Kent Route

Summary Route Plan

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Version 1.0

Foreword

Welcome to the Kent Route Plan.

This document is a key building block of Network Rail's Control Period 5 (CP5) Strategic Business Plan. It sets out the relevant outputs, activity and expenditure at route level to achieve the specified outputs. It also forecasts long-term activity and expenditure at route level to demonstrate that the route is delivering CP5 outputs based on a sustainable whole-life, whole-system basis. It should be read in conjunction with the other route plans that have been produced.

This plan details how the route will deliver a safe, efficient and reliable rail service that meets our customers' needs and contributes positively to the economic growth of South-East England. Network Rail has devolved significant responsibility to its operating route businesses and, to a large extent, the success of the company in CP5 will depend on delivery from the routes. The Route Plan provides details of what we will deliver and how route based activities support the HLOS and other cross-network outputs.

Safety

Safety is our key priority and our plans aim to provide assurance to all our stakeholders in this respect. Fundamental to this is the roll out of the new Network Rail safety culture and vision. An improvement in performance is high on our agenda – and the Kent Route Plan reflects this. The aim is to reduce delays for passengers, provide better customer service, deliver more effective management of disruption and improve the efficiency of the railway through more collaborative working and better decision making.

Transforming our railway

The route activity sections consider the changes to the operational structure of the route as a result of implementing the Network Operating Strategy (NOS), the work being done on a Route Access Strategy, and the detailed plans for asset renewals including their delivery. The Kent Route Plan also shows the expected future demand and development of particular lines of route, predicted expenditure, maintenance and investment requirements. The plan forecasts longer term outputs and expenditure on a sustainable whole-life, whole-system basis and has been developed on the premise that we achieve the route output and expenditure targets set for Control Period 4 (CP4).

The extensive work undertaken for the South London Route Utilisation Strategy (RUS) published in 2008, the Kent RUS (2010) and the London & South East RUS (2011) have been key inputs to this document. Each RUS modelled demand and developed potential enhancements to cater for the forecast growth. The introduction of domestic services on High Speed 1 demonstrated the transformation that major infrastructure improvements can deliver; by the end of CP5, the Thameslink and Crossrail programmes will also have been completed, providing additional capacity and journey opportunities as well as significant improvements to a number of stations, most notably London Bridge.

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Route overview

From central and South East London to the Channel Tunnel, the Kent Route provides an intricate rail network linking parts of East Sussex and the Kent coast via suburban London.

Kent Route serves a wide range of communities by providing passenger and freight services that form a key part of the rail network, connecting London to both the surrounding region and mainland Europe. The route has also recently benefited from the introduction of domestic trains on the High Speed 1 (HS 1) line connecting towns in East and mid-Kent to London St Pancras. The Thameslink and Crossrail programmes, due for completion in CP5, will be a major contributor to meeting future passenger demand and reducing congestion.

