

Route Plans 2007  
Route 2  
Brighton Main Line  
and Sussex

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## Route 2 Brighton Main Line and Sussex

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only this or a very similar option would provide the necessary additional peak capacity required to cope with predicted main line demand.

In Spring 2007 we will publish a Consultation Draft of the South London RUS. This work, which has had significant involvement from TfL, will provide a strategy for accommodating growth on slow line services and semi fast services from outer suburban destinations using the fast lines. It will inform the suburban train service specification for the replacement Southern franchise, which expires in 2009.

The Department for Transport's Southern Regional Planning Assessment (RPA) for the railway was published in January 2007.

### Today's route

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

- the main line from London to Brighton via Gatwick Airport. This comprises separate multi track routes from Victoria (02.01) and London Bridge (02.03), joining together in the Croydon area to Brighton (02.02), reducing to two tracks at Balcombe Tunnel Junction;
- branches off the main line forming routes to East Grinstead/Uckfield (02.12, 02.10), Caterham/Tattenham Corner (02.11), Tonbridge (01.11), Reigate (03.08), the Arun Valley (02.04), Eastbourne (02.06), Worthing (02.05) and beyond. Services from the branches all feed onto the main line making it increasingly busy closer to London;
- the lines leading west and east from Brighton providing links along the coast (02.05, 02.06);
- a network of suburban lines throughout south London (02.07, 02.08, 02.14). This is characterised by extensive linkages between the different routes so that most stations have services to both Victoria and London Bridge, creating significant complexity in the timetable structure;
- the Dorking to Horsham line (02.09);
- the West London Line, the major route around London for most freight to and from the south (02.13); and
- the cross London Thameslink route (02.15).

The boundaries of the Sussex route with adjacent routes are particularly complex. There are a number of boundaries with route 1 and route 3 in particular, and also north of the Thames on the West London Line and Thameslink routes.

### Route context

The Brighton Main Line provides a high capacity fast link between London (both the West End and City), Croydon, Gatwick Airport and the south coast, with a network of branches to other destinations in Surrey, West Sussex and East Sussex.

The Sussex route also provides an extensive suburban overground network throughout much of South London, providing frequent metro services to a large part of the capital which is not served by the underground system.

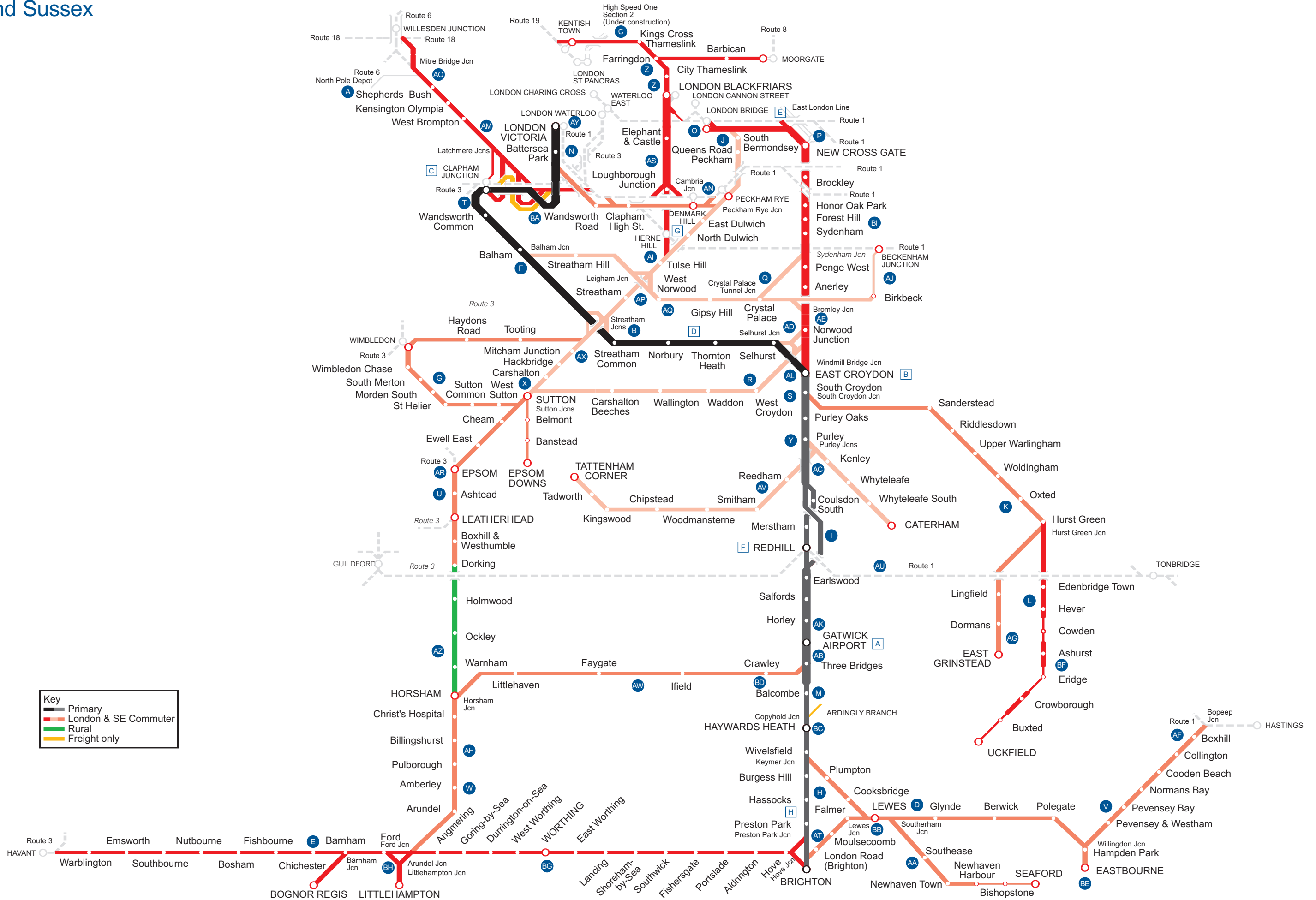
The majority of services on the Sussex route are provided by Southern. The other main operators are First Capital Connect (who operate cross London services to Brighton and Wimbledon) and Gatwick Express (who operate direct non-stop

services between Victoria and Gatwick Airport). Several other operators run on parts of the route.

There are significant overcrowding issues on both main line and suburban services. Resolving overcrowding by adding additional on-train capacity is therefore the main priority for future development of the route.

In September 2006 the DfT published a Consultation Document regarding Implementation of the Brighton Main Line Route Utilisation Strategy (RUS). This proposed four options for restructuring the timetable on the fast lines to provide additional capacity. Network Rail's response to this Consultation highlights that our preferred option is Option 1 (extending Gatwick services to coastal destinations). We believe that

# Route 2 Brighton Main Line and Sussex



## Passenger and freight demand

Passenger demand is high on the whole of the Brighton Main Line, plus most of the branches off it, leading to widespread peak period overcrowding. Most of the peak demand is commuter flows from the main population centres but it is notable that the most intensive flight arrivals period at Gatwick Airport is also during the morning peak.

Main line services generally compete with the parallel A23/M23 highway. This narrows from a six lane motorway to a single carriageway as soon as the Greater London boundary is reached, making the railway the only viable option for the majority of commuters.

A significant portion of demand is for the sizeable short distance commuting flow on both main line and outer suburban services between East Croydon and London. Developments in Croydon town centre and the Croydon Tramlink system have contributed to this significant feature in recent years.

With regard to the London suburban network, demand is also high, again leading to widespread peak period overcrowding and, in cases, passengers not being able to board trains at certain locations. Our work to date on the South London RUS has identified that most routes have demand which is significantly suppressed by current capacity and service patterns, leading to extra pressure on the alternative options and reduced economic activity.

Many of the current travel patterns require passengers to interchange onto other rail, underground, tram or bus routes to complete their journey. Many of these also have limited capacity, currently suppressing demand on certain routes. Key interchanges are Victoria (Victoria and District/Circle lines), Clapham Junction (South West Trains and Silverlink), London Bridge (Jubilee, Northern lines and Southeastern) and Balham (Northern Line).

There is modest freight demand on the core Sussex route (mainly to aggregates terminals) but the West London Line (WLL) has a high number of cross London freight services, primarily aggregates to and from southeast terminals and international trains running between the West Coast/Great Western main lines and the Channel Tunnel. At the south end of the WLL services to the Channel Tunnel are normally routed via Catford and Maidstone East (on Route 1) but the line via Redhill is the only alternative to this for W9 gauge freight traffic, though it requires diesel haulage.

Passenger demand on the West London Line is also growing significantly and a strategy for increasing the number of services operating on this route was outlined in the Cross London RUS which became established in October 2006. There is established demand for through services across Clapham Junction with significant interest in improved provision for more local flows.

Demand on the coastal lines is generally focussed on the major urban centres, especially Brighton and Portsmouth. These services generally compete with the parallel A27 highway.

## Current services

The main operators on the route are Southern Railway, Gatwick Express and First Capital Connect. Passenger services are also operated on the route by First Great Western, Southeastern, South West Trains, Silverlink and Virgin. Freight services are operated by EWS, Fastline, Freightliner, GB Railfreight and Direct Rail Services.

The main line passenger service structure is complicated by the number of separate branches off the Brighton main line, the different stopping patterns on it and the existence of more than one London terminal.

