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Route 1 Kent



Section 1: Today's railway

Route context

The Kent route is a complex network of interconnected lines linking central London with its south eastern suburbs, with the Kent coast, parts of East Sussex and with the Channel Tunnel.

Services from the route run to London Victoria, Charing Cross, Cannon Street and, as a result of the March 2009 timetable change, through central London Thameslink stations to St Pancras and beyond. Multiple central London stations are therefore served from the route, enabling direct journeys from many areas to both the West End and the City of London. In addition travel to areas such as Docklands is now becoming increasingly important.

An immediate consideration is that the route also includes connections to High Speed One, which is to be used by the fast domestic services to St Pancras from December 2009. This will result in major reductions in journey times and should assist in the regeneration of deprived areas. There will also be a number of improvements to other services, the most significant being that fast trains between Charing Cross and Tunbridge Wells will run every fifteen minutes at off-peak times.

Construction work has now commenced on the Thameslink Programme. When finished, this will provide significantly improved infrastructure in the central London area. However, prior to completion major construction works will be required in the London Bridge area which will reduce the available capacity for an extended

period, commencing in 2012 shortly after the Paralympic Games.

There is significant overcrowding on services in the London area in the morning and evening peak periods. Tackling this overcrowding, which is forecast to worsen if no action were taken, will be a major challenge in Control Period 4 (CP4). This will be tackled through a programme of train lengthening to provide additional capacity. When complete this will enable the relevant capacity metrics in the DfT's High Level Output Specification (HLOS) to be met.

The principle infrastructure work required is platform lengthening to allow the strengthening of peak suburban services to Charing Cross/ Cannon Street from 10-car to 12-car. The South London RUS recommended that this work should be completed prior to any reductions in capacity at London Bridge due to the Thameslink construction works.

A Draft for Consultation of the Kent RUS will be published in Spring 2009. This will provide an indication of the longer term strategy for the future development of main line services using the Kent route. The RUS will include, where necessary, consideration of domestic services using the High Speed Line.

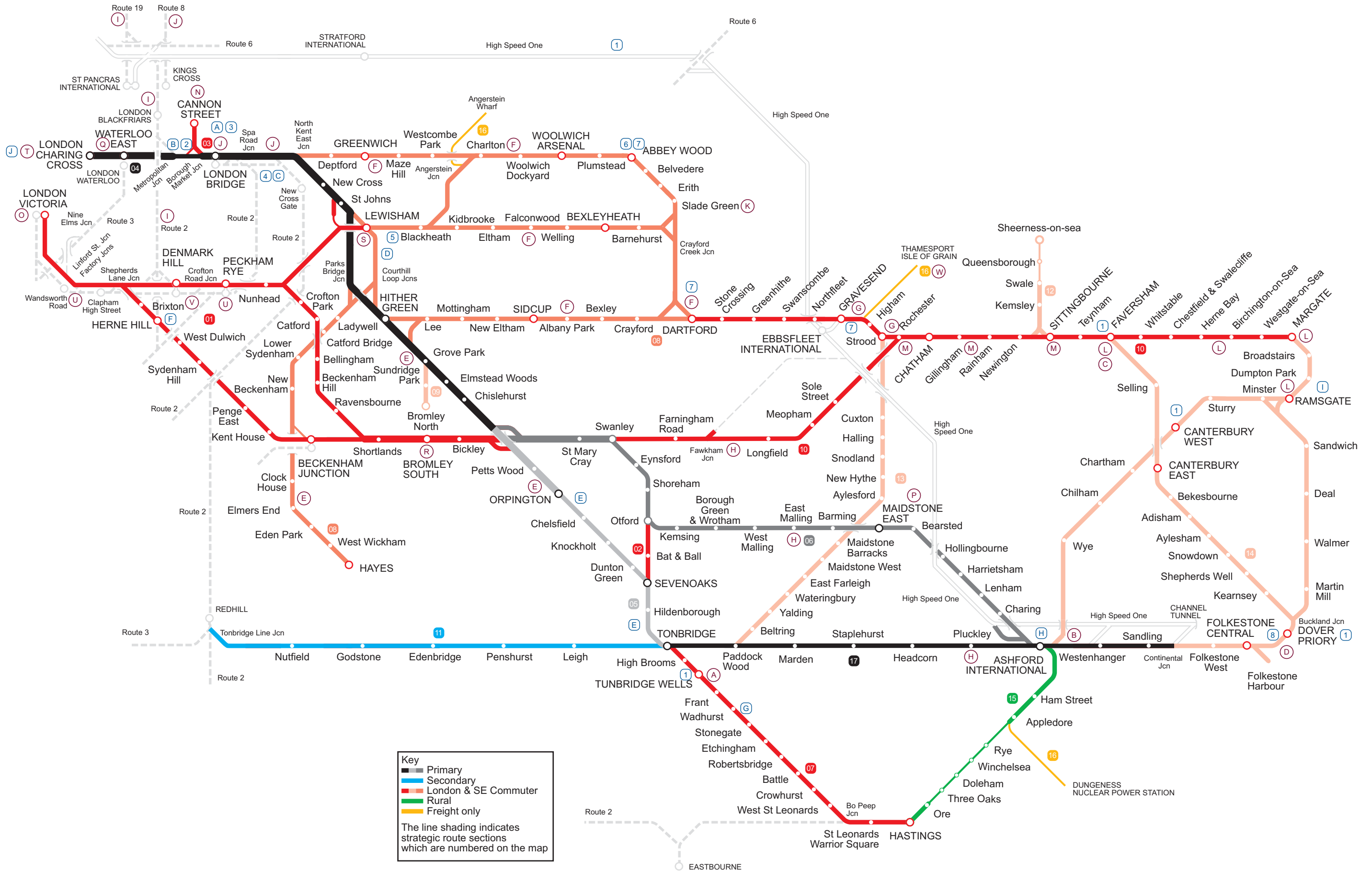
These lines are an important part of the national rail freight network, with the Channel Tunnel routes connecting the UK network to railways in mainland Europe. There are also important freight links to Thamesport on the Isle of Grain and many smaller terminals.

Today's route

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

- the main line from Victoria to Swanley (01.01), comprising two tracks via Herne Hill and two via Catford. From Swanley Junction there are lines to Ramsgate via Medway (01.10) and Ashford via Maidstone East (01.06), with a connection via Bat and Ball to Sevenoaks (01.02);
- the main line from Cannon Street/Charing Cross to Tonbridge (01.03-01.05). At Tonbridge this splits to Hastings (01.07) and Ashford (01.17);
- suburban lines from Victoria to Orpington (01.01) via Herne Hill and Catford. These services share tracks with main line services. There is also a route from Victoria to Lewisham via Nunhead;
- links (on route 2) from the Catford and Herne Hill routes towards Elephant & Castle, Blackfriars (2.15) and the Thameslink network;
- suburban lines from Cannon Street/Charing Cross. These are the Sevenoaks via Grove Park route (01.04), the Hayes line and lines to Dartford via Greenwich/Woolwich, Bexleyheath and Sidcup (01.08). At Dartford these merge and continue to join the main line near Rochester;
- lines east of Ashford to Ramsgate (via Dover) and Ramsgate (via Canterbury West), and the Faversham to Dover line (01.14);
- connections to High Speed One;
- freight connections to Dollands Moor and the Channel Tunnel (01.17);
- freight only lines to the Isle of Grain, Dungeness and Angerstein Wharf (01.16);
- the Redhill to Tonbridge line (01.11);
- the Sheerness-on-Sea branch (01.12), the Medway Valley line (01.13) and Hastings to Ashford line (01.15);
- the branch line between Grove Park and Bromley North (01.09).

Route 1 Kent



Current passenger and freight demand

Recent demand for both passenger and freight services has stood up well, despite tough economic conditions.

The principal feature of passenger demand is commuting during the weekday morning and evening peaks into and out of central London, from the suburbs and other major population centres.

A sizeable portion of demand on this network is contained wholly within the London suburbs and peripheral areas. These busy routes include those to Dartford via Sidcup, Bexleyheath and Greenwich/Woolwich, the Hayes line, local stopping services via Grove Park and local lines to Victoria via Herne Hill and Thameslink via Catford. In addition, there are significant suburban flows on fast main line services to London from Bromley South, Orpington and Sevenoaks.

Further out on main lines in Kent itself, demand is also primarily based around travel to London, but rail is also used for journeys to the major population centres such as Chatham, Maidstone, Ashford, Canterbury, Tonbridge, Tunbridge Wells, Bromley and Sevenoaks. There are also journeys to locations in Sussex, notably Gatwick Airport and Brighton.

Current travel patterns are dominated by the routings of trains into the various central London stations. From these, many passengers change onto other modes of transport to complete their journey within Zone 1. Key interchanges are Victoria (Victoria and District/Circle lines), London Bridge (Jubilee, Northern lines, Southern and First Capital Connect), Charing Cross (Bakerloo and Northern lines) and Waterloo East (South West Trains and Jubilee line). The interchange to the District/Circle lines at Blackfriars is closed at present due to construction work.

There are interchanges with the Docklands Light Railway, providing access to Docklands, at Lewisham, Greenwich and, since January 2009, at Woolwich Arsenal. There is no interchange at New Cross with the East London Line at present due to construction work.

Nearly all passengers heading to the north, west or east of London currently need to travel across London by other modes before continuing their rail journey. However, a new cross-London Thameslink route service from the Catford line has been in operation since the end of March 2009, providing easy access to Kings Cross and St Pancras.

Volumes of Channel Tunnel freight have recently been recovering but remain at a level significantly below the allocation of paths that are reserved for this purpose.

Freight services from other locations are generally showing some modest growth, particularly in aggregates. Termini at Battersea/Stewarts Lane and Angerstein serve the market for central London construction materials, in addition to there being a number of terminals in Kent.

There is a terminal at Tonbridge for Metronet traffic, used for LUL maintenance work.

Ports and heavy industry in the Thames/Medway corridors are the other main generators of freight demand, with increasing traffic from the Sheerness and Isle of Grain branches.

Current services

The principal passenger operator on the Kent route is Southeastern. Other TOCs with limited operations on this route are First Capital Connect (FCC) and Southern Railway. The new Kent route to Thameslink service is a joint Southeastern/FCC operation. Eurostar operate over High Speed One. There are also occasional charter train operations. The timetable structure is complicated by multiple London termini. In general services run as follows:

- main line services via Tonbridge mostly run to Charing Cross, with additional trains at peak times to Cannon Street
- main line services via Swanley generally run to Victoria (mostly via Herne Hill), though there are also some services to the Thameslink network and Cannon Street
- stopping suburban services via West Dulwich generally run from Orpington to Victoria, with a limited peak Thameslink service
- suburban services via Catford generally run from Sevenoaks (via Swanley) to Thameslink
- suburban services via Lewisham mostly run to Charing Cross or Cannon Street, with some services running to Victoria via Denmark Hill
- services in the current timetable via Greenwich run to both Charing Cross and Cannon Street.

Figure 1 and Figure 2 show the current passenger service to London from selected stations.

Main line services are mostly operated by mode Class 375 vehicles, together with some modified

Class 465 units with 1st Class (465/9 Weald units).

The London suburban area train fleet is made up of a mixture of Class 465/466 Networkers and newer Class 376 vehicles. The Catford Loop, and other trains operating north of Blackfriars, are mainly operated by dual voltage Class 319 or 377 vehicles.