Geography of Kent

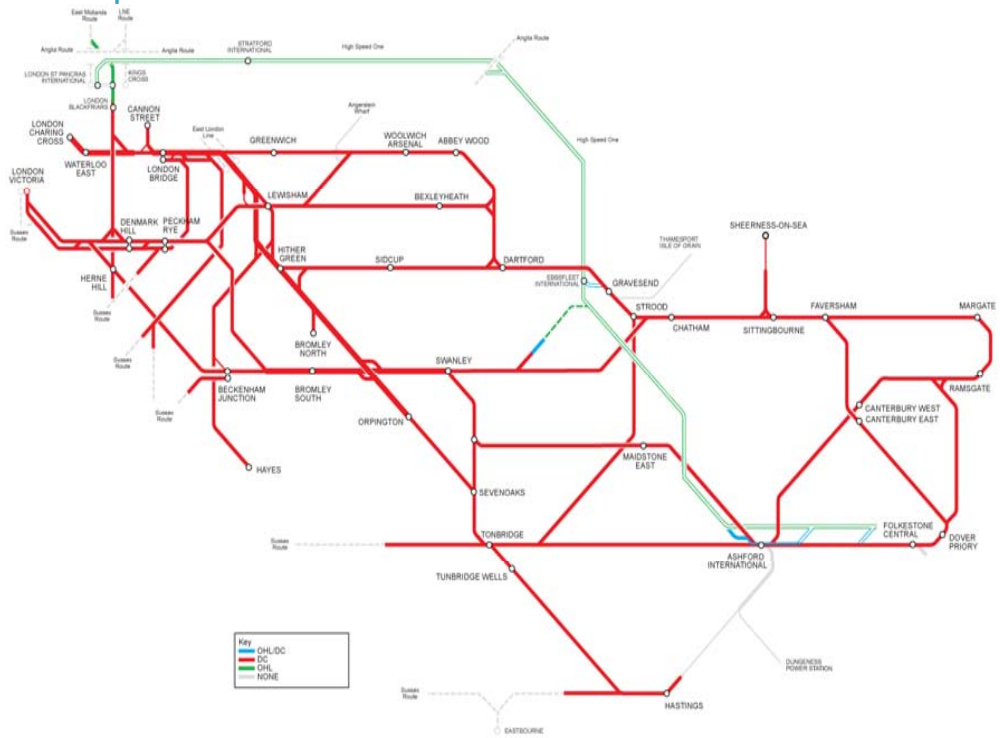
A dense network of suburban lines make up the Metro area, providing a key commuter and leisure service to South and South East London. This network is particularly important as there are few London Underground lines serving this area.

The Tonbridge Main Line is the backbone of the Kent network, connecting London's Charing Cross and Cannon Street stations to East Kent and East Sussex via Tonbridge. At Tonbridge, the line splits providing connections to the Hastings line, via Tunbridge Wells, and towards Ashford reaching Ramsgate, via Dover Priory and Canterbury West.

The Chatham main line connects towns across South London and North Kent with the main London termini. It runs from London Victoria to Margate via Swanley where the Maidstone East line begins and provides a connection to Tonbridge and Ashford via Sevenoaks and Maidstone East respectively. Suburban lines connect London Bridge to Gravesend via Sidcup, Bexleyheath and Woolwich. Freight facilities are provided at Angerstein Wharf, near Charlton, and at Hoo Junction, where the freight-only Grain branch line begins. There is a regular shuttle service to the Isle of Sheppey from Sittingbourne where the Sheerness branch meets the Chatham branch.

HS1, operated and maintained by Network Rail, is an integral part of the rail network in Kent. The HS1 line connects Kent to London St Pancras via Springhead Junction and Ashford International where onward journeys can be made to Hastings via the Marshlink line. The section between Ashford and Ore is the only remaining non-electrified passenger line on the Kent Route.

Route Map



This map shows the extent of the Kent Route (and the type of electrification).

Route Strategy

The Route Plan concentrates on the short to medium term of the next five year planning Control Period to 2019. However, the nature of investment in the rail industry is longer term, and those planning improvements to the network need to look beyond the next five years as customer needs, technology, and the industry itself develops.

Delivering value for money

The delivery of this plan over the next five years and beyond requires a considerable amount of financial resource, ultimately provided by our funders: the fare-paying customers and taxpayers. We recognise that the industry needs to seek better and more efficient delivery methods such that our funders see that they get value for money. To this end, we will work in all areas of our business to improve efficiency.

We will seek external investment to develop our infrastructure locally from both public authorities and the private sector, where appropriate enter into alliance arrangements with train operators, and we will work with other interested parties who can help maximise the value of the rail network.

Kent Route will play its part in delivering a network that becomes at least 16% more efficient to operate, maintain and renew in real terms over the duration of CP5.

All of this is in the context of historically high levels of performance being achieved, and it is important to a continually growing industry that this is broadly maintained through CP5.

One of the key elements of passenger feedback is reliability and performance of train services is essential to better utilising the capacity of the network.