Main line services to Victoria generally remain at a high level throughout the day, reflective of the spread of demand to leisure and shopping destinations in the West End. Services run to a variety of destinations in Surrey and the south coast at regular frequencies. There are some peak period additional services to certain destinations. There is also currently a non-stop Victoria to Gatwick Airport train every 15 minutes.

Main line services to London Bridge have a very intensive peak period with services terminating in the nine low level platforms. The off peak service is significantly lower, much of it being made up of four Bedford to Brighton through trains per hour. These services cannot generally operate via London Bridge during peak hours due to the lack of capacity in the area.

The London area passenger suburban service is governed by the complex nature of the network and by interaction with main line and First Capital Connect services, particularly during the peaks. This results in a suburban service on which several routes currently receive a less frequent service in the peak than in the off-peak. Improvements to the suburban service pattern and capacity enhancements are being examined by the South London RUS.

The West and East Coastway lines from Brighton are served by a mixture of local stopping services and semi-fast services providing faster links between the main towns.

The West London Line is currently served by a combination of through services from Gatwick and Brighton and a local Clapham – Willesden Junction shuttle (with some peak trains extended to Stratford), though there is wide variation in intervals between services. In addition there are typically 25-35 freight trains per day in operation each way on this line and empty Eurostar trains running between Waterloo International and North Pole depot.

Figure 1 and Figure 2 show the current level of service to London from principal stations.

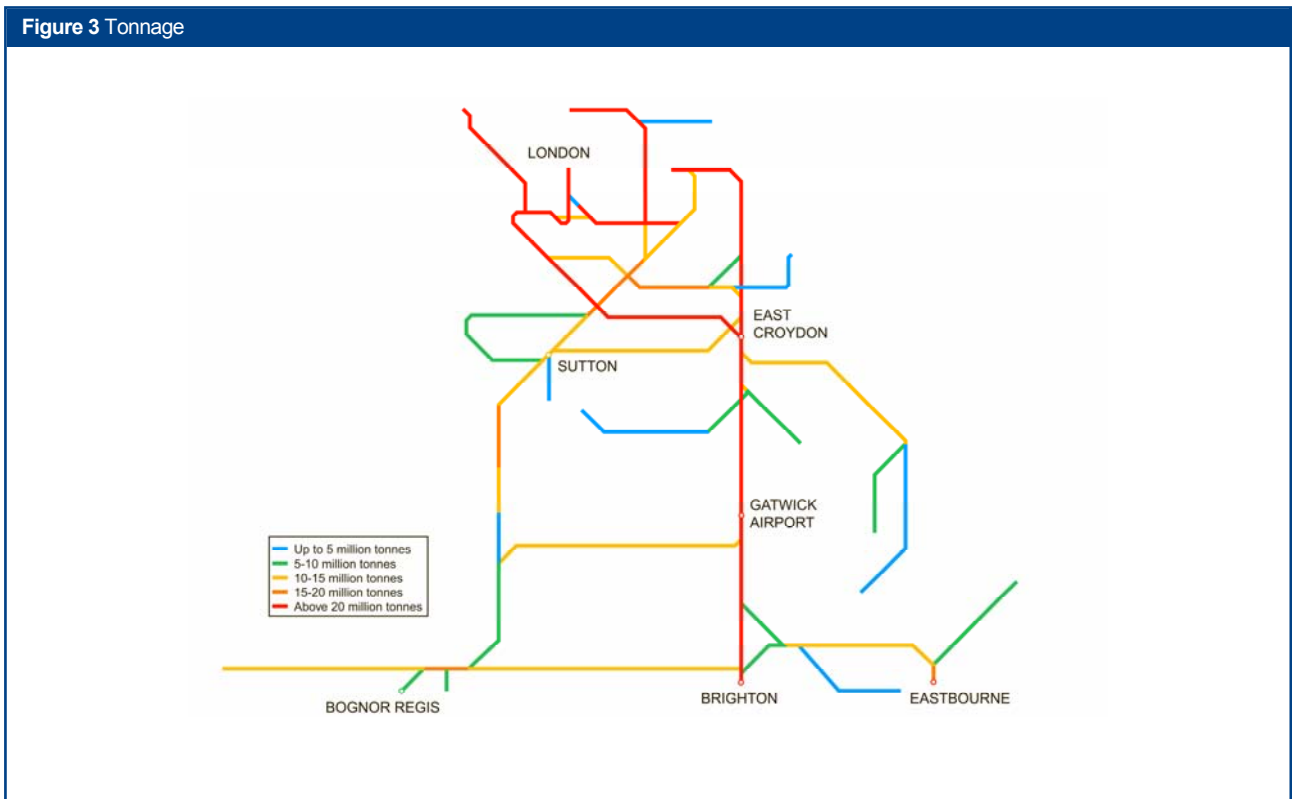
**Figure 1** Current suburban train service level (trains per hour)

Station	London Bridge or Blackfriars	Victoria
Sydenham	8 peak/6 off peak	0 peak/2 off peak
Norbury	1 peak/2 off peak	5 peak/6 off peak
Crystal Palace (via Gipsy Hill)	1 peak/4 off peak	4 peak/4 off peak
Sutton (via Hackbridge)	2 peak/2 off peak	4 peak/4 off peak
Wimbledon (via Tooting)	3 peak/2 off peak	N/A
West Croydon	5 peak/4 off peak	5 peak/6 off peak

**Figure 2** Current main line train service level (trains per hour)

Station	London Bridge or Blackfriars	Victoria
Brighton	3 peak/4 off peak	2 peak/2 off peak
Haywards Heath	6 peak/4 off peak	5 peak/2 off peak
Gatwick Airport	5 peak/4 off peak	4 peak/8 off peak
Redhill	4 peak/2 off peak	3 peak/2 off peak
Oxted	5 peak/1 off peak	2 peak/2 off peak
East Croydon	18 peak/7 off peak	14 peak/8 off peak

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)	37	1	37
Train tonne km per year (millions)	9,100	326	9,426