Eurostar's international services are operated by 186mph trains over High Speed 1. These vehicles are no longer capable of operating over third rail electrified routes.

Southern's Ashford to Brighton service, running over the un-electrified 'Marshlink' line, is operated using modern Class 171 diesel multiple units.

Freight services are operated by DB Schenker Rail UK (formerly EWS), Freightliner Intermodal, Freightliner Heavy Haul, First GBRf, Fastline Freight and Direct Rail Services. Most traffic is hauled by class 66 diesel or class 92 electric locos. Most freight travels via the busy South London Line, then to Europe via Catford & Maidstone East or to the Thames Gateway via Lewisham & Dartford.

The major freight flows are to/from the Isle of Grain (13-14 trains per day), the Channel Tunnel (8-10 tpd), Hoo (2-4 tpd), Angerstein (3 tpd), Stewarts Lane/Battersea (2-3 tpd), the Sheerness branch (3 tpd) and Mountfield (1-2 tpd). Bulk aggregate railheads receiving sporadic traffic include Hothfield and Sevington. Metronet traffic runs from Tonbridge to Barking, Gunnersbury and Amersham.

Figure 1 Chatham Lines – current train service level (trains per hour)

| Station | Victoria | Thameslink via Blackfriars | Cannon Street or Charing Cross |
|--|-------------------|----------------------------|--------------------------------|
| Chatham fast (via Sole Street - not calling) | 3 peak/2 off-peak | None | 3 peak/0 off-peak |
| Chatham slow (via Sole Street) | 2 peak/2 off-peak | 1 peak/0 off-peak | None |
| Maidstone East | 3 peak/2 off-peak | 1 peak/0 off-peak | 0 peak/1 off-peak |
| Sevenoaks (via Swanley) | None | 3 peak/2 off-peak | None |
| Bromley South | 9 peak/6 off-peak | 7 peak/2 off-peak | None |
| Herne Hill (excluding FCC services) | 6 peak/3 off-peak | 2 peak/0 off-peak | Not applicable |
| Catford | None | 4 peak/2 off-peak | Not applicable |

Figure 2 Tonbridge/Dartford Lines – current train service level (trains per hour)

| Station | Charing Cross | Cannon Street | Victoria |
|-------------------------|-------------------|-------------------|-------------------|
| Tunbridge Wells | 4 peak/2 off-peak | 1 peak/0 off-peak | None |
| Chislehurst | 4 peak/2 off-peak | 3 peak/0 off-peak | None |
| Sidcup | 6 peak/2 off-peak | 3 peak/2 off-peak | None |
| Bexleyheath | 5 peak/2 off-peak | 3 peak/0 off-peak | 3 peak/2 off-peak |
| Greenwich | 3 peak/2 off-peak | 3 peak/4 off-peak | Not applicable |
| Hayes | 3 peak/2 off-peak | 3 peak/2 off-peak | None |
| Ashford (via Tonbridge) | 3 peak/2 off-peak | 3 peak/0 off-peak | None |

Figure 3 Tonnage

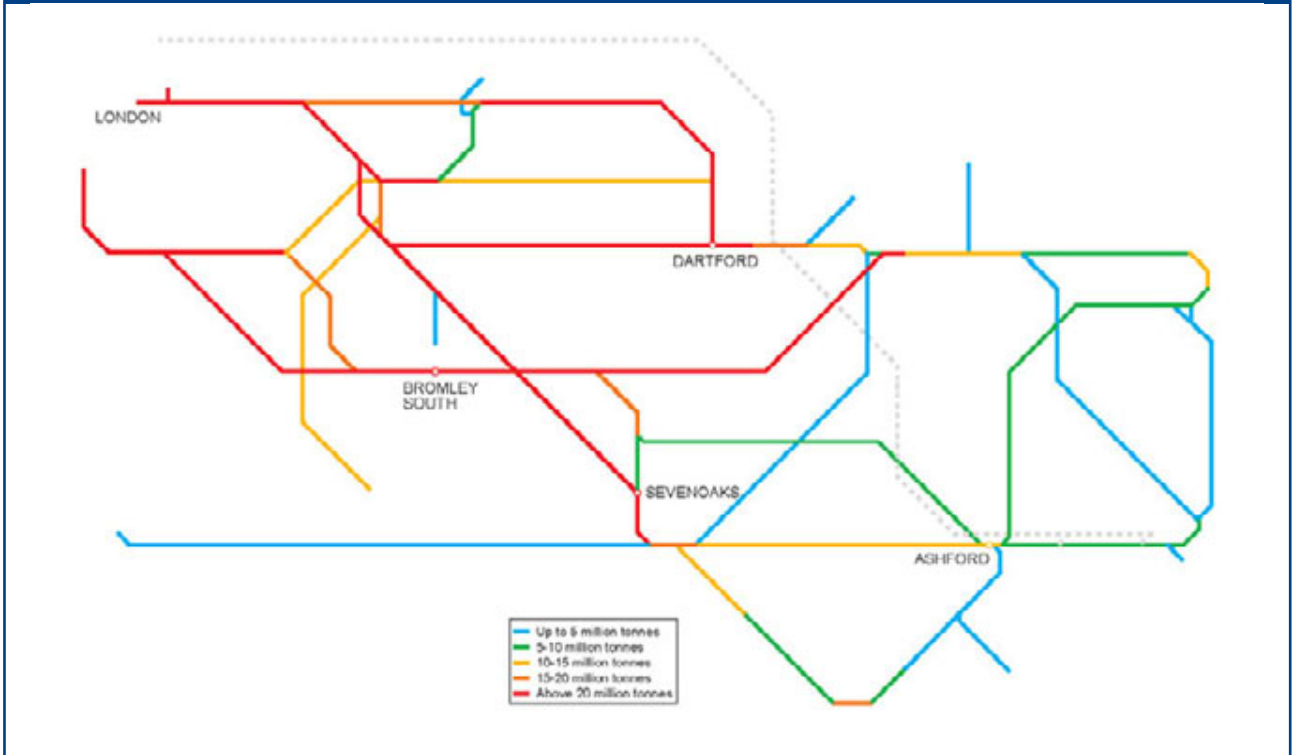


Figure 3 shows the total annual tonnage levels on the route.

Traffic volumes are summarised in Figure 4.

Figure 4 Current use

| | Passenger | Freight | Total |
|------------------------------------|-----------|---------|-------|
| Train km per year (millions) | 31 | 2 | 32 |
| Train tonne km per year (millions) | 8,544 | 1,140 | 9,684 |

Current infrastructure capability

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

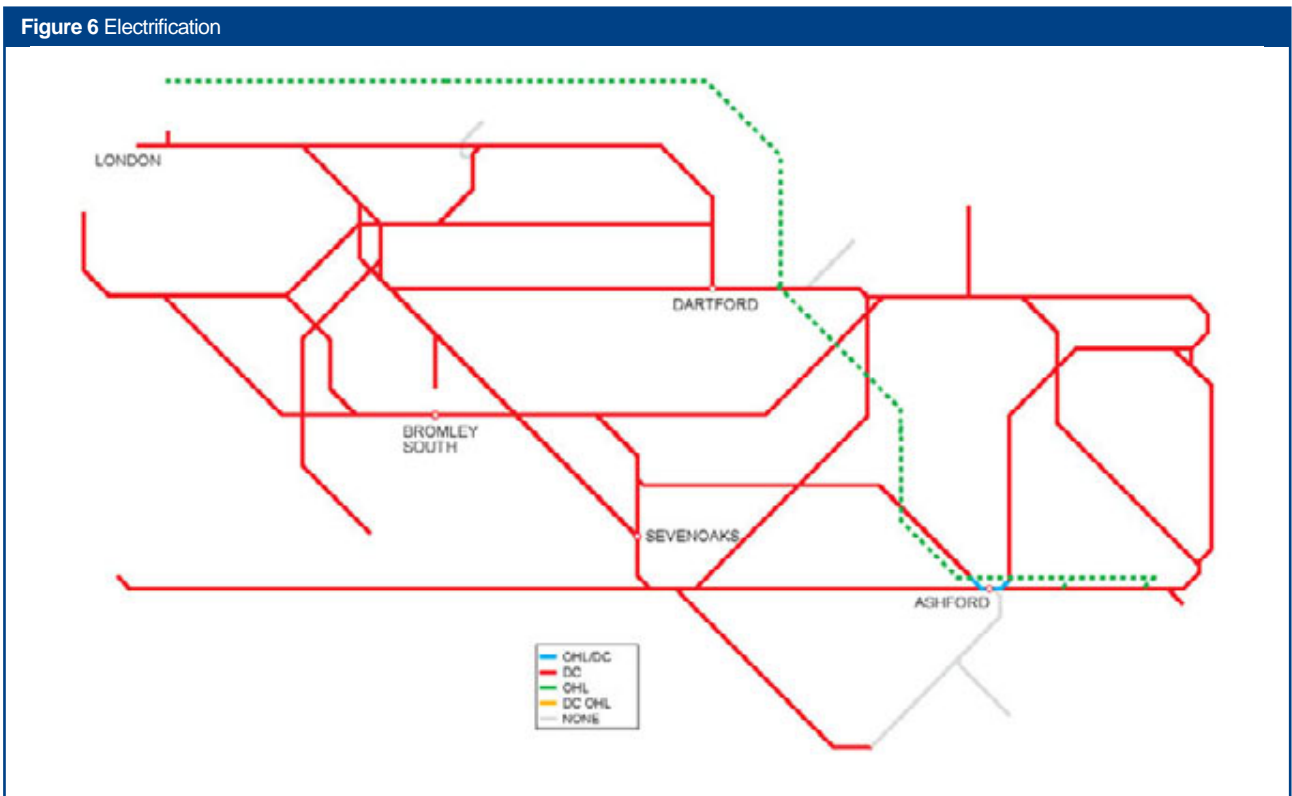
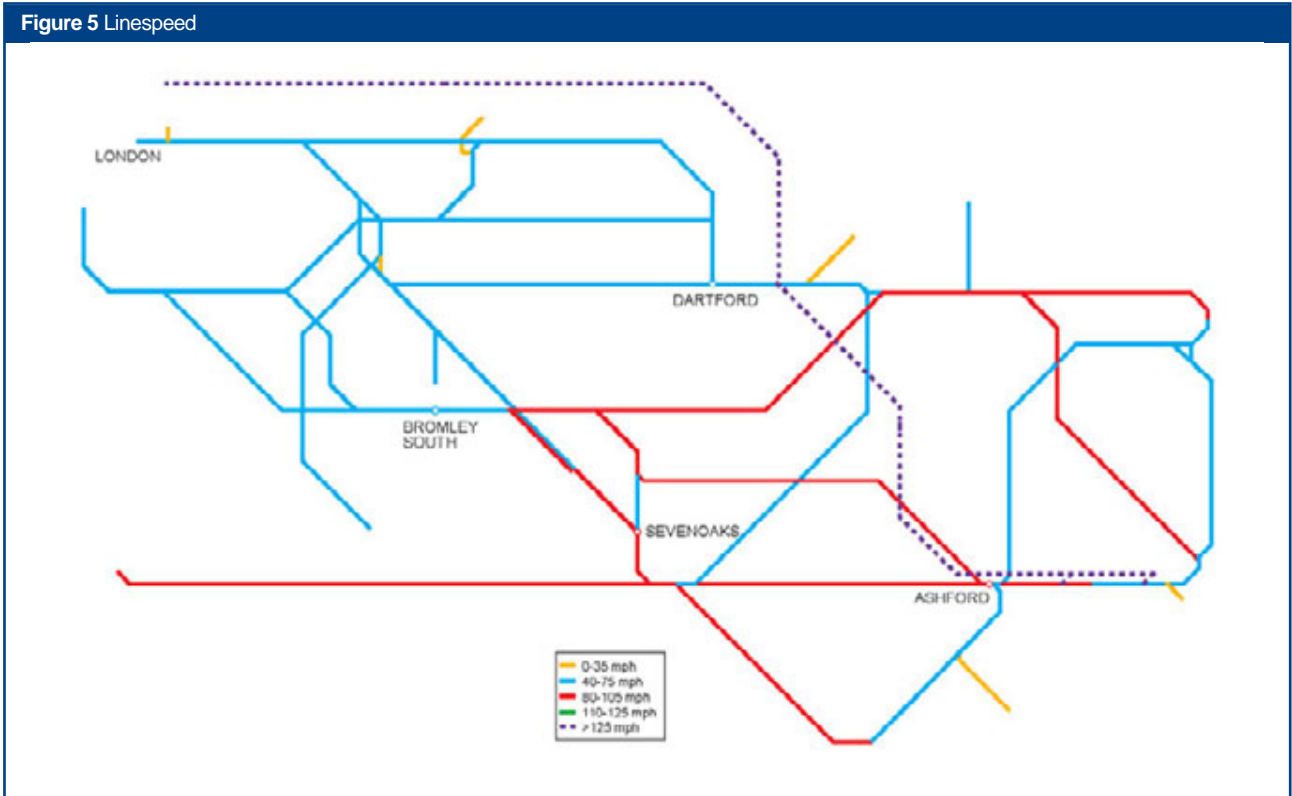


