	Third Party funding	GRIP stage	Completion year
A Liverpool Street to Ilford/Stratford (07.01)	8 day blockade to cover the demolition of Bridge 19 and associated infrastructure works for the East London Line Extension; may also cover some proposed renewals including plain line track, S&C at Bethnal Green West Junction and maintenance activities	Improved asset condition and performance. Will allow extension of East London Line services to Dalston	Structures, ohl and track	TfL (for Bridge 19 ELL works)	2	2007/08
B Stratford Capacity Enhancement Works (07.01)	Additional signals to allow more mainline trains to stop	Provides additional capacity through the use of closing up signals	Signals	OTA	1	2011
B Stratford Regional Station Upgrade (07.01)	Construction of Northern Ticket Office, decluttering platforms, reopening eastern subway, platform widening and proposed extension of platform 10a	Provides additional station capacity and safely accommodate growth anticipated from employment in docklands, developments at Stratford and the Olympics	Station works	TfL and developer	4	2011
D Shenfield S&C (07.01)	Like for like renewal	Includes some remodelling work to facilitate future Crossrail plans	Track	None	1	2007/08
G Witham S&C (07.02)	Life extension works	Improved asset condition and performance	Track	None	4	2006/07
H Marks Tey S&C (07.02)	Life extension works	Improved asset condition and performance	Track	None	4	2006/07
I Marks Tey to Sudbury (07.10)	Plain line track renewal	15 day blockade to give improved asset condition and performance	Track	None	1	2007/08

Figure 17 Planned infrastructure investment

Project	Scope	Enhancement or output change	Main asset type(s)	Third Party funding	GRIP stage	Completion year
• Marks Tey to Colchester bi-directional signalling (07.02)	Installation of simplified bi-directional signalling (SIMBIDS)	SIMBIDS will enable longer periods of single line working, which will help improve performance, maintenance and track quality	Signals	NRDF	1	2007/08
• Colchester TDM (07.02)	Like for like telecoms renewal	Improved asset condition and performance	Signals	None	6	2006/07
• Colchester North and South Jns S&C (07.02)	Life extension scheme	Improved asset condition and performance	Track	None	1	2006-2008
• Colchester to Clacton resigalling (07.08)	Like for like resigalling scheme	Improved asset condition and performance	Signals	None	5	2008/09
• Thorpe-le-Soken to Walton-on-the-Naze (07.08)	Plain line track renewal	7 day blockade to give improved asset condition and performance	Track	None	1	2007/08
• Ipswich to Felixstowe Freight Upgrade (07.12)	Partial track doubling and associated signalling	Increased capacity to meet growing freight train demand to and from Felixstowe Port	Track and signals	Developer	4	2008/09
• Diss to Trowse (07.03)	Plain line track renewal	9 day blockade including S&C and earthworks at Thrandeston Bog (near Diss). Will give improved asset condition and performance	Track and structures	None	1	2007/08
• Brundall Jcn to Yarmouth (07.11)	Plain line track renewal	15 day blockade to give improved asset condition and performance	Structures	None	1	2007/08
• Oulton Broad Swingbridge (07.11)	Like for like bridge renewal	7 day blockade to give improved asset condition	Structures	None	1	2007

Figure 18 table highlights uncommitted schemes under development.

Project	Scope	Enhancement or output change	Main asset type(s)	Status
C Upminster LUL/NR Link (phase 1) (07.09)	New connection between GE Romford to Upminster branch and LUL at Upminster	To allow LUL stock movements	Track	Phase 1 of a Third Party Metronet funded scheme currently under consideration.
C Upminster LUL/NR Link (phase 2) (07.09)	Signal the above connection and upgrade track on Romford to Upminster branch	To allow transfer of engineering trains between NR and LUL	Signalling and track	Phase 2 of a third Party Metronet funded scheme currently under consideration.
E Southend Airport station (07.05)	New station	New station as part of growing development of Southend Airport	Signalling and station	Third Party feasibility
E New station north of Chelmsford (07.02)	New station with long loops	New station to serve a growing housing development	Signalling, track and station	Third Party feasibility
N Bathside Bay (near Harwich) (07.07)	Rail connection to new port development	To allow freight train services to access and egress new deep sea port development	Track and signalling	Third Party funded scheme. Port development has just received approval from DfT.
P Great Blakenham station (07.03)	New station	New station as part of Snoasis development	Signalling and station	Third Party feasibility

Non infrastructure developments

Figure 19 The following significant timetable schemes for the route are under development

Figure 19 Timetable development				
Description	Key issues	Actions or options being developed	Benefits	Target timetable implementation
Greater Anglia RUS	Overcrowding, journey times, freight capacity and regional growth	Early stages of option development	Improved capacity, performance and reduced overcrowding.	December 2008

Figure 20 Other projects				
Description	Key issues	Actions or options being developed	Benefits	Start date
2012 Olympics	To deliver increased capacity to meet demand	Numerous schemes in development to facilitate passengers travelling to and from the Olympic venues	Improved capacity.	Ongoing.
Crossrail	Effects on capacity between Shenfield and Liverpool Street			
Smartcard introduction	Revenue protection and flexible ticketing	TfL/ATOC to take forward	Revenue increase and potentially demand management improvements.	

Appendix

Figure 21 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
07.01	Liverpool Street – Shenfield	LTN1	Primary	DfT	No	W10	8	90 (70)	25kv AC	TCB	2 mins	4 (6)
07.02	Shenfield – Ipswich	LTN1	Primary	DfT	No	W10	8	100 (90)	25kv AC	TCB	3	2
07.03	Ipswich – Norwich	LTN1 (LTN2)	Primary	DfT	No	W9 (W8)	8	100	25kv AC	TCB	3	2
07.04	Freight Lines	various	Freight	DfT	No	W6 (W8)	various	various	various	various	OTIS	1
07.05	Shenfield – Southend Victoria/Southminster	SSV (WIS)	London & SE	DfT	Yes	W6	7	80 (60)	25kv AC	TCB	3 (OTIS)	2 (1)
07.06	Braintree Branch	BRA	London & SE	DfT	No	W6	6	50	25kv AC	TCB	OTIS	1
07.07	Harwich Branch	MAH (NTE)	London & SE	DfT	No	W10	8	60 (45)	25kv AC	TCB	4 (OTIS)	2 (1)
07.08	Walton and Clacton Branches	COC (various)	London & SE	DfT	No	W6	7	75 (50)	25kv AC	TCB	4 (OTIS)	2 (1)
07.09	Romford – Upminster	ROU	Rural	DfT	No	W6	8	30	25kv AC	OTW	OTIS	1
07.10	Sudbury to Marks Tey	SUD	Rural	DfT	Yes	W6	6	50	None	OTW	OTIS	1
07.11	East Suffolk line and Norfolk Branches	various	Rural	DfT	Yes	W6 (W8)	7 (6)	various	None	RETB (various)	various	various
07.12	Felixstowe – Ipswich Yard	FEL (various)	Secondary	DfT	No	W10	7	50	None	TCB	OTIS (4)	1 (2)

Capacity and operational constraints

- A Acle: Passing loop length restricts capacity
- B Halesworth – Oulton Broad: Single track section with no passing loops
- C Braintree Branch: Single track section with no passing loops
- D Shenfield – Colchester: Intensively used track section almost at capacity
- E Southminster Branch: Single line with only one passing loop
- F Forest Gate – Stratford: Capacity constrained by a mix of passenger and freight trains
- G Liverpool Street – Bethnal Green: Lines almost at capacity

Other issues on the route

- I Potential strategic freight route would require an upgrade to this section