### Current infrastructure capability

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

Figure 5 Linespeed

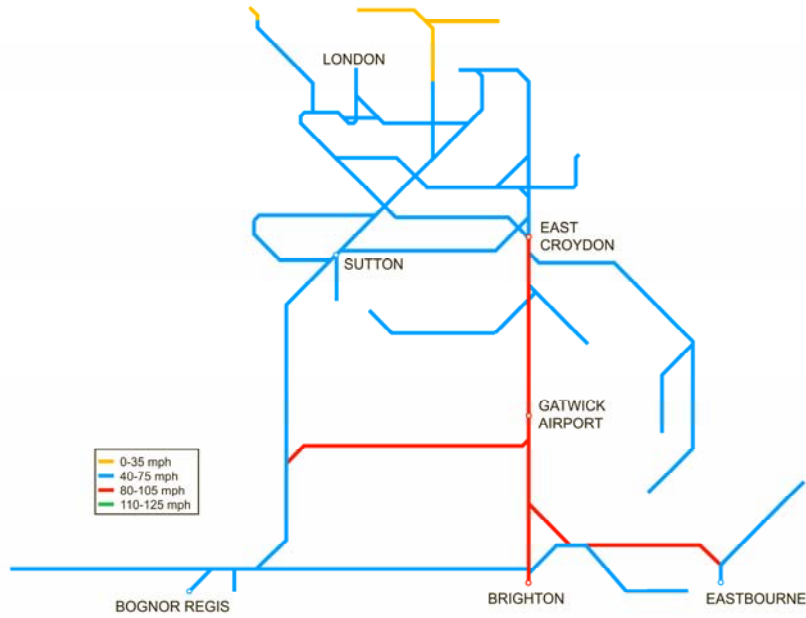


Figure 6 Electrification

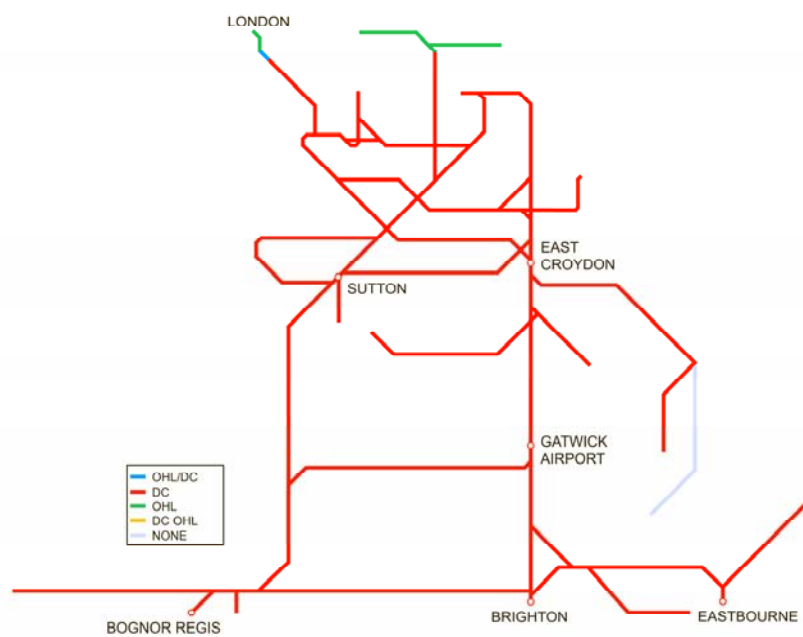


Figure 7 Route availability

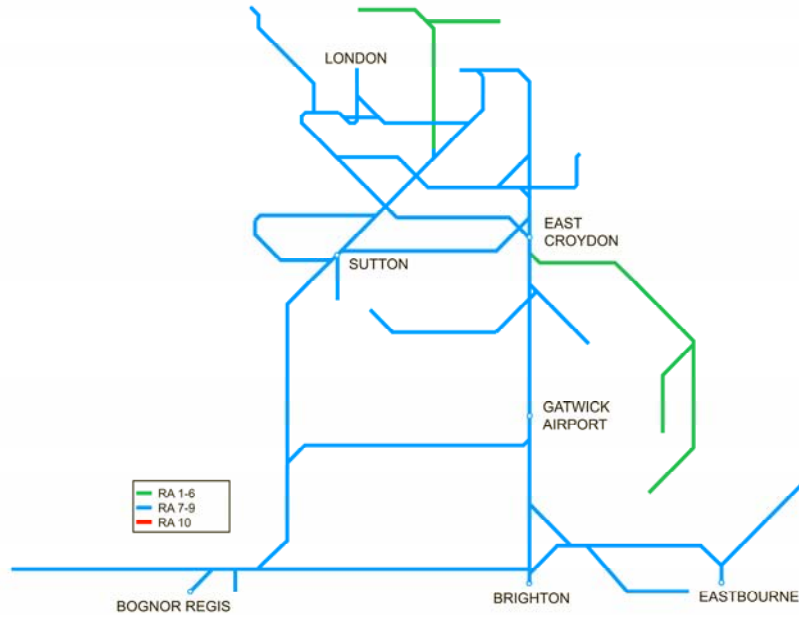


Figure 8 Gauge



### Current capacity

The route is operating near capacity for several hours each day. This is governed by a mixture of constraints, in particular the layout of certain junctions, dwell times at stations, limited reversing facilities and some features of the existing timetable. The issues are interlinked and overall route capacity is governed by a combination of these factors.

Key constraints to main line services are highlighted below:

- the dedicated Gatwick Express platforms 13/14 at Victoria limit other main line services to using platforms 15-19;
- the restrictive layout of the approaches to London Bridge and the limited number of platforms;
- the current method of operation at Gatwick Airport, due to the numerous crossing moves between the fast and slow lines and a train always occupying one of the through platforms;
- the two track railway between Balcombe Tunnel Junction and Brighton constrains capacity due to station dwell times on the stopping services;
- 8-car platform lengths and limited through capability of the core Thameslink route;
- conflicting moves between Down Victoria & Up London Bridge services at Windmill Bridge Junction and fast to slow line crossing moves at Selhurst; and
- the restrictive track layout and number of trains needing to reverse direction at Redhill.

Key constraints to suburban services are highlighted below:

- the restrictive layout of the approaches to London Bridge, the limited number of platforms and the intensive use of the available peak capacity by main line services;
- the current practice of running many peak period outer suburban services fast from East Croydon removes the calls that these services would otherwise make closer to London;
- platform lengths generally limit trains to 8-car;

- platform lengths on the Caterham and Tattenham Corner lines limit the many trains originating from these lines to 6-car length for their whole journey, unless carriages are locked out of use or they attach/detach at Purley;
- the dedicated Gatwick Express platforms 13/14 at Victoria limit suburban services to using platforms 9-12;
- conflicting moves at the numerous flat junctions, particularly Battersea Park, Balham, Streatham North, Streatham Common, Selhurst and Gloucester Road;
- the convergence of multiple suburban routes in the Croydon area, with very limited capacity for turning trains round at both East and West Croydon. This will become an increasing problem due to plans for additional services to Croydon from both the East and West London lines;
- only a single platform available for turning trains in the Sutton area;
- the requirement to run most peak period Brighton – Bedford services via Heme Hill utilises capacity that would otherwise be available for suburban services; and
- the short formation Victoria – Peckham Rye – London Bridge service utilises the same platform capacity at each end of its route as longer trains from further out.

Other notable constraints are:

- the flat junctions at either end of the West London Line with very limited locations suitable for holding freight trains;
- the single line sections of the Uckfield Line;
- certain stations do not have platforms on every track that passes through them; and
- passenger congestion at key stations such as Clapham Junction, Gatwick Airport, Balham, Victoria, London Bridge, Blackfriars, Farringdon, Kings Cross Thameslink and East Croydon.

Figure 9 represents the number of trains in the morning peak hour.

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

Route Section	Fast lines	Slow lines
Battersea Park – Victoria	16	14
Sydenham – London Bridge	15	7
South Croydon – East Croydon	17	16
Keymer Jn – Balcombe Tunnel Junction	12	N/A

## Current performance

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

Train performance on the Sussex route is currently slightly better than the national average. The reliability of Network Rail's assets has continued to improve. The improved condition of signalling infrastructure has produced particular benefits, with a significant and ongoing reduction in points failures, track circuit failures and other signalling faults, with many of these achieving all-time best performance in the last year.

The route is, however, highly sensitive to external events over which the rail industry has no direct control. Particular examples include:

- weather, particularly extremes of heat or cold, heavy rain and strong winds – these have accounted for around 20 percent of Network Rail caused delay in the last year;
- suicides are also one of the largest single causes of delay – the effects of these have accounted for around 10 percent of Network Rail caused delay in the last year;
- trespass and vandalism, mainly by youths, remains a problem;

- over-height road vehicles striking railway bridges remains a problem at certain locations;
- landslips resulting from the extremely dry summer coupled with a very wet winter caused significant delay and are a risk if this weather pattern continues; and
- tougher Fire Brigade regulations on the management of incidents involving acetylene bottles have resulted in significant delays this year.

The complexity of the Sussex route means that performance can be severely affected by incidents well after the time at which they have been cleared. A significant effort is required to recover on-time running for later services, partly due to the complexities of train crew and rolling stock diagrams and the large number of operators involved.

The splitting and joining of services at several locations on the route is a particular factor which can cause problems due to crew being displaced at time of disruption.

**Figure 10** Current PPM MAA (2006/07)

TOC	MAA	As at period
Southern	89.5%	11
Gatwick Express	90.9%	11
First Capital Connect	88.5%	11

## Future requirements

### Strategic direction

The South London RUS commenced in June 2006, and we will commence work on the Sussex RUS in early 2008. These will provide a detailed strategy for future development of the Sussex route.

The main strategic challenge to be answered by these RUSs is to cater for increasing passenger demand to London. The exact method of delivery will be determined by the RUS process.

A series of initiatives, with many significant impacts on the Sussex route, is envisaged over the next few years. These are highlighted below:

- timetable restructuring to optimise capacity and demand on main line services, by implementation of the Brighton Main Line RUS;
- timetable restructuring to optimise capacity and demand on London area suburban services. The South London RUS is currently investigating this option in detail, with a major recast being considered necessary to alleviate existing overcrowding and allow for future growth. Significant timetable changes are also required to allow the extension of East London Line (ELL) services to Crystal Palace and West Croydon;
- implementation of Key Output 1 of the Thameslink Programme. This will provide 12-car services on the Bedford to Brighton route;
- implementation of Key Output 2 of the Thameslink Programme. This will provide significant extra capacity and extensive new journey opportunities. It will also provide opportunities for an improved suburban service due to the removal of most main line services from London Bridge low level and removing the need for peak Brighton – Bedford services to run via Herne Hill and to cross between the fast and slow lines in the Croydon area; and
- potential implementation of a 10-car suburban network, subject to ongoing work by the South London RUS.

### Future demand

Passenger numbers are anticipated to continue to grow strongly throughout the route, with peak commuter travel into London expected to grow to quickly fill up any additional capacity that can be provided in the short term.

The BML RUS predicted a background growth rate (due to new employment and housing etc) of between 1% and 3% per year on main line services up to 2012, whilst ongoing work on the South London RUS is predicting a background growth rate on suburban services of between 1% and 2%.

However, recent growth has been significantly higher than these figures and experience has shown that when peak on-train capacity has been added it has very quickly filled up. This is believed to be due to there being a large element of suppressed demand at present, a factor which is potentially more significant than background growth in our plans over the next few years.

The planned major increases in capacity at Victoria underground station and on the Victoria Line are likely to encourage additional peak period demand on services into the main line station. At present, some journeys are made via alternative routes to avoid the underground.

The planned construction of several new high rise developments in the City of London, with the tallest at London Bridge station itself, is likely to lead to a significant increase in demand for services into London Bridge. A further contributing factor will be the continued growth of the Docklands area and development of the London Olympics site, both of which can be reached from London Bridge via the Jubilee Line.

The planned operation of ELL services from stations on the Sydenham line will open up new journey opportunities and demand from this line to northern parts of the City, plus interchanges to the Jubilee, District lines and DLR.

Charing Cross, located in the heart of the West End, is likely to remain the preferred final destination for a significant proportion of the suburban flows into London Bridge.

There is significant peak period interchange from suburban services onto the Northern Line at Balham, contributing to congestion both at the station and on the Northern Line itself. Many of those interchanging are believed to work in the City of London so it may be possible to reduce this feature by providing an increased level of peak services from the Norbury and Gipsy Hill routes direct to London Bridge.

It is likely that the development of improved through services from the West London Line to local stations south of Clapham Junction would lead to significant patronage. The large shopping centre under construction at Shepherds Bush is expected to be a significant off peak destination. The new station about to open at this site will also provide an interchange with the Central Line and the proposed West London Tram, leading to significant new journey opportunities.

The planned redevelopment of Battersea Power station is likely to generate significant off-peak demand.

Demand on the Uckfield Line is expected to continue to grow. This is likely to become constrained by on train capacity due to the availability of suitable diesel rolling stock.