Figure 7 Route availability

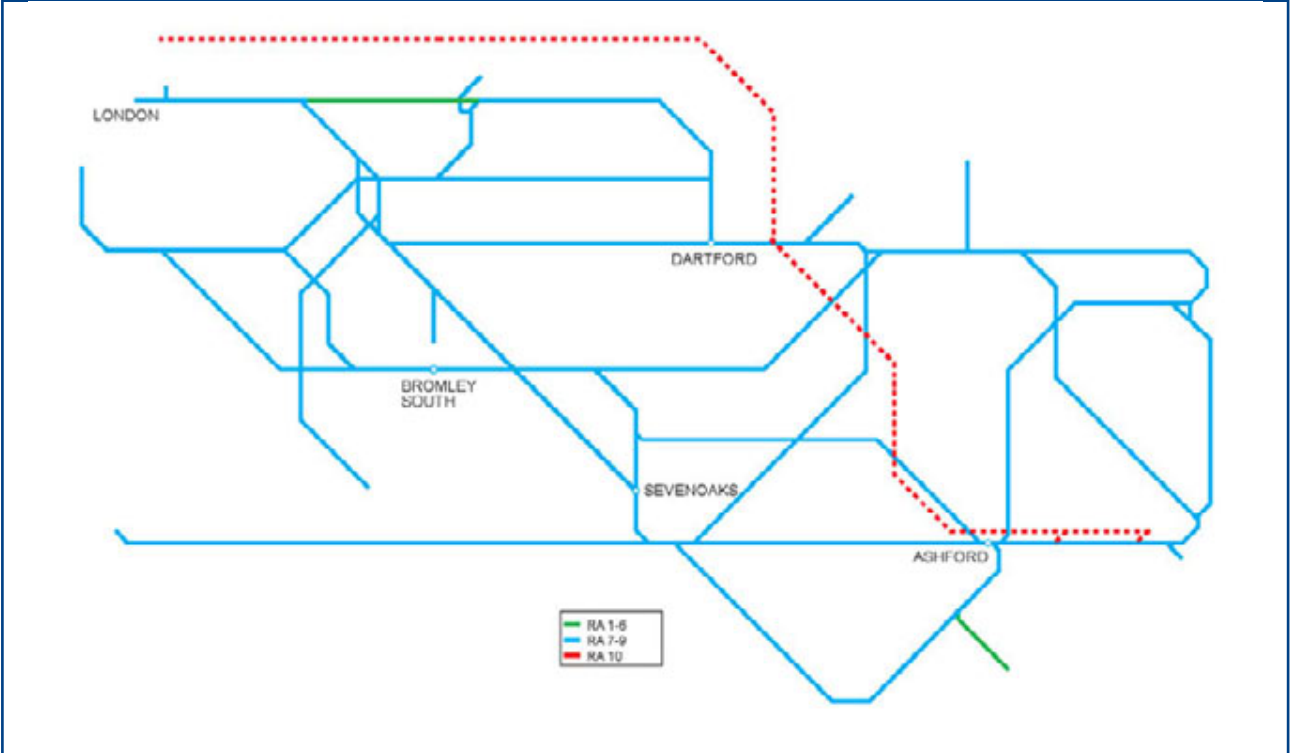
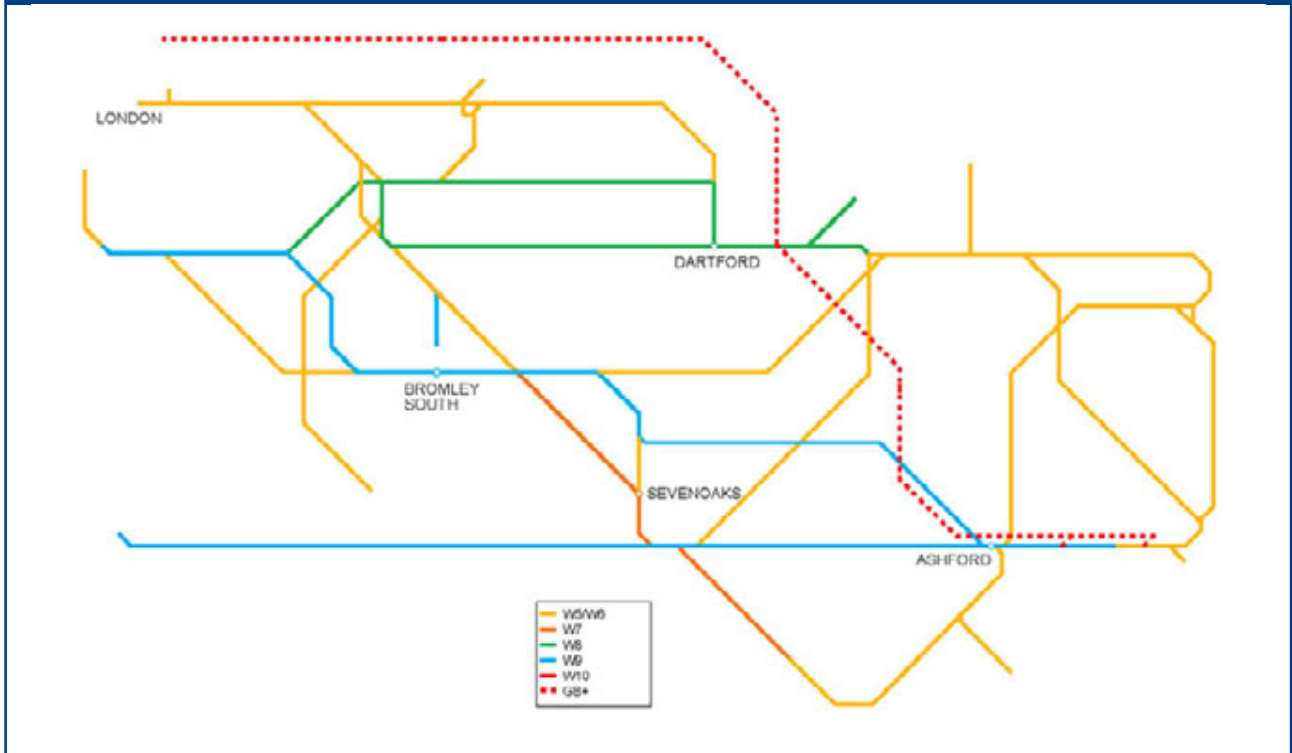


Figure 8 Gauge



Current capacity

The critical sections of the Kent route are operating near capacity for several hours each day. This is governed by a mixture of constraints, primarily limited capacity in the London area.

Many of the key capacity and performance problems are caused by constraints in the critical London Bridge area and approaches. The most significant problems in this area are:

- the restrictive layout of the immediate approaches on the east of London Bridge, with numerous conflicting moves being necessary between the different service groups across a series of flat junctions
- slightly further out, flat junctions between the tracks are also a feature in the Lewisham and Hither Green areas
- there are limited through platforms at London Bridge, especially on the Charing Cross line where all stopping London bound trains have to be timetabled through Platform 6
- the two track low speed section from London Bridge to Metropolitan Jn
- the single line connection between London Bridge and Blackfriars, used by any Thameslink route service via London Bridge.

Major constraints elsewhere on the route are:

- the need to accommodate a mix of fast and stopping trains on the mostly two track section between Victoria and Shortlands Jn, exacerbated by the flat crossing at Herne Hill with the north-south Thameslink route
- the limited number of platforms, and their usable lengths, at Charing Cross
- variable platform lengths at Victoria Eastern
- a mix of fast and stopping trains on the mainly two track section between Orpington and Tonbridge, which includes the two mile long tunnel at Sevenoaks
- limited overall stabling capacity on the route, especially near London terminals
- the capacity of the power supply system, especially in the London area
- ten car platforms on all suburban routes from

- eight car platforms on suburban routes from Victoria and the Thameslink network, with particularly constrained sites such as Elephant & Castle and Herne Hill stations
- four car platforms at Clapham High Street and Wandsworth Road, restricting which services can call at these stations
- platform capacity at Ashford
- several single track sections through gauge restricted tunnels on the Hastings line
- passenger congestion at key stations such as Charing Cross, Waterloo East, Victoria, London Bridge, Bromley South and Lewisham.

Key constraints for freight services are:

- most freight must operate through the congested inner London area, crossing the Thames at Battersea
- there are very few locations between freight terminals in Kent and the Wembley area where it is possible for freight services to be looped or regulated
- freight services generally have to cross from the Atlantic lines to the Catford Loop lines at Crofton Road Jn. This is a low speed move which utilises significant line capacity
- once passed this point, freight services to the Thames Gateway must operate through the congested Lewisham station area
- the restricted loading gauge, with numerous lineside structures limiting the routes to Grain and the nearby area to W8 gauge capability
- freight services are restricted by trailing load limits, with longer trains to locations such as the Grain branch not being compatible with existing infrastructure
- the absence of any suitable diversionary route to the Channel Tunnel, avoiding the Catford/Maidstone East lines, for use by electrically hauled W9 gauge freight services.

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

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

| Route Section | Number of trains |
|---------------------------------------|------------------|
| London Bridge – Metropolitan Junction | 28 |
| London Bridge – Cannon Street | 25 |
| Sevenoaks – Orpington | 14 |
| all trains via Lewisham | 21 |
| all trains via Herne Hill | 18 |

Charing Cross and Cannon Street, restricting train lengths

Figure 10 2008/09 PPM

| TOC | Forecast MAA |
|-----------------------|--------------|
| Southeastern | 90.9% |
| First Capital Connect | 92.1% |
| Southern | 90.0% |

Current performance

Figure 10 shows the forecast 2008/09 PPM for the main TOCs running on the Kent route. Following several years of better punctuality, the route suffered from poor infrastructure asset reliability and performance in 2008/2009, slowing down these improvements. This included a number of major points failures, track circuit failures, third rail faults in critical areas and difficulty coping with severe weather events.