Nationally, and at a route level, there will continue to be a focus on mitigating the effects of external factors, such as extreme weather, cable theft, vandalism and fatalities (suicides). The actions already undertaken in CP4, and plans for CP5, give some confidence that these risks can be contained.

There will also be a significant amount of industry change in CP5: continued passenger and freight growth, refranchising in the route, build phases of major engineering schemes, and the NOS.

All of these import a high level of risk to performance. Therefore a key planning assumption has been to concentrate on performance preservation through CP5, with a focus on effective risk management and mitigation, and the industry bringing up the performance of less consistent train service groups through a series of cost effective interventions.

Through the industry's transparency agenda we expect that more detailed information on the performance of individual services or journeys will become increasingly available. We are using this to explore the set of metrics that the industry uses to monitor itself against during CP5, as we recognise one metric does not fit all. However, the current planning process has remained focused upon the existing metrics of PPM, Cancellations and Significant Lateness (CaSL), and delay minutes.

People

Delivery of all the above relies entirely on our key asset – the people who come to work for Kent Route at all times of day, 365 days a year. We will develop plans that provide a clear line of sight between the corporate, strategic objectives and the daily activity of every single member of the Kent team. Engagement, people development, accountability and communication will be enhanced, at all levels, to establish an informed, confident team who are happy to engage with colleagues and customers alike and act with integrity as we deliver on our promises.

Our customers

Providing customers, passengers and freight users, with a service that meets their expectations is critical to retaining and expanding the rail market.

The Kent Route currently serves five passenger operators:

- **Southeastern:** operates a comprehensive network of suburban, main line, high speed and regional services across Kent, parts of East Sussex and South East London. Southeastern are by far the largest passenger train operator covered by this document. Their current franchise commenced in April 2006 and ends in March 2014.
- **Southern:** operates suburban services across south London, main line services from Tonbridge via Redhill, and regional services between Ashford and Brighton on Kent Route infrastructure.
- **First Capital Connect:** runs a jointly operated service with Southeastern between Kent and the Midlands via the Thameslink route.
- **London Overground** operates services across the East London Line connecting South and East London. East London Line services run on Kent Route infrastructure via New Cross/ Sydenham and from late 2012 via the South London Line to Clapham Junction.
- Eurostar operates services between St Pancras International and the continent via HS1. Although HS1 does not form part of the infrastructure covered by this document, stopping services run on Kent Route infrastructure at Ashford International station.

The Kent Route currently serves four principal freight operators:

- **DB Schenker (DBS)** is the largest freight operator in the UK operating services throughout Great Britain.
- **Freightliner** operates throughout Great Britain and has two divisions: Freightliner Limited and Freightliner Heavy Haul.
- **GB Railfreight (GBRF)** is an operator of container trains and infrastructure services.
- **Direct Rail Services** operates traffic for the nuclear industry in the UK.

There is a large and diverse freight market in Kent, which is dominated by the import and export of goods as well as bulk aggregates for rail and construction industries. The Channel Tunnel handles a range of imported and exported goods, which traverse the Kent network via the freight yard at Dollands Moor. Port facilities on the Grain and Sheerness branches handle a similarly variety of traffic. Additionally, there are other dedicated freight facilities across the network such as Mountfield and Dungeness. In each case, the freight traffic shares capacity with passenger services on the main line and suburban network.

Route Safety Improvement Plan (RSIP)

This section describes our route actions to deliver a safe railway for all our stakeholders, our workforce, our contractors and customers, passengers and the public. We also highlight our efforts to reduce the risk imported by level crossings – one of the greatest safety risks on the rail network.

Route Safety Improvement Plan

Our Kent Route Safety and Sustainable Development (S&SD) Improvement Plan has been prepared to reflect both Network Rail's national vision for safety and sustainable development, and Kent Route's safety aim.