Demand on the coastway lines is likely to continue to grow in line with employment and leisure growth at Brighton, Portsmouth and elsewhere. A further factor is the increasing traffic congestion on the A27 highway corridor and in town centres.

Freight demand on the West London Line is likely to grow modestly as aggregates, Channel Tunnel and other traffic develops.

### Future services

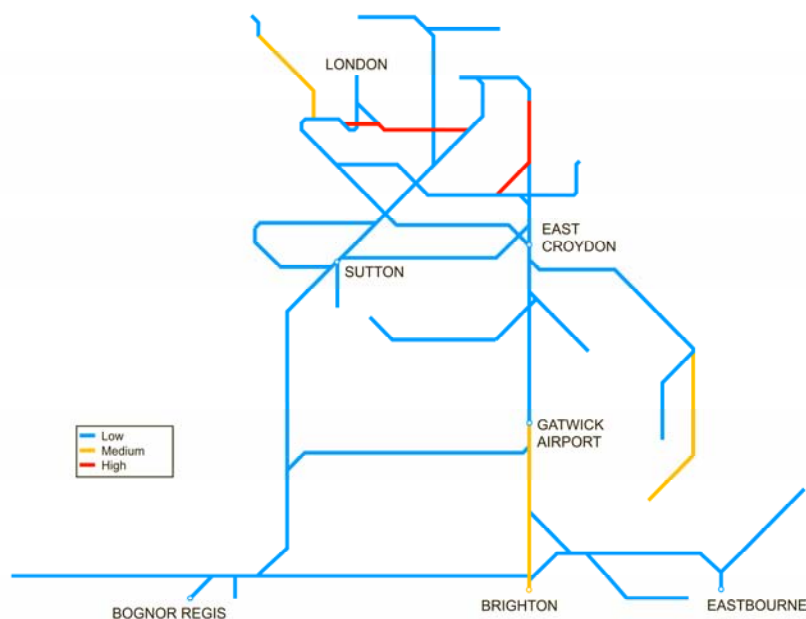
The following changes to service patterns are envisaged from operators to respond to growth:

- lengthening of certain short formation trains and a limited number of additional trains, using the final commissioning of Southern's new rolling stock from June 2007;
- introduction of a revised main line timetable by implementing the BML RUS in 2008;

- introduction of a revised suburban timetable by implementing the timetable change elements of the South London RUS in 2009. This will incorporate changes necessary to facilitate extension of East London Line services;
- implementation of Key Output 1 of the Thameslink Programme by 2011, allowing 12-car services (via Elephant and Castle in the peaks as at present);
- implementation of Key Output 2 of the Thameslink Programme around 2015, to create an expanded Thameslink network as per the TWA powers awarded in 2006;
- implementation of a half-hourly Gatwick Airport to Reading service, subject to the necessary track capacity being made available at Gatwick Airport and Redhill; and
- further extension of ELL services to Clapham Junction via Peckham Rye. This would increase journey opportunities and could potentially enable some additional services to operate on the busiest routes into London, as capacity would be released by diverting short formation trains away from London terminals.

Figure 11 indicates the forecast percentage change in tonnage to 2016.

Figure 11 Tonnage growth



### Future capability

Despite a major upgrade to the power supply in recent years some constraints remain and further work is potentially required.

Platform lengths for main line services are generally considered adequate, with the exception of the central section of the Thameslink route as described previously. The South London RUS is examining whether platform lengths for suburban services will need to be increased from 8-car to 10-car or more to cope with demand.

Linespeeds are generally considered adequate, as journey times are primarily dependent on stopping patterns rather than maximum speeds. However, a full review of linespeeds at certain junctions is underway and this could potentially lead to some limited opportunities to enhance current speeds.

The gauge and route availability is considered adequate for the limited freight traffic on the main Sussex route. The freight capability of the West London Line is considered adequate.

### Future capacity

The route is operating close to the maximum number of trains that can be run at present and several measures are envisaged as being necessary to accommodate the predicted growth:

- implementation of a revised main line timetable structure. The changes proposed by certain options in the BML RUS Implementation Consultation would ensure that all peak period trains operate at the maximum length that the infrastructure is capable of accommodating. This would therefore provide an overall increase in passenger capacity;
- an infrastructure enhancement scheme to increase the capacity and capability of the Gatwick Airport station area, one of the two main capacity pinchpoints on the route;
- an increase from 8-car to 10-car capability on the suburban network;
- an infrastructure enhancement scheme to increase the capacity, both for main line and suburban services, of the other main capacity pinch point in the Croydon area. Various options are currently under investigation by the South London RUS;
- implementation of the Thameslink Programme. This will provide 12-car trains on this route and a major increase in capacity in the London Bridge area. Removal of the interaction between main line and suburban trains would also significantly improve capacity for suburban services; and

- the track layout at Redhill is restrictive due to the limited number of platforms and the fact that reversals are required for certain service groups. It is likely that it will be appropriate to remodel the station and track layout at the time of major renewals.

The signalling headways in Sussex are generally considered adequate. Headways are rarely the limiting factor on the numbers of trains that can be run on this route, which is primarily governed by the occupancy of junctions and platforms.

Certain stations will require works to enable them to cope with the predicted growth in passenger numbers:

- London Bridge station is very congested. This is to be addressed by the London Bridge Masterplan which forms part of the Thameslink Programme;
- parts of Victoria station, notably the interface between main line and underground stations, are very congested. Options for increasing passenger capacity are under development by our Victoria Masterplan project and are being closely coordinated with London Underground's plans;
- Kings Cross Thameslink station is very congested. The replacement station at St Pancras Midland Road is on schedule for opening in December 2007;
- Blackfriars and Farringdon are also congested stations and capacity would be increased significantly by the Thameslink project;
- the subway at Clapham Junction is very congested. Options for addressing this by providing a new station entrance as part of the Access for All project are under development. We are also working with adjoining landowners to ensure that provision is made for the straightening of platforms 14-17 to improve stepping distances and facilitate lengthening;
- Battersea Park station is expected to become very congested when the Battersea Power station development opens. A major redevelopment of the station is currently planned;
- Balham station is currently congested with significant interchange movements to the Northern Line; and
- options for relieving congestion at East Croydon are being considered. This is likely to require a new station concourse at the northern end, with new station entrances to the east and west of the railway.

### Future performance

It is envisaged that performance levels for the main TOCs on the Sussex route will reach 90-92% PPM over the next two years.

Joint contingency plans for the route, drawing on experience gained in previous incidents, have been developed to assist in service recovery. These plans are under continual review.

The Sussex integrated control centre will open in 2007/08 and this is expected to deliver operational improvements in terms of train running and service recovery.

We are providing new staff facilities for train crew at Victoria station, close to the Southern Railway platforms, to assist with service recovery in times of disruption.

A project to install controlled track switches (feeding the power supply to the third rail) is being developed at key junctions across south London. This area is particularly problematic at present as incidents (suicides, trespassers etc) on one line regularly require the power supply to be shut off on lines that would otherwise be unaffected. Controlled track switches could be operated remotely from the Electrical Control Room, quickly enabling the unaffected line to be reopened. They would also assist with planned engineering access, reducing possession set up times.

The recently developed remote monitoring system for pre-empting points and track circuit failures by alerting nominated staff by text message when certain electronic characteristics change has been very successful and additional capabilities are to be added in future months.

Attention to detail will underpin performance improvement over the next year with a range of projects specifically addressing PPM, introduction of traffic management statements, identification of

risk sites for acetylene bottles, and improved data quality.

We are investigating and raising where possible long standing Permanent Speed Restrictions and four have been identified for removal by the end of 2007/08.

We will continue to work with highway authorities to reduce the impact of road traffic offences on our operations. In particular we will seek further measures to reduce the risk of bridge strikes and are investigating options for the closure of level crossings wherever possible. These initiatives would deliver both performance and safety benefits.

We are undertaking several initiatives designed to reduce the impact of severe weather. Particular examples include ongoing improvements to autumn preparedness, remote monitoring of points heaters, a review of extreme weather events and associated infrastructure failures that occurred in 2006/07 and improving our co-ordination with the Met Office to ensure weather forecasts reach our front-line staff.

There should be some performance benefits due to the reduction in conflicting train movements and crossing moves between fast and slow lines upon implementation of the BML RUS.

The Croydon area in particular, with its many flat junctions and limited platform availability, will become significantly busier when East London line trains commence running to West Croydon. The timetable currently under development will be subject to performance modelling analysis to confirm that a robust solution is found.

Figure 12 shows the forecast reduction in Network Rail delay minutes compared with 2006/07

Figure 13 shows the forecast PPM for the main TOCs running along the route.

**Figure 12** Forecast reduction in delay minutes

	2007/08	2008/09
% reduction in delay minutes	10%	16%

**Figure 13** Forecast PPM MAA

TOC	2007/08	2008/09
Southern	90.3%	90.8%
Gatwick Express	91.0%	92.0%
First Capital Connect	89.4%	89.8%

## Engineering access

Engineering access on the route is largely managed by a cyclical possessions regime, generally providing our engineers with access to every location on the route at least every 13 weeks.

Overnight maintenance opportunities are particularly short, primarily due to the very high passenger demand for trains leaving London late in the evening, rendering the unpopular option of bus substitution impractical in most cases. This results in midweek possessions generally lasting no more than 4 hours, severely limiting the types of activity that can be carried out on weekdays and significantly increasing overall maintenance costs.