Following our maintenance reorganisation we are now implementing processes to ensure an increased focus on asset reliability and improving working methods. This has included the implementation of maintenance benchmarking and initiatives to ensure best practice is spread between routes.

In common with other parts of the network incidents caused by external factors, including antisocial behaviour and criminal activities are an increasing problem. During the past year there has been an increasing number of large incidents due to fatalities and trespass on the route. Several of these incidents have occurred in critical areas such as London Bridge, including many during the most disruptive peak hours.

The early part of 2008 year saw the emergence of cable theft as a threat to our operations on the Kent route. This has been a problem elsewhere in the UK for some years, linked to the high scrap value which was achievable for certain metal types. The first half of the year saw a steep rise in cable theft, causing significant delays to services. In response we created a cable theft working group, which including external parties such as the British Transport Police. This led to successful arrests and a reduction in cable theft. In recent months cable theft has further reduced due to falling commodity prices and is now at negligible levels.

Section 2: Tomorrow's railway: requirements

HLOS output requirements

Figure 11 Total demand to be accommodated by Strategic Route

| Routes | Annual passenger km forecast in 2008/09 (millions) | Additional passenger km to be accommodated by 2013/14 (millions) |
|--------|--|--|
| Kent | 3,350 | 333 |

Figure 12 Peak hour arrivals to be accommodated by Strategic Route

| London Terminals | Peak three hours | | | High peak hours | | |
|--|----------------------------|-----------------------------------|--|----------------------------|-----------------------------------|--|
| | Forecast demand in 2008/09 | Extra demand to be met by 2013/14 | Maximum average load factor at end CP4 (%) | Forecast demand in 2008/09 | Extra demand to be met by 2013/14 | Maximum average load factor at end CP4 (%) |
| Blackfriars (via Elephant & Castle only) | 21,900 | 3,500 | | 11,200 | 1,200 | |
| London Bridge (includes Charing Cross/Cannon Street /Blackfriars and terminating services) | 127,600 | 12,600 | 67 | 65,200 | 7,800 | 76 |
| St. Pancras (includes Midland Main Line services) | 25,900 | 10,900 | | 13,100 | 5,700 | |
| Victoria (includes Sussex services) | 58,700 | 5,300 | | 29,300 | 2,800 | |

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

Future demand in CP4

The South London RUS identified that the key feature of passenger demand in CP4 will continue to be commuting to central London from the suburbs, with significant suppressed demand at present and a strong case for additional capacity to be provided to the London boroughs of Greenwich, Lewisham, Bexley and Bromley. This capacity will be provided through the CP4 platform lengthening.

The new High Speed services to St Pancras are predicted to create new markets for travel and will encourage people to relocate to areas such as the Medway Towns, Ashford and East Kent. At other locations, for example Tunbridge Wells, significant growth is also anticipated due to other December 2009 timetable improvements.

The morning and evening peak commuter periods into London have historically dominated the Kent railway network and will continue to do so. However there is also ongoing strong growth at off-peak times, for example in shopping and leisure trips on Sundays. Non-London flows are also growing, including a rise in the demand for travel between Ashford and Canterbury West.

The ongoing construction of several new high rise developments in the City of London, with the tallest at London Bridge station itself, is likely to lead, once filled, to a significant increase in demand for services to London Bridge, Cannon Street and the Thameslink core stations.

The continued development of Docklands and the Olympics site is likely to lead to an increased interchange to the DLR at both Lewisham and Greenwich and to passengers interchanging to the Jubilee Line at London Bridge. In addition the recently opened DLR station at Woolwich will lead to travel demand to the developing Royal Docks and to London City Airport.

Next year's East London Line (ELL) extension will lead to increasing interchange to ELL services at New Cross. The potential further ELL extension to Clapham Jn would lead to new journey opportunities from parts of the Kent route, interchanging at Denmark Hill for Clapham Jn. However this is subject to the ELL trains being able to be timetabled in a manner consistent with the significant freight usage of this area.

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 Freight RUS, published in 2007, established freight demand up to 2014/15 and was agreed by the industry. The main relevant traffic forecasts were for Channel Tunnel traffic and flows to/from the Thames Gateway.

Channel Tunnel freight traffic levels will be dependent on economic conditions, transport policies in both the UK and in Europe and Eurotunnel's pricing structure.

The potential freight growth areas in the Thames Gateway include the potential new terminal at Howbury Park (near Dartford), sidings at Northfleet, various facilities on the Isle of Grain and locations on the Sheerness branch. This area has potential to encourage several new freight flows onto the rail network.

Provision of suitable freight paths over the South and West London Lines, connecting the Kent network with the rest of the UK, are a critical factor in facilitating any new flow.

There may be demand in CP4 for freight flows to Europe via High Speed One, since this line is the only European Gauge (UIC GB+) route in the UK and is also the only crossing of the river Thames usable by freight services east of the West London Line.

Future demand beyond CP4

On main line services the Draft Kent RUS, to be published in April 2009, will provide an assessment of demand beyond Southeastern's franchise period, building on work carried out in conjunction with Kent County Council.

High levels of growth are forecast in the Thames Gateway, Ashford and much of east Kent, due to a combination of new housing developments and new opportunities provided by fast services to St Pancras. Demand from west Kent is more established, but is also forecast to grow over the RUS period, with potential peak Thameslink services via Tonbridge being a factor.

With implementation of the Crossrail project now a committed scheme, Abbey Wood will become a significant interchange. There is likely to be a reduction in demand from this point eastwards for services running via London Bridge.

Further freight growth is anticipated, notably Thames Gateway and European flows.

Section 3: Tomorrow's railway: strategy

Further explanation of the key service changes and infrastructure enhancements are set out in the following sections.

Figure 13 summaries the key milestones in delivering the proposed strategy for the route.

| Figure 13 Summary of proposed strategy milestones | | | |
|---|--|---|--|
| Implementation date | Service enhancement | Infrastructure enhancement | Expected output change |
| December 2009 | New timetable to implement Southeastern's SLC2 franchise commitments | <u>Route clearance for Class 395</u> <u>Completion of depot works at Ashford and Ramsgate</u> <u>Canterbury Line connection at Ashford depot</u> <u>Faversham new crossover</u> <u>Shakespeare Tunnel Class 395 clearance</u> <u>Tunbridge Wells turnback siding</u> | Implementation of a new timetable for the Kent route to meet Southeastern's updated SLC2 franchise commitments, maintaining broadly existing levels of capacity from the network as whole into established London terminals, plus new High Speed services from parts of Kent to St Pancras |
| December 2011 | Thameslink Programme Key Output 1 | <u>Blackfriars remodelling</u> <u>Farringdon remodelling</u> <u>Resignalling of the Thameslink core</u> <u>Civil engineering works for new Borough Market viaduct</u> <u>Doubling of Tanners Hill flydown</u> | <u>Capability for 12-car services through the Thameslink core.</u> <u>Provision of some early enabling works for Key Output 2</u> |
| October 2012 | South London Line service changes | Platform extensions at Clapham High Street and Wandsworth Road | <u>Implementation of a Victoria Eastern to Bellingham service (6-car probable)</u> <u>Extension of ELL services to Clapham Junction (subject to TfL funding)</u> |
| October 2012 | 12-car suburban operations (main phase) | <u>Platform extensions to accommodate 12-car services between London and Dartford (via Greenwich, Sidcup and Bexleyheath), the Hayes line and on the slow lines via Grove Park</u> <u>Various associated modifications to depots, sidings and other infrastructure.</u> | 12-car services on the majority of suburban services into Charing Cross and Cannon Street, to mitigate disruption during London Bridge remodelling and subsequently to contribute to HLOS outputs. |
| October 2012 | Start of London Bridge construction works | Reduction in capacity through London Bridge to allow construction works to proceed. | Temporary service reductions to facilitate long term works to re-configure the station |

Figure 13 Summary of proposed strategy milestones

| Implementation date | Service enhancement | Infrastructure enhancement | Expected output change |
|---------------------|--|--|---|
| December 2013 | 12-car suburban operations (final phase) | Gravesend remodelling, to be delivered in conjunction with Transport Quarter scheme. Strood and Rochester remodelling, potentially to be delivered as part of East Kent Resignalling | 12-car services on additional routes into Charing Cross |
| December 2013 | Kent outer train lengthening | No major works anticipated since the short platforms are all at small stations suitable for Selective Door Opening and Class 375 main line rolling stock has SDO fitted. However some limited platform extensions may be required. | 8-car operation on all peak trains on the Maidstone East line 12-car operation on all peak stopping trains on the route via Sole Street 12-car operation on all peak trains calling at Pluckley |
| December 2015 | Thameslink Programme Key Output 2 | Remodelling of London Bridge station and approaches | Increase in through capacity via London Bridge |
| December 2015 | Kent RUS service enhancements | None assumed | To be determined by Kent RUS |

Figure 14 shows the impact we have assumed on the HLOS metric from each of the CP4 interventions.

| Figure 14 Capacity enhancements to meet HLOS peak capacity in CP4 | | | | |
|---|-------------------------------------|---|------------------------------------|------------------------------------|
| Description | Additional vehicles involved | Station served Note: London Bridge HLOS metric covers Charing Cross & Cannon Street services | 0700 – 0959 Capacity Impact | 0800 – 0859 Capacity Impact |
| Southeastern December 2009 timetable SLC2 franchise commitments: St Pancras domestic service via High Speed One | 174 | St Pancras | 11,000 | 5,800 |
| Southeastern December 2009 timetable SLC2 franchise commitments: Victoria service change from 17tph to 16tph in high peak | -12 | Victoria | -1,200 | -1,200 |
| Train lengthening to Victoria in CP4 within existing infrastructure capability constraints | 4 | Victoria | 400 | 400 |
| Train lengthening to Charing Cross / Cannon Street in CP4 within existing infrastructure capability constraints | 30 | London Bridge | 5,200 | 4,400 |
| Train lengthening infrastructure schemes: 12-car operations Sidcup line to Dartford | 10 | London Bridge | 1,200 | 900 |
| Train lengthening infrastructure schemes: 12-car operations Bexleyheath line to Dartford | 12 | London Bridge | 1,400 | 1,200 |
| Train lengthening infrastructure schemes: 12-car operations Greenwich line to Dartford | 8 | London Bridge | 900 | 700 |
| Train lengthening infrastructure schemes: 12-car operation Sevenoaks (via Hither Green) stopping services | 10 | London Bridge | 1,200 | 900 |
| Train lengthening infrastructure schemes: 12-car operations Hayes line | 10 | London Bridge | 1,200 | 900 |
| Train lengthening infrastructure schemes: 12-car operations Dartford to Rochester | 16 | London Bridge | 1,900 | 1,400 |
| Train lengthening schemes (SDO assumed) 12-car operations: stopping services via Sole Street | 8 | Victoria | 500 | 500 |
| Train lengthening schemes (SDO assumed) 8-car operations: Maidstone East line | 4 | Victoria | 200 | 200 |
| South London line 6-car Victoria Eastern to Bellingham service | 8 | Victoria | 900 | 500 |

Figure 15 shows how the HLOS load factor targets for London stations are met by the proposed strategy. The measures will also allow the total additional passenger kilometre to be accommodated.