The Kent Route has the challenge of keeping the railway running in southeast London, Kent and East Sussex, to improve train service performance for passengers and freight traffic, and to increase the number of customer journeys.

To achieve this we must safely deliver projects and maintain the infrastructure whilst running services. This challenge will only be successfully achieved if safety is at the top of our agenda in everything that we do.

We aim ***to develop an environment of zero harm, developing a safety culture through focusing on the psychological, behavioural and situational aspects of safety***.

The Kent Route teams are committed to achieving the highest standards of health, safety and environmental performance and will use our S&SD Improvement Plan to further the aims of zero harm and deliver a continuously improving level of safety.

Managing safety and sustainable development is a key business driver and we are committed to developing, implementing, maintaining and constantly improving our associated strategies, plans and processes. This will ensure that all our activities take place under a balanced allocation of organisational resources, aimed at achieving the highest level of safety performance. In doing this we intend to meet and increasingly exceed national standards, while delivering our services.

Engagement and collaboration is critical to our success in delivering our safety aims. This will be achieved through existing forums and meetings, and via the implementation of new channels of communication between our staff, customers, passengers, public and third parties such as Local Authorities and the British Transport Police.

Planning for Safety

We want S&SD performance to be owned by everyone in the Kent Route, from front line employees to the Route Managing Director, and we will engage with people within our business to achieve this. Our S&SD Improvement Plan will provide clarity on our S&SD objectives and targets and set the overall direction as to how we will improve our performance. By collating all safety, wellbeing and sustainable development activity into one document we will provide all route employees with a single point of reference.

The Plan has two connected elements:

1. National Safety & Sustainability Policy and Principles, and the application of these to the Kent Route;
2. Local route based safety, wellbeing and sustainability initiatives. These will be focused both on risks generic to the Network Rail and/or specific to the Kent Route.

The Network Rail vision for safety:
We will work together so that everyone returns home safely at the end of every day.

Safety Management System (SMS)

Our S&SD Improvement Plan is underpinned by Network Rail's Safety Management System which is aligned to Health & Safety Executive and ISO management approaches. It provides a framework to achieve improvements in our health, safety and environmental performance for our staff, customers, suppliers, as well as the public and the environment.

Risk management

Our principal risks relate to:

- Employee safety and health, specifically in maintenance
- System safety in areas such as signal risk and level crossings
- Route crime, e.g. trespass, vandalism
- Safety of passengers at stations particularly related to slips, trips and falls

We will use the route's Active Risk Manager risk management process for S&SD risks. This will help:

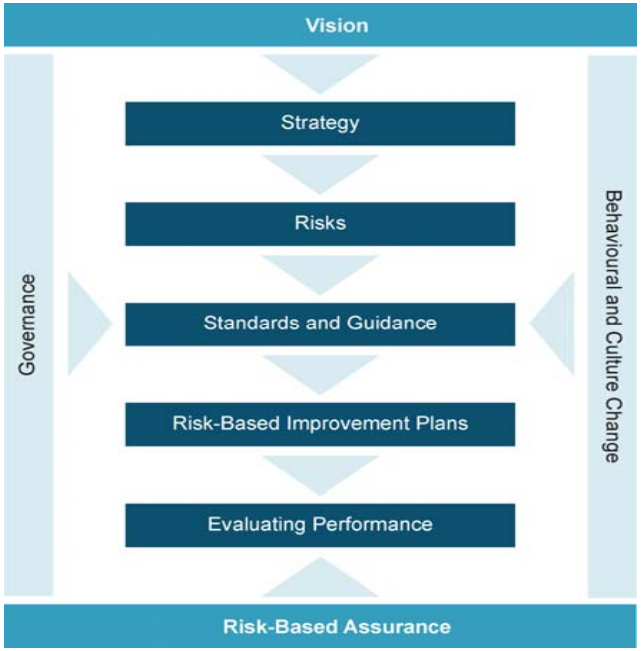
- to develop a clear understanding of the risk profile of the Kent Route
- to minimise and where possible eliminate safety and sustainable development risks to our staff, passengers and public; to our neighbours and to supplier staff by making safety a core element of our design, management, maintenance and operational activities
- to aim to eliminate work related injuries and ill health and associated losses and delays
- to actively comply with our rules and to challenge to have increasingly clear, relevant, rules and standards
- to adopt an increasingly risk based approach to our activities

Investigating Accidents & Incidents

We are continuously mindful of the risks present whilst working on the railway. For example, work takes place in close proximity to moving trains and other vehicles, on uneven surfaces, at height, and on or adjacent to live power sources.