Demand for weekend services is significantly lower than that on weekdays for most of the year. Major items of engineering work are therefore scheduled to be carried out on Sundays, or in some cases on Saturdays, affecting far fewer numbers of people. The main constraint to this is the high passenger demand for weekend coastal services (especially to Brighton) between mid May and mid September, during which time we seek to avoid disruptive engineering work. There is also high weekend demand into principal towns in the month prior to Christmas, and at times of other key events.

There are diversionary routeing opportunities that enable passengers to reach many of the main towns even if the main route is closed with, for example, multiple routes to London from Croydon, Sutton, Epsom and Horsham. There are also diversionary routes available to Brighton via either Horsham or Lewes, though both routes have significantly longer journey times than the main line and have limited capacity.

It is normally possible for two tracks to be kept open to traffic during most types of maintenance work on the four track sections of the Brighton Main Line. This enables an hourly overnight service to run between London Victoria and Three Bridges every night of the week. If adjacent lines are required these can be taken on a Saturday night for four hours whilst trains are single line worked over the remaining open line. If any longer periods are required this is generally planned around Christmas and Boxing days when a limited service would normally operate.

The route will be affected by some significant and challenging engineering projects over the next few years. Careful planning is underway for these schemes to minimise any adverse impact. Potential examples include implementation of the ELL project, the Thameslink Programme (especially works around London Bridge), together with the potential enhancement schemes at Gatwick Airport, Redhill, East Croydon and Clapham Junction.

There are also potentially a number of further S&C renewal schemes on the route. These are currently under investigation, though by their nature some of these will be extremely disruptive and will therefore be planned between Christmas and New Year when there are fewer commuters travelling.

## Opportunities and challenges

We anticipate that accommodating growth in commuting to central London will be a significant challenge on the route, with continued growth in central London employment expected. The context is that most of the route is already operating at, or very close to, capacity.

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

- implementation of the BML RUS;
- implementation of a revised suburban timetable and train lengthening on certain routes;
- implementation of the Thameslink Programme;
- encouraging a review of ticket pricing measures to spread the peak and smooth the high peak requirements;
- incremental capacity enhancement (which can be delivered as improvements to planned renewals); and
- limited stand alone capacity enhancements at critical locations.

It is notable that certain infrastructure constraints on this route do not lend themselves to a solution in the foreseeable future. These factors limit the route's ability to cope with future growth:

- there are several stations where additional platforms would be desirable, but there is insufficient land available to build them; and
- there are several flat junctions on the route, but there is insufficient space available for grade separation at most of the locations that would benefit from it.

## Delivering future requirements Summary

The main categories of infrastructure investment planned for the Brighton Main Line and Sussex route are as follows:

- major projects; notably the East London Line extension and Thameslink;
- remodelling of Gatwick Airport station and the track approaches;
- a comprehensive resignalling programme for the major signalling centres on the route (Victoria, London Bridge and Three Bridges);
- a programme of S&C renewals for a number of sites on the Sussex route. It is expected that an increasing volume of S&C will become life-expired from 2010 onwards and will require renewal, though it may be possible to incorporate some of this work into resignalling schemes;
- targeted incremental enhancements, with works tying into planned S&C renewals, resignalling schemes or property schemes wherever possible; and
- an ongoing renewals programme, though plain line track requirements will potentially start to reduce to reflect the mostly good condition of this asset type.

## Expenditure

Figure 14 shows the planned level of expenditure on renewals on this route over the next two 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 (2006/07 prices)	2007/08	2008/09
<b>Renewals</b>		
<b>Track</b>		
Plain line	11	20
Switches and crossings	1	–
Other	1	–
<b>Track total</b>	<b>13</b>	<b>20</b>
<b>Civils</b>		
Underbridges	3	9
Overbridges	0	1
Bridgeguard 3	1	1
Footbridges	0	1
Earthworks	4	3
Tunnels	0	0
Retaining walls	–	1
Major structures	0	2
Other	1	0
<b>Civils total</b>	<b>9</b>	<b>18</b>
<b>Signalling</b>		
Resignalling	6	6
Minor works/other	4	11
Over-planning	(2)	–
<b>Signalling total</b>	<b>18</b>	<b>17</b>
<b>Electrification</b>		
<b>DC systems</b>		
HV switchgear	5	11
HV cables	2	0
LV switchgear	0	0
Transformers/rectifiers	0	4
Grid supply points	0	0
Conductor rail	2	1
Other	1	1
<b>Electrification total</b>	<b>10</b>	<b>17</b>
<b>Telecoms</b>		
<b>Concentrators</b>		
Large	–	0
Telecoms: cables and cable routes	0	0
Other	0	0
<b>Telecoms total</b>	<b>0</b>	<b>0</b>

<b>Operational property</b>		
<b>Stations</b>		
Managed	1	0
Franchised	6	3
Lineside buildings	0	-
<b>Operational property total</b>	<b>7</b>	<b>4</b>
<b>Plant and machinery</b>		
<b>Fixed plant</b>		
Point heating	2	2
Signal supply points	0	0
Other	0	0
<b>Plant and machinery total</b>	<b>3</b>	<b>3</b>
<b>Total Renewals</b>	<b>60</b>	<b>79</b>
<b>Enhancements (funded by)</b>		
<b>Network Rail</b>		
<b>Planned</b>		
Other	1	0
<b>Total</b>	<b>1</b>	<b>0</b>
<b>Network Rail (RAB)</b>		
<b>Planned</b>		
St Pancras Box	76	2
Blackfriars	16	26
Electrification and plant	16	18
Permanent way 1	2	16
Farringdon	4	10
Signalling 1	2	9
London Bridge	0	8
Outer areas South	2	3
Telecommunications	2	1
Signalling 2	1	1
Permanent way 2	0	1
Other	2	5
<b>Total</b>	<b>123</b>	<b>99</b>
Potential schemes	1	4
<b>Total</b>	<b>124</b>	<b>103</b>

<b>Other third party</b>		
<b>Planned</b>		
West Croydon / Crystal Palace	4	28
NXG on Network Rail works	1	4
South Croydon turnback	0	2
NWG enabling work TPH	1	0
NXG enabling work Sigs	1	0
SDO Balise system	1	0
Other	2	2
<b>Total</b>	<b>10</b>	<b>37</b>
Potential schemes	0	1
<b>Total</b>	<b>10</b>	<b>38</b>
<b>Total Enhancements</b>	<b>135</b>	<b>141</b>

**Figure 15** Forecast volumes

	2007/08	2008/09
<b>Track</b>		
Plain line (km)		
Rail	18	26
Sleepers	17	26
Ballast	18	26
<b>Total</b>	<b>53</b>	<b>78</b>
<b>Switches &amp; crossings (no.)</b>		
Complete renewal	3	–
Abandonment	2	–
S&C (equivalent units)	4	–
<b>Other (km)</b>		
Drainage	3	–
<b>Civils</b>		
Underbridges (m <sup>2</sup> )	858	3,761
Overbridges (m <sup>2</sup> )	–	505
Bridgeguard 3 (m <sup>2</sup> )	412	182
Footbridges (m <sup>2</sup> decking area)	–	230
Earthworks (m <sup>2</sup> slope surface)	25,180	28,285
Retaining walls (m <sup>2</sup> )	–	660
Major structures (m <sup>2</sup> )	–	2,870
<b>Signalling</b>		
Resignalling (SEUs)	–	53
<b>Electrification</b>		
DC systems		
HV switchgear (cb)	40	44
HV cables (km)	8	7
LV switchgear (cb)	4	5
Transformers/rectifiers (no.)	1	13
Grid supply points (no.)	–	1
Conductor rail (km)	13	7

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 two years.

**Figure 16** Forecast expenditure

£m (2006/07 prices)	2007/08	2008/09
Maintenance	51	47

## Infrastructure investment

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

Figure 17 Planned infrastructure investment						
Project	Project Description	Output change	Main asset type(s)	Funding	GRIP stage	Completion year
A Shepherds Bush station	New station	New journey opportunities to White City shopping centre, interchange to Central Line and proposed West London Tram.	Station	Developer	6	2007/08
B Streatham Common new entrance	New station entrance to provide access onto footbridge.	Reduced walking times to station for many passengers.	Station	Local authority / Network Rail Discretionary Fund	6	2007/08
C St Pancras Midland Road/Thameslink station	Completion of the partially constructed station box	Improved station facilities. Congestion relief arising from closing Kings Cross Thameslink station. Improved interchange with underground, main line and CTRL services.	Station, signals	DfT	6	2007/08
D Beddingham level crossing closure	Replacement of A27 Beddingham level crossing with a bridge	Safety benefits. Operational cost savings. Removal of PSR across crossing.	Signals	DfT	6	2008/09
I M25 bridges (Quarry & Redhill lines)	Full blast and repaint	Renewal.	Structures	Network Rail	6	2007/08
Driver only operation CCTV renewals	Like for like CCTV renewals at various sites	Compliance to optical group standards.	Telecoms	Network Rail	6	2008/09
O London Bridge Customer Information System (CIS)	Upgrade to CIS system	Improved passenger information.	Telecoms	Network Rail	6	2007/08