Note that the temporary impact of construction works at London Bridge for the Thameslink Programme (2012-2015) has been excluded from this table. The actual capacity provided at the end of CP4 will therefore be different to that shown.

Figure 15 Impact on HLOS peak capacity metric

| London Terminals | Peak three hours | | | Load factor end CP4 | High peak hours | | | Load factor end CP4 |
|---|------------------|--------------------|------------------|---------------------|-----------------|--------------------|------------------|---------------------|
| | Demand end CP4 | Capacity start CP4 | Capacity end CP4 | | Demand end CP4 | Capacity start CP4 | Capacity end CP4 | |
| Blackfriars (via Elephant & Castle only) | 25,400 | 25,900 | 33,400 | | 12,400 | 10,900 | 13,300 | |
| London Bridge (metric includes Charing Cross, Cannon Street and terminating trains, also Blackfriars services not covered by the above) | 140,200 | 179,300 | 192,200 | 64% | 73,000 | 81,100 | 88,900 | 74% |
| St. Pancras (includes MML services) | 36,800 | 31,000 | 62,800 | | 18,800 | 13,200 | 26,500 | |
| Victoria (includes Sussex services) | 64,000 | 95,700 | 103,800 | | 32,100 | 41,400 | 45,300 | |
| Other London Termini* | 295,500 | 412,100 | 489,600 | | 146,000 | 177,500 | 207,600 | |

Strategic direction

The Kent route will undergo a significant period of change in CP4 and beyond. The most obvious impacts will be domestic services operating on High Speed One and the commencement and completion of Thameslink construction works.

The South London RUS identified that train and platform lengthening will be the major means of delivering growth in the London suburban area. Whilst analysis for the Kent RUS is still under ongoing it is envisaged that the strategy for main line services will be based around providing as much capacity as possible via the High Speed Line into St Pancras, since there are limited opportunities elsewhere.

The most significant infrastructure enhancement requirements for CP4 are therefore:

- implementation of the Thameslink Programme
- platform lengthening to 12-car on the various suburban routes to Dartford, to Hayes and to Sevenoaks (via Grove Park)
- extending 12-car operations beyond Dartford, with remodelling at Gravesend and Rochester.

The lengthening of Southeastern's services to Charing Cross and Cannon Street needs to be completed prior to Thameslink construction works affecting the through platforms. This sequencing will maximise passenger capacity during the works.

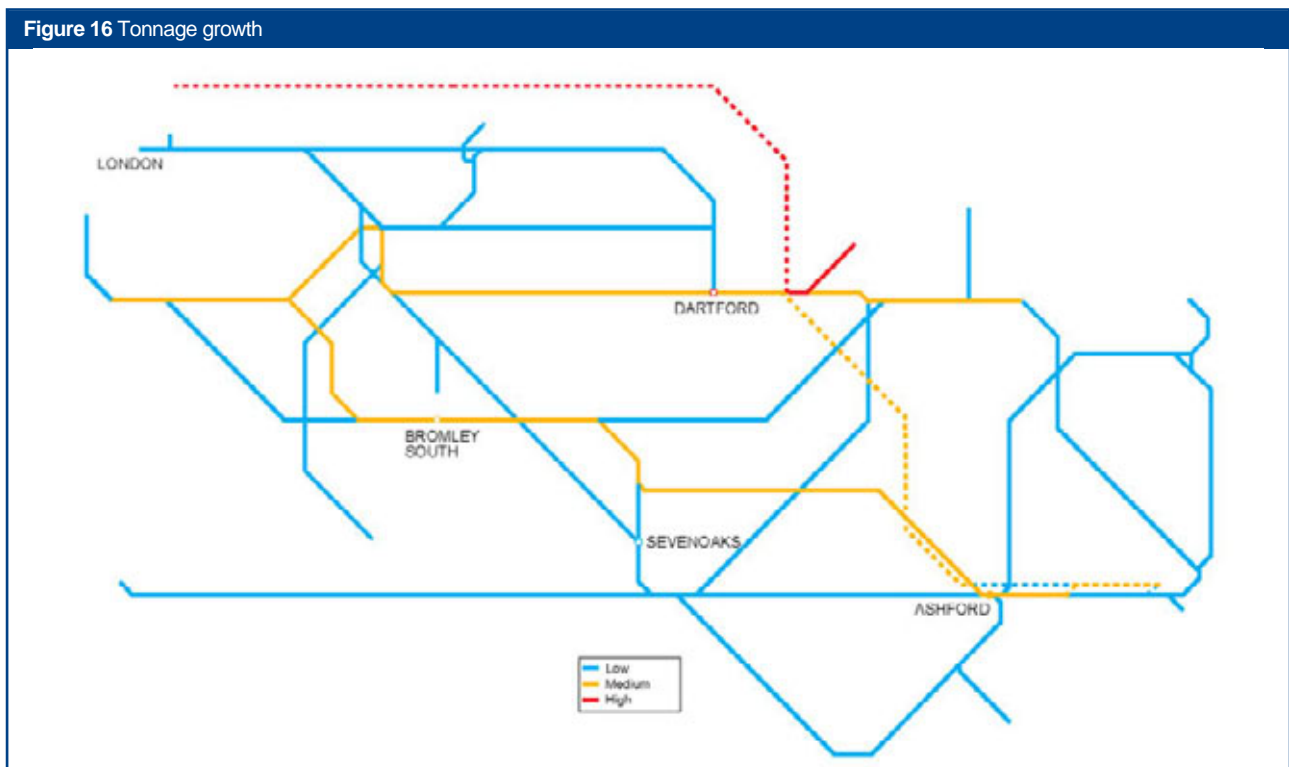
Prior to 2015 several major timetable changes are likely to be needed, initially to implement Southeastern's franchise commitments, then at various stages to facilitate Thameslink Programme construction works and to deliver HLOS capacity metrics. The key timetable changes required will be:

- the commencement of services to St Pancras from December 2009 from the Medway and East Kent areas via the High Speed Line, together with implementation of Southeastern's other SLC2 timetable commitments
- the commencement of 12-car suburban operations into Charing Cross and Cannon Street by December 2012 at latest
- to facilitate construction works in the London Bridge area from December 2012 onwards
- to facilitate operation of the 86tph service at London Bridge and 24tph Thameslink route service from the end of 2015.

With respect to freight services the key issues, for consideration as part of the national Strategic Freight Network programme, are as follows:

- increasing traffic to Grain/Hoo Jn, with enhanced infrastructure such as a passing loop on the branch and eventual W10 gauge
- the potential development of an alternative route via Redhill and Reading for Channel Tunnel to the Midlands traffic
- potential use of High Speed 1 for freight.

Figure 16 indicates tonnage forecasts to 2018.



Future train service proposals

Key issues for the passenger operators are likely to be as follows:

Southeastern

From December 2009, High Speed services will operate from the Medway and East Kent areas to St Pancras. These will offer new journey opportunities and significantly reduced travel times. Services will be operated by advanced Class 395 units, designed for operation over both the High Speed Line and other routes in Kent.

Once the initial services are up and running further opportunities using High Speed 1 may need to be considered if demand rises. Investigations are being undertaken by the Kent RUS to inform this issue.

First Capital Connect

Services from the Kent route to Thameslink stations have operated over suburban lines via Catford since March 2009. From 2015 services fast Tonbridge area to Cannon Street services are likely to be diverted to Thameslink, consistent with the working assumptions described in the South London RUS.

For all Thameslink route services the need to minimise station dwell times in the Thameslink core will be a critical factor, heavily influencing rolling stock design.

Southern

It is possible that the replacement South Central franchisee may wish to retain the existing limited off peak operation from the Sussex route into Charing Cross. However this may be inconsistent with Southeastern's franchise commitments.

Eurostar

As far as the Kent network is concerned, Eurostar's main concerns will be ensuring that the commencement of domestic services on the High Speed line does not impact on the high levels of reliability achieved by their European services, or on the potential growth future in these services.

London Overground

Subject to available funding, it is possible that London Overground may wish to operate services over the South London Line to Clapham Jn in CP4.

The main issue to be resolved with this scheme is the passenger/ freight interaction in the Wandsworth Road – Clapham Jn area, since ELL services would run via a section of track currently used for holding freight services.

Future capability

The main infrastructure capability changes planned for the route are described below:

Train lengthening

The most significant scheme will be investment in a programme of platform lengthening works to enable longer trains to operate.

In many cases platform extensions will only require minor associated works, for example the relocation of Driver Only Operation equipment and signals. However in some cases far more significant work is necessary, for example track layout changes or bridge reconstruction.

12-car operations at Charing Cross

Running of 12-car suburban services into Charing Cross presents a significant challenge, since this terminal station has short platforms, no space available for expansion and limited operational capacity. In addition Class 465/466 Networkers do not currently have an operable Selective Door Operation system fitted.

Given that this is a critical issue for 12-car suburban operations in general our detailed assumptions are listed below:

- the disused platform section at the Waterloo end of island platform 1 & 2 will be brought into use, to enable 12-car class 465 vehicles to use these platforms. This section is marginally narrower than would be required by modern design standards but, given that it is located furthest from the station exit, it would not need to handle significant passenger flows
- the narrow drivers' walkway section at the Waterloo end of 10-car platform 3 is far too narrow to be brought into passenger use and we are therefore planning on the basis that this platform will be unsuitable for 12-car Networkers, except possibly in an emergency situation
- platforms 4, 5 & 6 are 11-cars long (excluding the unusable narrow drivers' walkway section at the Waterloo end of platform 4), but 12-car class 375 trains with SDO are in operation today. These platforms could only be used for 12-car Networkers if works were undertaken to the rolling stock to implement a SDO solution to prevent doors on the rear carriage from opening. In addition it is possible that relocation of buffer stops on platform 5 by up to a metre may be needed
- in order to run into platforms 4, 5 & 6 a system for inhibiting the doors from opening on the rear coach only will need to be retrofitted to Class 465 vehicles. This is believed to be consistent with the

very limited potential SDO functionality of this rolling stock type

- 2-car class 466 units will be prohibited from operation as part of 12-car formations, since the additional 12-car train length this creates results in such formations not being able to fit into Charing Cross
- turnaround drivers are likely to be required at Charing Cross to enable the same number of trains to run after the introduction of 12-car suburban operations.

Further consideration of this issue will be required in conjunction with development of the DfT's rolling stock strategy.

Power supply

Despite the completion of significant power supply upgrade work a few years ago, there remains a shortage of capacity in the power supply system, especially in the London area. Further work is planned in CP4. Elsewhere on the network additional 12-car operations to Tunbridge Wells will present performance risks in the short term and will require power supply reinforcement in the longer term. 12-car operations south of this point towards Hastings are unlikely to be economical, due to major power supply constraints.

Implementation of additional regenerative braking capability remains a key aspiration of passenger and freight train operators, and this is recognised by our power supply schemes in CP4.

Journey times

Increasing linespeeds in general is not an immediate priority, since journey times are more affected by station stops than maximum speeds. However, increasing the speeds at which St Pancras services can operate once they leave the High Speed Line is a key exception and would have significant benefits. For example some minor linespeed improvements along the North Kent Coast are being provided by the East Kent resignalling scheme. Elsewhere, further opportunities will be explored as other renewals become due.