Reducing incidents is inherent in a number of our work streams for safety and forms part of our safety culture programme. This programme will align with our safe by design work where opportunities for designing out risks will be taken. It will also complement our awareness campaigns to improve the knowledge of our staff in respect to the risks of their work and the controls available. Additionally our intent is to work towards a culture where all incidents are reported, including near misses, to improve our ability to prevent injury incidents from taking place.

We want to establish a culture where all members of the workplace are involved in establishing better ways of working, eliminating risks and developing safe methods of work. We want our staff to be competent to undertake their work and have the time and resources needed to safely fulfil their roles. Our intent is to review and enhance the coaching, mentoring and supervision in place, with all work being properly planned, and everyone working to a safe system of work in all instances.



Key risk areas that we will focus on are:

- Road rail vehicles
- Red zone working
- Electricity
- Working at Height
- Manual handling
- Slips, trips and falls including access and egress to the railway environment
- Road Rail Vehicles

Assurance

We will undertake appropriate assurance and monitoring activities to demonstrate and give ourselves confidence that we are achieving the objectives that we have set ourselves in our S&SD Improvement Plan.

We will assess whether our risk interventions are effectively controlling foreseeable health, safety and environmental risks to as low as reasonably practicable. We will monitor and measure tangible benefits such as accident reduction and intangible benefits such as positive safety behaviour. As a route we will seek assurance through validation of compliance, staff supervisory and engagement visits and review of data.

Examples of the methods we will use in Kent include:

- Health and safety performance indicators and trends – this will include a periodic review of route and national year to date (YTD) and moving annual average (MAA) accident and incident data
- Internal and external auditing – this includes internal auditing by our central and S&SD audit teams and the Office of Rail Regulation's (ORR's) audit programme
- Feedback from safety tours and planned general inspections – including a periodic holistic review of senior management safety tours and a detailed review of line manager and supervisors planned general inspections (PGIs)
- Feedback from ORR and our customers – gathered through level 1 and 2 meetings with the ORR and regular reviews held with Southeastern and other key stakeholders
- Employee feedback including review and response to CIRAS concerns raised and promotion of the new Close Call intervention process
- Close out of audit actions (National Core Audit Programme (NCAP)) – including regular Maintenance Delivery Unit and route reviews of progress and action plans

We will also aim to seek assurance of positive safety behaviour through the implementation of a Safety Behavioural Indicator to measure our performance against a set of indicators aligned to the ORR safety model RM3. Our intention is to drive positive safety behaviour from a bottom up approach and measure ownership of safety at all levels.

Workforce Safety

We are committed to continuously seeking new and improved ways to keep our people safe. The route will implement plans for:

Safety leadership and culture change

- to be active, visible and trusted leaders and managers across the route
- to provide effective leadership that fully engages and collaborates with our staff, suppliers and customers, encouraging all to take their safety and sustainable development responsibilities seriously
- for all staff to be included in improving our health, safety and environmental performance
- to embrace national initiatives

Culture and behaviours

- for safety and sustainable development to be at the heart of everything we do
- to develop a culture that is just, flexible, learning, questioning and encourages reporting
- to be an open, communicating business, to maximise the benefits of sharing best practice and identifying opportunities
- to empower all employees to speak up and get involved in creating solutions