Figure 17 Planned infrastructure investment

Project	Project Description	Output change	Main asset type(s)	Funding	GRIP stage	Completion year
E Barnham resignalling / Bognor Regis life extension	Revised track and station layout at Barnham to comply with modern standards. Requires platform extensions, construction of a new bridge and track layout changes.	Renewal. Provides additional capability through a new up direction overtaking move.	Signals, track, structures, station	Network Rail	5	2009/10
F Balham up fast PSR increase	Increase from 45 to 60mph short section south of Balham up fast	Improved performance recovery.	Signal sighting	Network Rail	5	2007/08
G Morden South PSR increase	Increase from 20 to 40mph short section north of Morden South	Assists station dwell time issues on Wimbledon loop.	Track, structures	Network Rail	5	2007/08
E Chichester HV supply	Power supply work.	Increased asset capability.	Electrification	Network Rail	5	2008/09
H Hassocks earthworks	Drainage works and cess stabilisation	Renewal	Structures	Network Rail	5	2007/08
J South Bermondsey earthworks	Embankment stabilisation and new retaining wall.	Renewal	Structures	Network Rail	5	2007/08
K Scout Hut (Oxted) earthworks	Embankment stabilisation	Renewal. RA10 traffic.	Structures	Network Rail	5	2007/08
L Edenbridge Road bridge (Uckfield Line)	New underbridge deck	Improved asset condition. Removal of differential speed restriction. RA10 traffic.	Structures	Network Rail	5	2007/08
M Balcombe Tunnel shaft drainage	Diversion of water inflow to track drainage	Improved asset condition and performance	Structures	Network Rail	5	2007/08
Enhanced selective door opening (SDO)	Track-based equipment to optimise SDO operation where platform lengths at a station are different.	Removes unnecessarily restrictive SDO door opening arrangements.	Signals	Southern Railway	5	2007/08

Figure 17 Planned infrastructure investment

Project	Project Description	Output change	Main asset type(s)	Funding	GRIP stage	Completion year
N Battersea Park station redevelopment	Station upgrade to cater for Power station development	Increased capacity and DDA access.	Station	Developer	4	2009/10
O London Bridge "Shard of Glass"	Construction of landmark new high rise tower adjacent to London Bridge station.	Interface with London Bridge station currently under consideration.	Station	Developer	4	starts 2007/08
Sussex Route Integrated control centre	Real time control centre combining Network Rail and TOC management.	Improved performance.	Operations	Network Rail	4	2007/08
National DDA programme (tranche 1)	Installation of ramps and lifts at various stations.	Step free access (phase 1 stations Balham, Streatham Hill, Norwood Junction, Denmark Hill, New Cross Gate, Herne Hill, Oxted, Purley, Three Bridges & Clapham Junction*) *scheme described below	Station	DfT Access for All Fund	4	2009/10
T Clapham Junction DDA provision and open up St Johns Hill entrance	Installation of lifts on footbridge. Opening of St Johns Hill entrance to provide DDA access to street. Installation of additional staircases to platforms 11/12 and 15/16.	DDA access. Congestion relief. Synergy with long term strategy of making the overbridge the main access into the station.	Station	DfT Access for All Fund	3	2008/09
P ELL Phase 1 works – New Cross Gate	New flyover.	Allows extension of ELL services to West Croydon and Crystal Palace. Passive provision for future 10-car.	All asset types	TfL (ELL project)	3	2009/10
Q ELL Phase 1 works – Crystal Palace	New central and bay platforms.	Allows extension of ELL services to Crystal Palace. Passive provision for future 10-car except in ELL bay.	All asset types	TfL (ELL project)	3	2009/10

Figure 17 Planned infrastructure investment

Project	Project Description	Output change	Main asset type(s)	Funding	GRIP stage	Completion year
R ELL Phase 1 works – West Croydon	New 10-car centre turnback siding country side of station. Renewal of existing crossover.	Allows extension of ELL services to West Croydon. Passive provision for future 10-car.	All asset types	TfL (ELL project)	3	2009/10
S ELL Phase 1 works – South Croydon	New 40mph facing crossover to north of station to allow trains to reverse in platform 4.	Allows relocation of West London Line services to Croydon via the slow lines.	All asset types	TfL (ELL project)	3	2009/10
T Clapham Junction station electrical renewals	Replacement of substation supplying station power, upgrade to lighting.	Improved asset capability and performance	Station power	Network Rail	3	2007/08
V East Sussex Coast Resignalling	Life extension of signalling equipment (Hampden Park area)	Renewal. Relocation of certain signals to improve sighting. Possible closure of Hampden Park signal box.	Signals	Network Rail	2	2008/09
W Arun Valley signal renewals	Life extension of signalling equipment. Closure of Amberley signal box.	Renewal. Allows emergency diversions off Brighton Main Line, avoiding need to rapidly open Amberley.	Signals	Network Rail	2	2008/09
X Sutton transformer renewal	Renewal of power supply equipment	Renewal	Power supply	Network Rail	2	2007/08
P New Cross Grid feeder renewals	Upgrade to Network Rail power supply feed from electricity company networks.	Potential to increase capacity at a key power supply constraint.	Power supply	Network Rail	2	2007/08
Y Purley transformer renewal	Renewal of power supply equipment	Renewal	Power supply	Network Rail	1	2007/08
Z Farringdon contactors renewal	Renewal of power supply equipment	Renewal	Power supply	Network Rail	1	2008/09
U Leatherhead Grid renewals	Renewal of power supply equipment	Renewal	Power supply	Network Rail	1	2007/08

Figure 17 Planned infrastructure investment

Project	Project Description	Output change	Main asset type(s)	Funding	GRIP stage	Completion year
AA Newhaven Resignalling	Signal renewal scheme with closure of Newhaven Town signal box. Further simplification of the area could potentially follow as a later scheme.	Renewal. Maintenance and operations cost savings.	Track, signals, station	Network Rail	1	2009/10
AB Three Bridges S&C renewal	Like for like S&C renewal (fast lines)	Renewal	Track	Network Rail	1	2007/08
AC Stoats Nest S&C renewal	Like for like S&C heavy maintenance.	Renewal	Track	Network Rail	1	2007/08
AD Selhurst S&C renewal	Like for like S&C renewal	Renewal	Track	Network Rail	1	2009/10
AE Norwood Junction S&C renewal	Like for like S&C renewal	Renewal	Track	Network Rail	1	2009/10
National DDA programme (tranche 2)	Installation of ramps and lifts at various stations.	Step free access (phase 2 stations Dorking, Forest Hill, Streatham Common, Thornton Heath).	Station	DfT Access for All Fund	1	Ongoing
AF Bexhill signal renewals	Life extension of signalling equipment. Potential closure of Bexhill signal box.	Renewal. Reduced operating costs	Signals	Network Rail	1	2010+
AZ Kingsfold	Embankment stabilisation	Renewal	Structures	Network Rail	1	2008/09
AG Cookspond viaduct (near East Grinstead)	Bridge refurbishment and potential strengthening.	Renewal. Potentially allows RA10 traffic.	Structures	Network Rail	1	2008/09
AH Black Rabbit bridge (Arun Valley line)	Bridge reconstruction.	Renewal. RA10 traffic.	Structures	Network Rail	1	2009/10

**Figure 17** Planned infrastructure investment

Project	Project Description	Output change	Main asset type(s)	Funding	GRIP stage	Completion year
AH Peppering bridge (Arun Valley line)	Bridge reconstruction.	Renewal. RA10 traffic.	Structures	Network Rail	1	2009/10
J Surrey Canal bridge	Bridge reconstruction.	Renewal. RA10 traffic.	Structures	Network Rail	1	2008/09
AA Glynde Reach bridge	Bridge refurbishment or reconstruction.	Renewal. Potentially allows RA10 traffic.	Structures	Network Rail	1	2011/12
AI Thurlow Park Road bridge (Tulse Hill)	Refurbishment or reconstruction with direct fastening of track.	Renewal. Potentially allows RA10 traffic.	Structures	Network Rail	1	2009/10

Figure 18 highlights other schemes under consideration.

Figure 18 Infrastructure investment under consideration					
Project	Project description	Output change	Main asset type(s)	Funding	GRIP stage
Z Thameslink programme (Key Output 0)	Closure of the Moorgate branch. Services terminating Blackfriars and Moorgate are linked together.	Enables work to commence on Thameslink project.	All asset types	Under consideration by DfT (HLOS)	
Z Thameslink programme (Key Output 1)	12-car Brighton to Bedford via Herne Hill. Remodelling of Farrington and Blackfriars.	Increase from 8-car to 12-car trains across London.	All asset types	Under consideration by DfT (HLOS)	
O Thameslink programme (Key Output 2)	Remodelling of London Bridge and approaches. Includes London Bridge resignalling.	Elimination of major bottleneck at London Bridge. Improved capacity and performance across a wide area. Enables running of 12-car trains on an expanded Thameslink network.	All asset types	Under consideration by DfT (HLOS)	
AI Thameslink programme (Herne Hill tumbuck)	New crossover to enable services to reverse in long siding and platform 4 at Herne Hill.	Enables services from north of London to reverse. Assists construction strategy for Thameslink project. Reduces risk of importing delay to Southern and Southeastern networks.	Track, signals	Under consideration by DfT (HLOS)	
Thameslink programme (Outer area works)	Mainly comprises platform extensions and power supply works.	Enables 12-car Thameslink services	Stations and power supply.	Under consideration by DfT (HLOS)	
AN T East London Line extension (phase 2)	New connection between ELL and South London Line. Surrey Canal Road station.	Allows extension of East London Line services to Clapham Junction.	All asset types	Awaiting TfL funding	
T Clapham Junction passenger capacity / remodelling	Congestion relief scheme, potentially in connection with commercial development of adjacent site. Potential new upper level concourse, 12-car platforms, straightening of platforms 14-17.	Longer trains through 12-car platforms. Congestion relief in subway. Reduced stepping distances, wider and longer platforms as a result of track straightening.	Station, track, signals, structure	Under consideration by DfT and TfL. Under discussion with outside party developer.	