Freight capability

The following capability issues are relevant on the Channel Tunnel freight routes:

- the route via Redhill is not cleared for the operation of Class 92 electric freight locomotives, since this would require works to the signalling system and power supply reinforcement. This has a stronger case than the more expensive alternative of gauge clearance works via the Sevenoaks tunnel
- there are many potential future uses of High Speed One for freight services, should an operator be able to develop markets for traffic flows of this nature, find the necessary rolling stock and train paths and implement a cost effective operating plan.

With regard to freight flows to Grain and other parts of the Thames Gateway the key capability issues in the long term are eliminating structure gauge limitations and increasing train lengths.

Other issues

Operational procedures have been developed for the narrow bore Shakespeare Tunnels (located between Folkestone and Dover). Together with some minor physical works this will enable Dover to be served by High Speed Line services.

We are currently reviewing the future use of the Folkestone Harbour branch. The line and station are in a poor condition and the branch only receives an occasional charter train service.

Future capacity

The commencement of services on the High Speed line to St Pancras will provide significant additional peak capacity to London from parts of the Kent network. These additional services should also increase the chances for main line passengers closer to London of being able to get a seat.

Within the London area many services operate at present with large numbers of standing passengers for part of the journey. The South London RUS identified that the route is already operating at the maximum number of trains that can be run in peak periods. It is not therefore practical to increase service frequencies from most areas at such times. As a result implementation of a train lengthening programme is more practical than additional trains.

The DfT's rolling stock strategy, published in January 2008, identified 110 additional vehicles to be provided to Southeastern and 256 vehicles – some of which will operate onto the Kent route – to be provided to First Capital Connect. Some of these vehicles (those associated with Thameslink Key Output Zero) are now in operation and have enabled early partial delivery of some CP4 HLOS outputs before the end of CP3. The remaining vehicles will commence operations in advance of Thameslink Key Output 2 and will enable the remainder of the HLOS outputs to be met.

This additional rolling stock will require additional maintenance and berthing facilities to be constructed. 12-car suburban operations will require works in depots, principally Slade Green, to accommodate both the increased length and the additional units.

In CP5 completion of the Thameslink Programme will provide enhanced capacity, and may allow some additional services to operate, but it is likely that the majority of services will be substitutions of trains to alternative termini. This is because no viable way has been identified to provide extra capacity at critical locations such as the New Cross/Lewisham area and over the Orpington to Tonbridge two-track section.

In CP5 Crossrail will provide services to Abbey Wood, also calling at a new station in Woolwich. In the longer term Crossrail services could potentially be extended to Gravesend, subject to additional tracks through the Dartford area, an additional platform at Gravesend and freight capacity to the Grain branch being maintained. This potential extension would require Crossrail services to be operated by dual voltage rolling stock.

The East Kent Resignalling Programme may provide an opportunity to alleviate capacity constraints in the Medway Towns area from 2013 onwards. Our current expectation is that 12-car capability at Rochester will be best undertaken through this scheme, though alternative delivery mechanisms may exist.

With a limited number of specific exceptions in east Kent, the signalling headways on the route are rarely the most limiting factor on the numbers of trains that can be run. More important constraints tend to be the occupancy of flat junctions and station platforms, especially in the London area.

The SL RUS described how certain stations will require works to enable them to cope with the predicted growth in passenger numbers:

- Charing Cross station is very congested with no space available for expansion. Development of the Embankment end of the station to provide additional capacity may become needed
- Waterloo East station is very congested and the link to Waterloo main station is constrained by the space available. The South London RUS recommended provision of a new entrance at the Southwark underground station end
- Victoria is similarly congested, particularly the interchange with Underground. Increasing passenger capacity is, together with expansion of the underground station, is planned
- London Bridge station is very congested and will be addressed by the Thameslink programme;
- Blackfriars station is congested at peak times. Construction work has now commenced as part of the Thameslink programme
- Bromley South station is very congested at peak times. Work is currently ongoing to identify an appropriate solution
- Lewisham station is very congested at peak times. Work is currently ongoing to identify an appropriate solution.

The expected growth in passenger numbers will result in increased car parking capacity becoming necessary at certain stations, especially to ensure that off-peak users are able to park. This will have interfaces with the land use and transport policies of the relevant local authorities.

The Kent RUS will take a longer term view of the capacity on the route needed following the completion of the Thameslink Programme. It is investigating further interventions which may be required to meet the predicted passenger and freight demand.

Figure 17 Forecast PPM MAA /CP4 plan

| | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 |
|--------------|---------|---------|---------|---------|---------|
| Southeastern | 91.4% | 91.9% | 92.2% | 92.5% | 92.8% |
| FCC | 91.7% | 92.1% | 92.4% | 92.7% | 92.9% |
| Southern | 90.7% | 90.9% | 91.1% | 91.6% | 91.9% |

Future performance

Figure 17 sets out the planned PPM for each passenger operator.

Our analysis has identified the following key performance risks and opportunities during CP4:

- the need to achieve a reduction in both the incidence and impact of trespass, vandalism and fatalities on railway operations
- delivering further improvement to autumn leaf fall management and that of other seasons
- the reliable introduction of the December 2009 timetable, including introduction of High Speed services under Southeastern's revised SLC2
- robust management of further timetable and service pattern changes during CP4
- an improved system for the isolation of traction supply to enhance possession productivity and reduce delay per incident
- robust planning for the delivery of Thameslink Programme engineering work, especially the remodelling of London Bridge
- delivery and commissioning of East Kent Resignalling project
- the introduction of information systems to support control centre staff in managing the network during normal and degraded working
- investment in the upgrade of Ashford IECC
- re-focussing on the delivery of a 'Right Time Railway' through joint objectives between Southeastern and Network Rail
- installation of additional remote condition monitoring and intelligent infrastructure and using the data effectively to reduce failures
- With the Gravesend area becoming a feeder route to HS1, robust management of the passenger/freight interface in the Gravesend/Grain area will be critical. Additional infrastructure in this area may be beneficial.

Southeastern

Southeastern's Public Performance Measure (PPM) is expected to be around 91 percent moving annual average at end of Control Period 3. This is forecast to rise steadily to 92.8 percent by the end of CP4.

Despite these improvements, our analysis of Southeastern's performance trajectory in CP4 is not consistent with their franchise commitments. This is due to performance impacts anticipated during the early years of the Thameslink construction works, which were not accounted for in their franchise agreement. Analysis prior to the recent implementation of Key Output 0 identified a likely performance deterioration of 0.5 percent PPM to 2011, though this cannot be confirmed as yet.

From October 2012 onwards further significant performance challenges are probable, due to the likely impact of the London Bridge remodelling works. However at present the implementation strategy for these works is not finalised so the impact cannot be fully quantified and has not been included in our forecast performance trajectory.

Other passenger operators

The other operators on this route are Southern and First Capital Connect. Their future performance assessments can be found in the Route 2 plan.

Freight operators

We would anticipate that freight operators will experience many of the same performance issues on the route as those which are forecast to affect passenger services. Some further key issues are likely to be:

- Ensuring that the anticipated freight growth to the Thames Gateway area can be delivered reliably, especially whilst the Grain loop remains as single track
- Managing the impact of Crossrail construction work at Abbey Wood, especially any impact on Plumstead sidings and traffic to Angerstein Wharf
- Ensuring that the potential East London Line extension to Clapham Jn does not impact on freight performance
- Ensuring robust operational management of the interfaces between freight terminals and the adjacent main lines.

Network Availability

Aspirations for the route

The national 'Seven Day Railway' initiative is implementing techniques which will minimise the impact on passengers and freight of engineering work. However the Kent route was not identified in the Strategic Business Plan as one of the routes delivering a significant benefit to cost ratio and was therefore not included in that plan as being appropriate for early implementation.

In its Final Determination the ORR asked Network Rail to refine its proposals and optimise the benefits over the whole network. Network Rail will therefore be re-evaluating the plans across all routes including Kent.

The Seven Day Railway initiative is also intended to facilitate the efficient delivery of more engineering work within more restrictive access than exists today. Implementation will require significant process changes and consideration of infrastructure enhancements.

On the Kent route most major items of engineering work are at present normally scheduled to be carried out on Sundays (and in some cases on Saturdays as well) as historically this was thought to affect fewer trains and people. However the demand for weekend services has risen considerably during the last decade and we now need to adapt our working practices to meet this demand.

We have consulted with Southeastern, Passenger Focus and freight operating companies and this has informed our understanding of priorities. In the short term the immediate requirement is to reduce the need for replacement bus services and run as much of the published timetable as practical. Beyond this there are longer term aspirations for additional train services at times when trains cannot run at present.

How this will be delivered

Increasing the availability of the network requires that maintenance, renewals and enhancements are delivered together in a cyclical possession pattern. Integrating these activities into a single coherent programme is intended to result in an overall reduction in the number of disruptive track closures.

One of the key work streams will therefore be improving the planning of engineering works. The strategic aim will be to establish a single cyclical possession strategy that integrates maintenance and 'standard renewals' in a unified and predictable possession pattern. This will also deliver efficiencies in our maintenance and renewals activities.

Further work streams which will deliver improved efficiency include national schemes for disaggregating electrical isolations from track possessions, achieving faster isolations and for the implementation of a modular approach to renewals.

Specific local schemes are being developed. These include track worker protection schemes, access point improvements and provision of lighting at key junctions. These schemes will improve night-time maintenance productivity and will be prioritised on the basis of achieving maximum returns.

Track renewals will be undertaken in line with the national strategy through CP4, resulting in maximum 16 hour possessions for plain line track renewals by 2012/13. Possessions of longer than 16 hours will therefore only be required on an exceptional basis.

The confluence of these work streams will deliver the major part of the reduction in access requirements and will significantly reduce the impact of engineering work on passengers and freight.

Where disruptive work is unavoidable our aim is to provide a through rail journey by seeking to use diversionary routes and/or single line working. The existing diversionary route strategy will be further developed and refined as part of the Seven Day Railway initiative.

Network Availability on the Kent route in CP4 will be complicated by the need for delivery of a number of large and complex projects, all of which will require significant track access at busy sections of the network. In particular the Thameslink Programme, Crossrail, East Kent Resignalling and platform lengthening schemes will require careful planning and coordination to minimise their impact.

Next steps

We have agreed with Southeastern that 52 hour possessions will not be taken on routes to be operated by the new Class 395 services between December 2009 and July 2010. This is designed to avoid disrupting passengers trying out these St Pancras services for the first time. However, there may unfortunately be a need for a small number of Sunday possessions at certain locations for essential maintenance during these months.

The delivery of East Kent Resignalling in 2011 will present some problems, principally due to the temporary impact on access into and out of Ramsgate depot.

The reconstruction of London Bridge station will present a particular challenge in the 2012-2015 period. Development work is ongoing regarding the capacity which will exist through the station at peak times during this timeframe. With regard to evening and weekend services it is likely that significant closures will be required during much of the construction period. Many alternative routes into London will, however, be available, for example into Victoria, Blackfriars/Thameslink, St Pancras, the East London Line and Docklands Light Railway.

With regard to freight we recognise that we must provide a through path for freight services. Due to limited capacity being available in the daytime significant volumes of freight are moved at night, so are susceptible to track maintenance activities. Our plans seek to ensure that these trains can run in their timetabled paths.