Excellence

- to aim for excellence in our own activities and deliverables, and drive exemplary safety and sustainable development performance and risk management into everything we do
- to provide the skills and equipment required by our staff in order to do our jobs
- to learn continuously from all incidents – with employees and union reps involved in investigations, effectiveness of recommendations and sharing of good practice.
- to actively promote health and wellbeing for our staff

Health promotion and education

Our strategy for improving employee health and wellbeing will be focused on health promotions and reinforcing the benefits of a healthy lifestyle. To sustain a healthy workforce we need to invest time in employee wellbeing alongside physical risk reduction activities. We aim to raise awareness of occupational health and the benefits of a healthy lifestyle using a variety of media. This includes building on direct interventions such as Health Fairs, information leaflets and emerging national health strategies. We will use information from these to identify and target specific health interventions for our employees. Health surveillance for work-related health problems such as noise induced hearing loss (NIHL) and hand-arm vibration syndrome (HAVS) is already established and we will continue to maximise our use of this.

Electricity

We will continue to work to minimise the risk of contact with electricity on our route. We will look to maximise green zone working; improve our processes for isolations both on and off the track environment; and ensure our staff are fully briefed and aware of the risk of working in a third rail environment. We will work with to develop mechanisms to achieve safer, faster isolations.

Track worker safety

The physical environment and access to remote locations means that manual handling tasks are a requirement particularly for Infrastructure Maintenance teams and the risk of slips, trips and falls is ever present for those operating trackside.

To mitigate these risks we will improve our points of access and egress. We will either introduce additional access points or refurbish those which present a foreseeable risk to workers. The distance travelled from access point to the place of work will be limited to an acceptable distance, with cognisance also taken of possession limits to minimise the required line closures. Manual handling training will be reinforced through local presentations and toolbox talks; as will other training particularly on key risk areas such as working at height and lifting operations.

We will investigate ways to improve pre-task safety briefings, moving from generic references to more comprehensive and meaningful briefings to cater for the dynamic nature of their work. We will set demanding yet achievable targets to reduce injuries rates in accordance with Network Rail's zero harm strategy.

We aim to deliver a structured safety development programme for managers and supervisors of teams to: reinforce line management responsibilities for safety; understand how individual actions taken can affect the safety of others; and how teams can generate and deliver simple safety improvements.

Irregular working

We will work to make sure that any irregular working events are fully understood and actioned as appropriate to reduce the number of occurrences. By improving the consistency of risk ranking of irregular working events we will target resources in the correct areas and be able to manage the risk on the route more effectively:

- We will seek to reduce/eliminate the wrong routing of trains due to signaller error, competence or training issues; improve our processes and performance in taking line blockages; seek to remodel higher-risk junctions, and continue to improve our signalling risk profiling

Public safety

Kent Route is affected by a range of crime including trespass, vandalism and theft.

Other crimes range from relatively minor but offensive crimes such as graffiti to serious, life-threatening crimes such as throwing objects at trains and the wilful obstruction of the track with the potential to derail a train.

We will aim to tackle these through a wide range of actions that include:

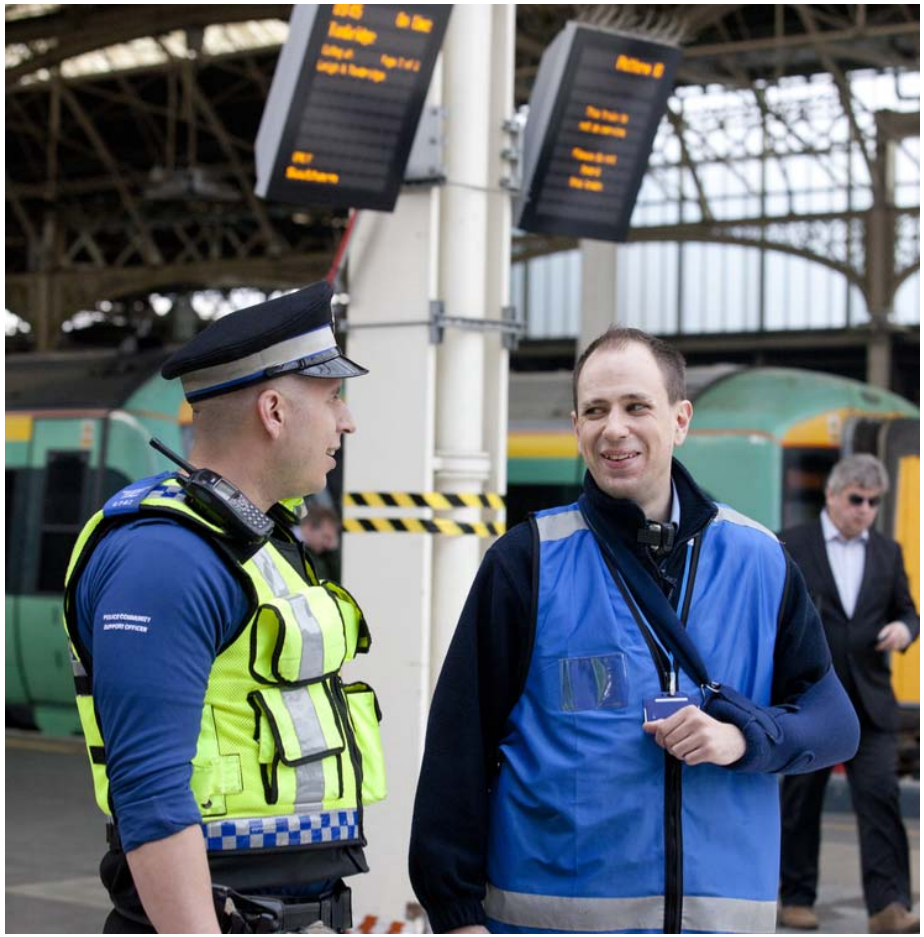
- A reduction in the number of incidents and minutes delay at our identified hotspots by developing a route crime reduction plan based around the 5 Es – enable, educate, engineer, enforce and evaluate
- Work with our national team and other routes to determine effective measures to tackle and prevent cable theft
- Work with the BTP to ensure resources are used effectively to deter potential route crime and undertake enforcement action
- Identify areas for potential fencing upgrades in high risk areas
- Develop a route strategy for scrap removal/collection to avoid stocking points around known route crime locations
- Prioritise areas of high graffiti and look for alternative solutions to deter graffiti
- Continue to build on relationships established with local authorities, schools and enforcement agencies in reducing railway crime, and review further opportunities to work with other agencies.

The route has plans in CP5 to minimise a range of external risks as far as reasonable. Increased vigilance (through patrolling of access points and the use of CCTV) and fencing improvement will be of benefit to issues such as cable theft and suicides, as well as wider incidents of trespass and vandalism.

Target hardening and the identification of Network Rail assets using SmartWater or equivalents will assist in deterring cable theft, whilst a programme of fast line platform segregation and ramp end barriers has been shown to reduce the risk of fatalities. Target locations for these activities mainly focus on south London locations (e.g. between Petts Wood and New Cross), where risk and potential impact are greatest, although some other urban areas (e.g. Medway and Thanet) are also under consideration. Nationally, programmes of education and legislative change will assist all routes in managing the risk.

The Kent Route has a Road Rail Partnership Group (RRP) covering the Kent County Authorities. We also attend the Sussex Route RRP meetings as a number of Kent Route level crossings fall within East Sussex County Council's boundary.

The RRP Group has been created to seek engagement in implementing closer working relationships with traffic authorities on Level Crossing issues which represent a significant source of road and rail delay. Additionally, regular meetings are held with the Local Authorities by the Operations Risk Team and the Route Enhancement Manager to progress the route's plans for the closure and upgrading of crossings throughout Kent and East Sussex.



Level crossings

Our strategy on level crossings aligns with national level crossing policy.