**Figure 18** Infrastructure investment under consideration

Project	Project description	Output change	Main asset type(s)	Funding	GRIP stage
T Clapham Junction platform 1 and Kensington sidings	Reopen platform 1 and Kensington sidings.	Provides capacity for additional WLL services and ELL phase 2, plus additional berthing.	All asset types	Under consideration	
AK Gatwick station passenger capacity	New concourse with additional lifts and escalators to all platforms. Requires widening of platforms 5/6. Potential for additional platforms.	Congestion relief and improved step free access to platforms.	All asset types	Under development	1
AK Gatwick signal renewals / remodelling	Interlocking renewal scheme with opportunities for track layout changes	Under development.	All asset types.	Under development	1
AL East Croydon passenger capacity	Various options for providing an additional upper level concourse to the north of the existing one. New station entrances to east and west of railway.	Congestion relief. Reduced walking times to station for many passengers. Improved station environment.	Station	Under discussion with adjacent developers and London Borough of Croydon	
AM Imperial Wharf station	New station.	New journey opportunities. Rapidly developing area is poorly served by public transport.	Station	Developer (part)	4
AN Crofton Road Junction speed review	Removal of approach control on the signal protecting the junction.	Increase speed of crossing move from Down Atlantic to Down Catford Loop line.	Signals	Potential Network Rail Discretionary Fund	
AO West London Line AC/DC changeover point	Allow passenger trains to changeover on the move.	Reduced journey times	Electrification	Potential Network Rail Discretionary Fund	
AO North Pole depot tumbback	New reversing facilities near current depot.	Ability to turn back WLL trains to/from the south when Eurostar relocates to Stratford.	Track, signals	Under development	
Z Snow Hill development	Outside party development (subject to planning) above railway. Replace existing Snowhill Tunnel.	Improved asset condition.	Structures	Awaiting planning approval	4

Figure 18 Infrastructure investment under consideration

Project	Project description	Output change	Main asset type(s)	Funding	GRIP stage
AP Streatham S&C renewal / track layout changes	S&C renewal.	Improved asset condition and performance. Possibility of higher speed crossing moves by installing flashing yellow signals. Possible drivers' walkway to assist in trains reversing.	Track	Potential Network Rail Discretionary Fund	1
F Balham S&C renewal / track layout changes	S&C renewal	Renewal. Possibility of higher speed crossing moves by installing flashing yellow signals.	Track	Potential Network Rail Discretionary Fund	1
AQ West Norwood Junction S&C renewal / track layout changes	S&C renewal	Renewal. Possibility of higher speed crossing moves by installing flashing yellow signals.	Track	Potential Network Rail Discretionary Fund	1
AR Epsom S&C renewal / track layout changes	S&C renewals. Need to incorporate platform extensions and consider options for reducing conflicting moves between Southern and SWT services	Renewal.	Track, signals	Potential Network Rail Discretionary Fund	
X Sutton S&C renewal / track layout changes	S&C renewals. Track layout changes under investigation	Potentially enables use of platform 3 for terminating services from Wallington line.	Track, signals	Potential Network Rail Discretionary Fund	
X Sutton drivers walkway	Short staff walkway past crossover at Carshalton end of station.	Enables 8-car FCC trains to reverse from Wimbledon direction.	Structure	Potential Network Rail Discretionary Fund	1
AG East Grinstead signalling improvements	Install additional signal on up line to reduce headways.	Improved performance.	Signals	Potential Network Rail Discretionary Fund	
AT Brighton Carriage Road upgrade	Upgrade Brighton Carriage Road to a signalled running line	Improved performance and engineering access.	Signals	Potential Network Rail Discretionary Fund	
AU Second unrestricted freight route to the Channel Tunnel	Signalling and power supply works to allow electric freight services to run via Redhill. Alternative option to gauge clearance of Sevenoaks route.	Allows W9 route for electric trains via Redhill when Maidstone East is blocked	Signals, electrification	Potential Network Rail Discretionary Fund (for study)	

**Figure 18** Infrastructure investment under consideration

Project	Project description	Output change	Main asset type(s)	Funding	GRIP stage
<p><b>AJ</b> Croydon Tramlink</p> <p><b>Q</b> Crystal Palace extension</p>	Extends Tramlink from existing Harrington Road tram stop to Crystal Palace. Potentially involves closure of the heavy rail route between Bromley Junction and Beckenham Junction	New journey opportunities between Croydon town centre and Crystal Palace area. Closure of heavy rail branch requires alternative turnback facilities elsewhere (see below)	All asset types	Awaiting TfL funding	2
<b>AE</b> Diversion of Beckenham Junction services to Norwood Junction	Linked to the scheme above. Bidirectional signalling and remodelling of Bromley Junction. Reopen platform 7 at Norwood Junction.	Allows diversion of Beckenham Junction services to Norwood Junction, without impinging on capacity in the Croydon area	Track, signals	Under consideration	
<b>Q</b> Crystal Palace turnback	New turnback siding south of Crystal Palace	Allows a Victoria to Crystal Palace service, without impinging on capacity in the Croydon area.	Track, signals	Under consideration	
<b>AD</b> Selhurst turnback	Potential track or signalling changes at Selhurst	Allows a Victoria to Selhurst service, without impinging on capacity in the Croydon area.	Track, signals	Under consideration	
<b>AX</b> Eastfields station	Potential pilot site for New Station Concept 2030.	New journey opportunities. Would improve accessibility of Mitcham Town centre.	Station	Potential Network Rail Discretionary Fund	5
<b>AW</b> Holmbush new station	New station	New journey opportunities adjacent to potential major residential development. Need to review in conjunction with Ifield and Faygate.	Station	Under consideration by developer	
<b>AS</b> Relocation of Loughborough Junction station to Camberwell Green	New station at Camberwell Green. Closure of existing station at Loughborough Junction.	New journey opportunities. Area is poorly served by public transport. Alternative journey options (e.g. Brixton tube) considered to exist at Loughborough Junction.	Station, track, signals	Under consideration by London Borough of Southwark	
<b>AY</b> Victoria Masterplan	Redevelopment of Victoria station	Congestion relief.	Station	Under development	
<b>R</b> West Croydon interchange	Various options available to provide new concourse and/or additional station entrance. Possible track layout changes.	Improved interchange between rail, bus, tram and ELL phase 1. Step free access. Potential for track and platform layout changes to increase capacity. Improved station environment.	Station, track, signals	Under consideration	

Figure 18 Infrastructure investment under consideration

Project	Project description	Output change	Main asset type(s)	Funding	GRIP stage
AE Goat House bridge (north of Norwood Junction)	Strengthening and refurbishment of over-line bridge	Improved asset condition (strengthened structure meeting current requirements).	Structures	Network Rail / TfL	
AV Woodcote Grove bridge (near Smitham)	Overbridge reconstruction	Improved asset condition. Discussions ongoing regarding highway width.	Structures	Local authority	3
EA Pouparts Bridge (north of Clapham Junction)	Potential replacement with a ballasted bridge deck.	Improved asset condition. Reduced maintenance requirements. Potential for RA10.	Structures	Network Rail	1
EA Four Span Bridge (Intersection bridge over Ludgate and Kensington lines north of Clapham Jn)	Bridge strengthening or renewal (the structure carries the down fast, up slow and down slow lines).	Improved asset condition. Reduced maintenance requirements. Potential for RA10.	Structures	Network Rail	1
AC Brighton Road Coulsdon – No 1 Bridge	Direct track fastening scheme	Improved asset condition.	Structures	Network Rail	1
AC Brighton Road Coulsdon – No 2 Bridge	Direct track fastening scheme	Improved asset condition.	Structures	Network Rail	1
AM Chelsea River Bridge maintenance	Heavy maintenance on bridge. Potential strengthening works.	Improved asset condition	Structures	Network Rail	1
EF Hendsals bridge (Uckfield Line)	Potential replacement with a ballasted bridge deck.	Improved asset condition. Reduced maintenance requirements. Potential for RA10.	Structures	Network Rail	1
EB Station Road overbridge, Lewes	Bridge reconstruction	Improved asset condition.	Structures	Network Rail / local authority	1
AH Timberley viaduct (Arun Valley line)	Bridge strengthening.	Improved asset condition. Potentially allows PSR to be removed and RA10 traffic.	Structures	Network Rail	1

**Figure 18** Infrastructure investment under consideration

Project	Project description	Output change	Main asset type(s)	Funding	GRIP stage
I Redhill station redevelopment	Commercial property development	Improved station facilities and car parking. Passive provision for future remodelling.	Station	Third party developer	3
I Redhill remodelling	Track and/or signal renewal scheme with opportunities for track layout changes and additional platforms.	Improved asset condition and performance. Options for additional platform capacity, improved maintenance and speed improvements	Track, signals, station	Under consideration by DfT (HLOS).	
AB Gatwick to Balcombe 100mph on fast lines	Allow all rolling stock types to run at 100mph (only class 319 can now).	Improved performance recovery.	All disciplines	Under consideration	
Controlled track switches Sussex Inner	Replace manual third rail switches with remotely controlled switches at various locations (Windmill Bridge, Leigham, West Norwood, Selhurst, Streatham & Streatham Common junctions)	Improves the efficiency of taking and giving up traction power supply isolations. Also enables the unaffected route at junctions to be kept open when an isolation is required in an emergency.	Electrification	Network Rail	1
AK BML RUS implementation works	Possibly required to enable implementation of BML RUS.	To be defined.	To be defined.	Awaiting DfT	
10-car suburban network (10x20m)	Track layout, structures, platforms, power supply and signalling work to enable 10-car operations on suburban services from London Victoria and London Bridge.	Provides 25% passenger capacity increase compared to existing 8-car network.	All asset types	Under consideration by DfT (HLOS)	
AG 12-car operations on East Grinstead line	Power supply, platform extensions and minor signalling works.	Removes the need for splitting and joining at Oxted which will otherwise be necessary when the Thameslink programme is complete.	Electrification	Under consideration by DfT (HLOS)	
BF Uckfield line upgrade	Various options including platform extensions, double tracking, linespeed increases and electrification	Implementation of more frequent services on this route. Potential for extension to Lewes and beyond.	All asset types	Under consideration	
Regenerative braking	Works to enable braking energy to feed back into power supply system.	Reduced operational costs and environmental benefits.	Electrification	Under consideration	