Crossrail works at Abbey Wood may require an extended blockade in late 2012 or early 2013, in order to facilitate tunnelling operations on this new section of railway. Freight access to Angerstein Wharf during these works potentially requires new run-round facilities in the Plumstead area.

We will continue to develop the business case to allow Class 92 operation via Redhill and implement this scheme in CP4 if priorities permit. This would allow unrestricted operation of W9 gauge traffic to the Channel Tunnel when the normal route via Catford and Maidstone East is closed.

Freight traffic to the Thames Gateway is restricted whenever engineering works takes place in areas such as Factory Jn, Lewisham, Dartford or Gravesend. We will review potential options to minimise the impacts of engineers' possessions on these freight flows in our Seven Day Railway plans.

Long term opportunities and challenges

Up to the end of CP5, we believe that the solution to passenger growth and future capacity requirements will be met by a combination of several initiatives:

- ensuring timetables are optimised around critical constraints to maximise the number of trains that can be operated
- ensuring that the High Speed line is fully utilised
- implementation of the train lengthening programme

- construction of the Thameslink programme
- construction of Crossrail, possibly with an extension beyond Abbey Wood to Gravesend;
- incremental infrastructure capacity enhancement to address other key constraints
- potential ticket pricing initiatives to spread the peak, smooth the high peak requirements and ensure that High Speed line services are fully utilised
- small schemes to provide incremental freight capability.

Beyond the completion of the above, we anticipate that accommodating further commuter growth would be a significant challenge for the route. The following factors will significantly constrain the route's ability to grow further in the very long term:

- there are several lines where expansion from two to four tracks would be desirable, but this is not practical without major construction works on non-railway land at critical locations
- there are several flat junctions on the route, but there is insufficient space available for grade separation at many of the locations that would benefit from it
- there are numerous major obstructions that physically limit potential platform lengths on routes into Charing Cross and Cannon Street to no more than 12-car, even if trains longer than this were desirable
- there are numerous obstructions that physically limit platform lengths on stopping services into Victoria and stopping services via Elephant & Castle to 8-car length;

Furthermore it is likely that the railway will experience increasing capacity challenges at times other than the traditional morning and evening weekday peak periods. Providing appropriate services at off-peak times, late in the evenings and at weekends will become key issues, linked to the long term challenge of minimising the impact of engineering works. However it is noted that implementing the Seven Day Railway will be a significant challenge, especially in the London area.

Infrastructure investment in CP4

Figure 18 Enhancements to be implemented prior to December 2009 to facilitate Southeastern's new timetable

| Implementation date | Project | Project description | Output change | Funding | GRIP stage |
|---------------------|---|--|---|---------------------------------|------------|
| 2009 | Ⓐ Tunbridge Wells 12-car turnback | 12-car siding to the south of Grove Hill tunnel | Will ensure a robust 4tph Tunbridge Wells to Charing Cross service can be provided In the longer term the scheme will allow 12-car trains to meet demand via Sevenoaks | Network Rail Discretionary Fund | 4 |
| 2009 | Ⓑ Ashford depot Canterbury line connection | New crossover to allow services to run between Ashford depot and the Canterbury line | Ensures timetable robustness by reducing the number of empty trains needing to operate in the Ashford station area | Department for Transport | 3 |
| 2009 | Ⓒ Faversham new crossover | New crossover to allow services to terminate in platform 1 | Will ensure a robust 2tph Faversham to St Pancras service can be provided Also allows direct access from the down line to the sidings | Network Rail | 3 |
| 2009 | Class 395 route clearance (general) | Gauge clearance works Power supply works | Facilitates introduction of the High Speed services to St Pancras | Department for Transport | 7 |
| 2009 | Ⓓ Shakespeare Tunnel Class 395 clearance | Operational procedures and minor works | Allows High Speed services to Dover | Network Rail Discretionary Fund | 4 |

Figure 19 HLOS enhancements (capacity metric & specified schemes)

| Implementation date | Project | Project description | Output change | Funding | GRIP stage |
|---------------------|--|--|--|----------------------|------------|
| 2012 | Ⓔ Suburban train lengthening (initial phase) | 12-car operations on the Hayes line and the slow lines to Orpington/Sevenoaks via Grove Park. 6-car capability at Clapham High Street and Wandsworth Road in preparation for Victoria to Bellingham service | Enables small scale train lengthening for an initial limited number of services | Periodic Review 2008 | 2-4 |
| 2012 | Ⓕ Suburban train lengthening (routes to Dartford) | 12-car operations west of Dartford. Scheme covers the Sidcup, Bexleyheath and Greenwich/Woolwich lines, plus Dartford station itself. | Enables further train lengthening for additional services to Charing Cross / Cannon Street The number of trains which can be lengthened at this point will depend on the ability to cope with a mixed length network, since only partial 12-car operations will introduce a significant degree of inflexibility, especially in the Dartford area and at London terminals. | Periodic Review 2008 | 2-4 |
| 2013 | Ⓖ Suburban train lengthening (routes east of Dartford) | <u>12-car operations between Dartford and Rochester</u> Strood and Rochester remodelling to be delivered as part of East Kent Resignalling Gravesend remodelling, possibly to be delivered in conjunction with Gravesend Transport Quarter project | Allows further suburban train lengthening. <u>Removes inflexibility caused by constraining 12-car operations west of Dartford in earlier stages</u> Remodelling of Gravesend potentially assists with a possible future Crossrail extension Remodelling of Rochester potentially allows further 12-car operations into St Pancras | Periodic Review 2008 | – |
| 2011-2013 | Ⓗ Kent outer train lengthening | <u>8-car operations between Swanley and Ashford</u> <u>12-car operations between Swanley and Rochester</u> 12-car operations on services calling at Pluckley | Longer main line trains, utilising Selective Door Opening where appropriate. Removes the need for short formation trains to operate into London terminals in peak hours. | Periodic Review 2008 | – |

Figure 19 HLOS enhancements (capacity metric & specified schemes)

| Implementation date | Project | Project description | Output change | Funding | GRIP stage |
|---------------------|--|--|---|----------------------|------------|
| 2011 | ① Thameslink Programme Key Output 1 | <u>Reconstruction of Blackfriars station</u> <u>Reconstruction of Farringdon station</u> New viaduct at Borough Market | Allows 12-car services to operate across central London, with timetable enhancements Farringdon and Blackfriars station congestion relief and improved facilities New entrance to Blackfriars station on the South Bank | Periodic Review 2008 | |
| 2015 | ② Thameslink Programme Key Output 2 | Reconstruction of London Bridge station and approaches | Allows 24 tph to operate across central London London Bridge station congestion relief and improved facilities | Periodic Review 2008 | |
| 2014 | Power supply upgrade | Further power supply strengthening works | Provide sufficient power supply to cope with future levels of train service, including allowing all services operating into/via London Bridge to run as 12-car | Periodic Review 2008 | 1 |
| 2014 | ③ Depot and berthing modifications | <u>Capacity and capability upgrades to enable stabling of 12-car suburban services</u> Principal works involve expansion of Slade Green depot | Enables berthing of additional vehicles to facilitate 12-car operations | Periodic Review 2008 | – |

Figure 20 Other enhancements

| Implementation date | Project | Project description | Output change | Funding | GRIP stage |
|---------------------|---|---|---|--|------------|
| 2011 | Ⓛ East Kent Resignalling Phase 1 | Resignalling scheme including remodelling of Ramsgate, Margate and Faversham areas | Facilitates more efficient operations in these areas to increase capacity | Network Rail, including an enhancement element at Faversham | 4 |
| 2013 | Ⓜ East Kent Resignalling Phase 2 | Resignalling scheme in the Medway area, including the remodelling of the Rochester area | Potentially facilitates more efficient operations in these areas to increase capacity Potentially provides an effective means of delivering 12-car operations at Rochester | Enhancement element through Network Rail Discretionary Fund and Periodic Review 2008 | – |
| 2010 | Ⓝ Cannon Street station redevelopment | Station redevelopment scheme | Improved station facilities | Network Rail | 3 |
| 2011 | Ⓞ Victoria station redevelopment | Station redevelopment scheme | Improved station facilities | Network Rail | – |
| 2014 | Ⓟ Maidstone East redevelopment | Station redevelopment scheme | Improved station facilities | Network Rail/Kier Property | 2 |
| 2009 | Ⓠ Waterloo East second entrance | Installation of a new entrance via Southwark underground station ticket hall | Reduces congestion and walk times into station | Network Rail Discretionary Fund | 3 |
| 2011-2013 | Ⓡ Bromley South station congestion relief | Wider staircases and other congestion relief measures | Improved passenger circulation | Network Rail Discretionary Fund | – |
| 2011-2013 | Ⓢ Lewisham station congestion relief | Station improvements and congestion relief | Improved passenger circulation | Network Rail Discretionary Fund | – |
| 2015 onwards | Ⓣ Charing Cross station congestion relief | Long term (CP5) requirement. Will require development work in CP4. | Improved passenger circulation | CP5 advance development fund | – |
| 2012 | Ⓤ East London Line extension to Clapham Jn | Connection of East London Line to South London Line and Clapham Jn as part of London Overground | 4tph service ELL to Clapham Jn 2tph service Victoria Eastern to Bellingham | Transport for London (anticipated) | – |
| 2010 | Ⓥ Crofton Road Jn Removal of approach control | Removal of approach control by a minor PSR reduction and signalling changes | Increases capacity across junction and performance | Network Rail Discretionary Fund | 4 |

Figure 20 Other enhancements

| Implementation date | Project | Project description | Output change | Funding | GRIP stage |
|---------------------|--|--|--|---|------------|
| 2012 | Ⓜ Isle of Grain / Hoo improvements | Construction of a section of double track railway on the single line Grain branch. Track layout improvements at Hoo Jn to improve access to Hoo Yard. | Would increase cross-London timetable opportunities and improve both passenger and freight performance. | Network Rail Discretionary Fund | 2 |
| 2011 | Regenerative braking extension | To facilitate an increase in the return of braking energy into power supply system | Reduction in operational costs for passenger and freight train operators | Periodic Review 2008 | – |
| 2012 onwards | Victoria resignalling | Resignalling scheme affecting parts of the Inner London area. | Potential capacity enhancements under consideration, for example optimisation of the track layout on the Victoria Eastern approaches | Enhancement element through Network Rail Discretionary Fund | – |
| 2011-2013 | Outer area linespeed increments | Linespeed increases on the Kent main lines, principally east of Gravesend and Ashford | Journey time reductions to maximise the benefit of the high speed line | Network Rail Discretionary Fund | – |
| 2009-2013 | National Stations Improvement Programme (NSIP) | Station improvement works at selected stations: Ashford International; Brixton; Bromley South; Canterbury West; Chatham; Crayford; Dartford; Denmark Hill; Deptford; Dover Priory; Folkestone Central; Gillingham; Gravesend; Lewisham; Margate; Northfleet; Paddock Wood; Ravensbourne; Rochester; Sevenoaks; Sittingbourne; Strood; Swanley; Tonbridge; Tunbridge Wells; Wadhurst; Waterloo East; Woolwich Arsenal | Improving passenger environment through enhancements to access, egress, security and overall presentation | Network Rail/Third Party | 1-4 |
| 2009-2011 | Access for All Programme | Works to improve accessibility at the following stations: Canterbury West; Denmark Hill; Gravesend; Grove Park; Herne Hill; Lewisham; New Cross; Orpington; Sittingbourne; Staplehurst; Strood; Swanley | Provision of a step-free route between station entrance and station platforms at these sites | Department for Transport | 1-7 |

Figure 20 Other enhancements

| Implementation date | Project | Project description | Output change | Funding | GRIP stage |
|---------------------|---|---|--|---|------------|
| 2009 onwards | Abbotscliffe tunnel lining | Major civil engineering renewal scheme | Renewal | Network Rail | 1 |
| 2009 onwards | Sevenoaks tunnel drainage and waterproofing | Major civil engineering renewal scheme | Renewal | Network Rail | 1 |
| 2012-2016 | Crossrail | Realignment of the North Kent Line between Plumstead and Abbey Wood to accommodate Crossrail route. Potential mitigation works in the Plumstead and Belvedere areas to facilitate any blockade at Abbey Wood. | New railway | Department for Transport/Transport for London | – |
| 2009 onwards | Charing earthworks | Major civil engineering renewal scheme | Renewal | Network Rail | 1 |
| 2009 onwards | Car park expansion programme | Works to improve and extend car parking facilities at selected stations: Canterbury West; Chatham; Folkestone West; Gravesend; Marden; Sevenoaks; Sittingbourne; Staplehurst; Tonbridge; Paddock Wood | Enhanced parking facilities at stations with existing or anticipated problems. | Network Rail | 1-3 |

Renewals activity

Figure 21 shows the estimated renewals costs and activity volumes.

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

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

Figure 21 Summary of estimated renewals costs and activity volumes

| £m (2009/10 prices) | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | CP4 total |
|-------------------------|------------|------------|------------|------------|------------|------------|
| Renewals | | | | | | |
| Track | 20 | 24 | 43 | 47 | 55 | 189 |
| Signalling | 23 | 34 | 35 | 28 | 29 | 149 |
| Civils | 11 | 15 | 19 | 18 | 17 | 81 |
| Operational property | 45 | 29 | 24 | 18 | 16 | 133 |
| Electrification | 13 | 18 | 16 | 18 | 17 | 82 |
| Telecoms | 8 | 3 | 4 | 4 | 6 | 26 |
| Plant and machinery | 1 | 1 | 1 | 1 | 2 | 6 |
| Total | 122 | 124 | 142 | 134 | 143 | 584 |
| Renewals volumes | | | | | | |
| Track | | | | | | |
| Rail (km) | 15 | | | | | |
| Sleeper (km) | 11 | | | | | |
| Ballast (km) | 19 | | | | | |
| S&C (equivalent units) | 9 | | | | | |
| Signalling | | | | | | |
| SEUs (conventional) | 0 | 35 | 3 | 120 | 250 | 408 |
| SEUs (ERTMS) | 0 | 0 | 0 | 0 | 0 | 0 |
| Level crossings (no.) | 1 | 0 | 4 | 0 | 5 | 10 |

Appendix

Figure 22 Strategic route sections

| Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference, RA is Route Availability | | | | | | | | | | | | |
|---|---|-----------------------------------|----------------|---------|----------------|---------------|-------|-------|-----------------|-----------------|---------------------------|--------------|
| SRS | SRS Name | ELR | Classification | Funding | Community Rail | Freight Gauge | RA | Speed | Electrification | Signalling Type | Signalling Headway (mins) | No of Tracks |
| 01.01 | Victoria Lines | VIR, CAT, NTL | London & SE | DfT | No | W6/W9 | RA8 | 45-60 | Third rail | TCB | 2.5-3 mins | 2-4 |
| 01.02 | Otford – Sevenoaks | OJS | London & SE | DfT | No | W6 | RA8 | 40 | Third rail | TCB | 3-4 | 2 |
| 01.03 | Cannon Street | CBM | London & SE | DfT | No | W6 | RA8 | 20 | Third rail | TCB | 2-2.5 | 3 |
| 01.04 | Charing Cross – Chislehurst Junction | XTD | Primary | DfT | No | W6 | RA8 | 60 | Third rail | TCB | 2-3 | 2-4 |
| 01.05 | Chislehurst Junction – Tonbridge | XTD | Primary | DfT | No | W6 | RA8 | 70-90 | Third rail | TCB | 2-3.5 | 2 |
| 01.06 | Chislehurst Junction – Ashford via Maidstone East | VIR, SBJ | Primary | DfT | No | W9 | RA8 | 70-80 | Third rail | TCB | 3-4 | 2-4 |
| 01.07 | Tonbridge – Hastings | TTH | London & SE | DfT | No | W6 | RA8 | 60-80 | Third rail | TCB | 3-5.5 | 1-2 |
| 01.08 | Dartford Lines plus Hayes Branch | NKL, BEX, BTC, NCS, HDR, LLL, LCH | London & SE | DfT | No | W6/W8 | RA6/8 | 60 | Third rail | TCB | 2-6 | 2 |
| 01.09 | Bromley North | BNG | London & SE | DfT | No | W6 | RA8 | 40 | Third rail | TCB | 3 | 2 |

Figure 22 Strategic route sections

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

| SRS | SRS Name | ELR | Classification | Funding | Community Rail | Freight Gauge | RA | Speed | Electrification | Signalling Type | Signalling Headway (mins) | No of Tracks |
|-------|--|-----------------------|----------------|---------|----------------|---------------|-------|--------|-----------------|-----------------|---------------------------|--------------|
| 01.10 | Dartford and Swanley – Margate | VIR,HDR | London & SE | DfT | No | W6 | RA8 | 70-90 | Third rail | TCB | 2-4 | 2 |
| 01.11 | Redhill – Tonbridge | RTT | Secondary | DfT | No | W9 | RA8 | 60-85 | Third rail | TCB | 7-9 | 2 |
| 01.12 | Sheerness Branch | SEJ | London & SE | DfT | Yes | W6 | RA8 | 30 | Third rail | TCB | 4 | 1 |
| 01.13 | Strood – Paddock Wood | PWS | London & SE | DfT | Yes | W6 | RA8 | 55 | Third rail | TCB | 7 | 2 |
| 01.14 | East Kent Routes | VIR,FDM, ACR,BME, XTD | London & SE | DfT | No | W6 | RA8 | 40-70 | Third rail | abs block | 3-14.5 | 2 |
| 01.15 | Hastings – Ashford | ATH | Rural | DfT | No | W6 | RA8 | 40-60 | none | mixed | 13-14 | 1-2 |
| 01.16 | Angerstein, Grain and Dungeness branches | AGW,HTG, APL | Freight only | DfT | No | W8 | RA6/7 | 30 | none | key token | N/A | 1-2 |
| 01.17 | Tonbridge – Continental Junction | XTD | Primary | DfT | No | W9 | RA8 | 90-100 | Third rail | TCB | 2.5-3.5 | 2 |

Capacity and operational constraints

- A London Bridge: insufficient platform capacity for service growth or for all existing Charing Cross services to call
- B Borough Market – Metropolitan Junction: two track section restricts capacity
- C Spa Road: flat junctions between Tonbridge, Greenwich and Brighton lines restrict capacity
- D Lewisham, Hither Green: flat junctions restrict capacity
- E Orpington – Tonbridge: mainly two track railway with local stations to serve restricts capacity
- F Herne Hill: Flat crossing between Sussex and Kent routes is a significant timetable constraint
- G Tonbridge – Hastings: four single track tunnel sections restrict capacity
- H Ashford International platforms not available for domestic services
- I Ramsgate: track layout at depot restricts capacity`
- J Charing Cross: Platform 3 unable to be extended for 12-car capability. Platforms 4,5,6 only have potential to accommodate 12-car trains with Selective Door Opening on rear vehicle.

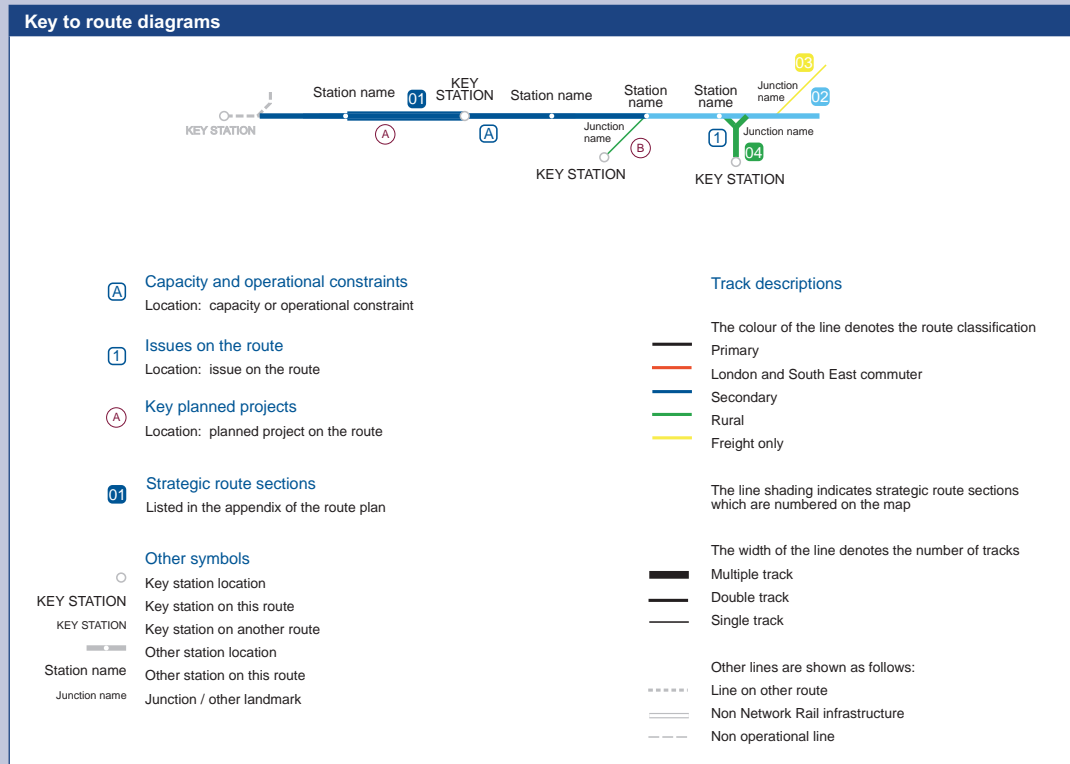
Other issues on the route

- 1 Medway, East Kent, Tunbridge Wells: Planned new timetable from December 2009. New domestic services on High Speed One to Medway and East Kent, 4 trains per hour between Charing Cross and Tunbridge Wells.
- 2 Borough Market – Metropolitan Junction: four tracking planned by the Thameslink Programme will increase capacity, improve performance and should allow less disruptive maintenance opportunities
- 3 London Bridge: remodelling and additional through platforms planned by the Thameslink Programme will increase capacity, improve performance and enable all trains to call
- 4 Berrondsey: grade separated junction planned during the Thameslink Programme will reduce flat crossing moves, facilitate new journey opportunities and improve performance
- 5 Lewisham: double tracking of the Tanners Hill flydown planned during the Thameslink Programme should enable improved operational efficiency
- 6 Abbey Wood: planned interchange with Crossrail line one
- 7 Abbey Wood to Gravesend area: Safeguarding of a potential future Crossrail extension, likely to require additional tracks in the Dartford area and an additional platform at Gravesend

Note

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

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



GRIP stages

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

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**This Route Plan is part of a set.
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