Figure 18 Infrastructure investment under consideration

Project	Project description	Output change	Main asset type(s)	Funding	GRIP stage
BA	Stewarts Lane depot	Potential land use changes	Potential development, consistent with the need to retain the depot for railway operational use.	Depot	Under consideration
AO	North Pole depot – future use	Identification of long term use of North Pole depot	DfT have indicated that North Pole is required for FOCs due to Crossrail using Old Oak Common.	Depot	Crossrail project
AH	Billingshurst Up platform extension	Platform extension to allow 8-car services to call without SDO.	Removes trains fouling the level crossing whilst calling at station.	Platforms	Under consideration
AL	Resolution of East Croydon platform 4&5 signal overlap issues	Overcome inability to run up out of platform 5 at the same time as up into platform 4. Possible platform extensions required.	Increased capacity and performance.	Signals	Under consideration
T	Falcon Junction – removal of approach control	Removal of approach control	Reduction in the time taken for the conflicting move	Signals	Potential Network Rail Discretionary Fund
BC	Haywards Heath commercial development	Potential commercial development	Potential new station buildings and increased car park capacity	Station	Third party
AB	Three Bridges commercial development	Potential commercial development	New station entrance and car park capacity	Station	Third party
H	Burgess Hill commercial development	Potential commercial development	Potential increased car park capacity	Station	Third party
H	Hassocks commercial development	Potential commercial development	Potential improved station environment and increased car park capacity	Station	Third party
X	Sutton commercial development	Potential commercial development	Improved station environment	Station	Third party

**Figure 18** Infrastructure investment under consideration

Project	Project description	Output change	Main asset type(s)	Funding	GRIP stage
AR Epsom commercial development	Potential commercial development	Improved station environment	Station	Third party	
BD Crawley commercial development	Potential commercial development	Improved station environment	Station	Third party	
BE Eastbourne commercial development	Potential commercial development	Improved station environment	Station	Third party	
BG Worthing commercial development	Potential commercial development	Improved station environment	Station	Third party	
BH Ford commercial development	Potential commercial development	Potential for station relocation, platform extensions and remove of level crossing.	Station	Third party	
BI Forest Hill commercial development	Potential commercial development	Improved station environment	Station	Third party	
Car park expansion	Car park expansion at various stations: Pulborough, Three Bridges, Upper Warlingham, Haywards Heath, Hove, Kingswood, Lewes, Hassocks, Redhill, Uckfield.	Increased car park capacity.	Station	Various	
Level crossing closures	Various sites under consideration	Improved safety. Reduced operating costs.	Signals	Under consideration	

The following potential enhancement schemes were listed in the 2006 Route Plan. Further work has shown that these are unlikely to be viable without major signalling works: (1) Three Bridges ASC computer aided route setting, (2) Swinging Overlap faults prevention.

## Non-Infrastructure developments

Figure 19 highlights 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	Description
West Coastway	Semi fast services west of Brighton.	Discussions ongoing between Network Rail, Southern and SWT.	Aspiration to maintain journey times and capacity when SWT services are withdrawn from Brighton as per DfT franchise.	from December 2007	West Coastway
BML RUS – main line	Existing overcrowding levels.	Final options under development	Improved capacity and performance. Shorter journey times to south coast	from December 2008	BML RUS – main line
Joint suburban / East London line timetable	Existing overcrowding levels. Additional trains to the Croydon area.	Final options under development	Improved capacity and performance. Facilitates ELL project	from December 2009	Joint suburban / East London line timetable
Thameslink Key Output 0	Thameslink construction period.	Final options under development	Enables services displaced from Moorgate branch to have an alternative destination south of the Thames	from December 2008	Thameslink Key Output 0

Figure 20 Other projects				
Description	Key issues	Actions or options being developed	Benefits	Start date
Smartcard introduction	Revenue protection and flexible ticketing	Under discussion between TfL & affected operators	Simplified ticket purchases.	Under consideration

## Appendix

**Figure 21** Strategic route section

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference and RA is Route Availability												
SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway	No of Tracks
02.01	Victoria – Windmill Bridge Jn	VTB1	Primary	DfT	No	W6/W9	RA8	45-60	Third rail	TCB	2 – 3 mins	4
02.02	Windmill Bridge Jn – Brighton	VTB2,3	Primary	DfT	No	W7/8/9	RA8	70-90	Third rail	TCB	2 – 4	2 and 4
02.03	London Bridge – Windmill Bridge Jn	LBW	London & SE	DfT	No	W6	RA8	60-70	Third rail	TCB	2 – 3	4
02.04	Three Bridges – Littlehampton Jn (Arun Valley Line)	TBH1	London & SE	DfT	No	W6	RA8	65-85	Third rail	Various	3 – 12	2
02.05	South Coastal Line (West Coastway)	BLI, PPH, BBR, TBH2	London & SE	DfT	No	W7	RA8	60-80	Third rail	TCB	3 – 4	2
02.06	Eastbourne Line (East Coastway)	KJE,BTL, STS, WJB	London & SE	DfT	No	W6	RA8	55-90	Third rail	Various	3 – 7.5	Mostly 2
02.07	Southern Inner Suburban	BTH1,HHT, LTH,BBJ, WTH,SCP, SSC,WCS, NFE,BJN, SNS	London & SE	DfT	No	W6	RA8	30-50	Third rail	TCB	2 – 3.5	Mostly 2
02.08	Southern Suburban Sutton Lines	SMS,NFE, BTH2,3	London & SE	DfT	No	W6	RA8	40-60	Third rail	TCB	3 – 7.5	Mostly 2
02.09	Dorking – Horsham	BTH3	Rural	DfT	No	W6	RA8	75	Third rail	mixed	3 – 9	2

Figure 21 Strategic route section

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

SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway	No of Tracks
02.10	Hurst Green Junction – Uckfield	SCU	London & SE	DfT	No	W6	RA6	70	None	TCB	12	1 and 2
02.11	Tottenham Corner and Caterham Lines	PAT,TAT	London & SE	DfT	No	W6	RA8	20-60	Third rail	TCB	4 – 8	2
02.12	East Grinstead Line	SCU,HGG	London & SE	DfT	No	W6	RA6	60-70	Third rail	TCB	3.5 – 8	2
02.13	West London Line	WLL,CJL, SCC,FLL, CKL,BSF	London & SE	DfT	No	W9	RA8	40-60	Third rail/overhead line	TCB	3 – 4	2
02.14	South London Line	ATL	London & SE	DfT	No	W9	RA8	45	Third rail	TCB	2.5 – 3	2
02.15	Thameslink Routes	HHH,FTL, MCL	London & SE	DfT	No	<W6	RA4	25-60	Third rail/overhead line	TCB	2 – 3	Mostly 2

**Capacity and operational constraints**

- A** Gatwick Airport: track layout is not optimised for terminating services, pedestrian capacity issues in station.
- B** East Croydon area: track and platform capacity at limit, pedestrian capacity issues in station.
- C** Clapham Junction: pedestrian capacity issues in station.
- D** Suburban area: 8-car platforms prevent train lengthening.
- E** Spa Road/Blue Anchor: flat crossing for FCC services between Sussex and Kent routes restricts capacity
- F** Redhill: limited number of platforms and the need for services to reverse restricts capacity
- G** Heme Hill: flat crossing between Sussex and Kent routes restricts capacity
- H** Balcombe Tunnel Junction to Brighton: mainly two track railway with differing stopping patterns restricts capacity

## Note

This Route Plan forms part of the business plan suite of documents which is produced annually and in accordance with our network licence condition 7. Our plans and the way in which we intend to achieve those plans are summarised in the Business Plan itself. This document provides further detail on the specific plans for this Strategic Route including the expenditure over the next two years to the end of Control Period 3.

This year our business plan focuses on the remainder of Control Period 3 (to March 2009). We shall provide a submission to the Office of Rail Regulation in October 2007, which will set out our view of the expenditure and activities that will be required in Control Period 4 (2009/10 to 2013/14).

The Route Plan shows in more detail how the strategies set out in the Business Plan will be delivered at a route level across the network, and how we are working with our customers and other stakeholders to improve the

performance and utilisation of the network. It presents a portfolio of activities to develop the network.

The expenditure section contains tables showing the planned level of expenditure and volumes on renewals on the route over the next two years, split by asset category. Expenditure figures are shown in 2006/07 prices, and are rounded to the nearest £1 million. An entry of £0 indicates spend of less than £0.5 million. 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.

Please note that figures in tables may not sum to the totals shown, because of rounding.

The other documents in the business plan suite can be found on the Network Rail website [www.networkrail.co.uk](http://www.networkrail.co.uk)



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