Our approach

We will implement plans that aim to reduce level crossing risk across the route. We will seek closure/diversion as our first option; if this cannot be achieved we will look at the option of bridges, then to alternative options and improvements. We will better engage with users of level crossings to reduce incidents of misuse and to actively discourage intentional misuse.

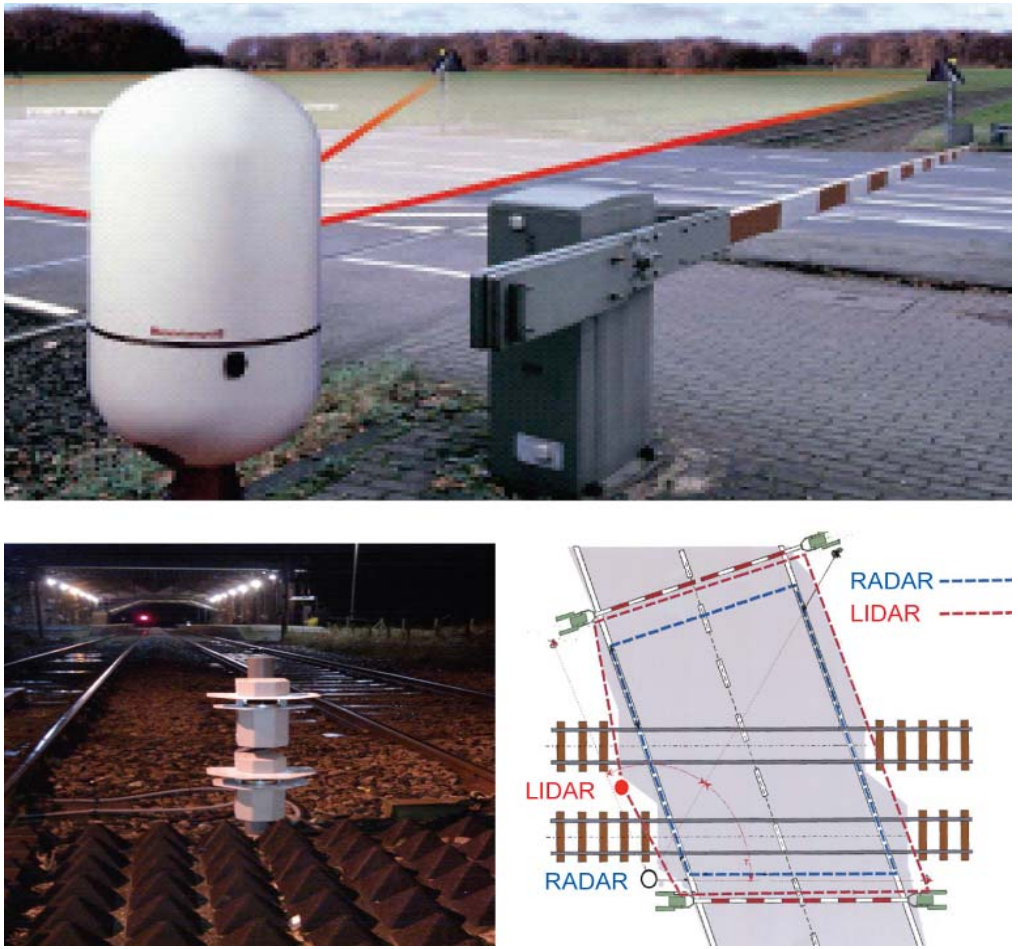
Our primary aim is to focus on reducing risk and where appropriate utilise innovative and novel methods in order to increase the delivery pace.

As part of our ongoing commitment to level crossing risk reduction during the rest of CP4 and through CP5 we will:

- utilise the Level Crossing Risk Reduction Fund to maximum effect.
- maintain a register of level crossings prioritised by risk as measured by All Level Crossing Risk Model (ALCRM), augmented with local knowledge and reasonable customer requirements. This register will provide long-term risk mitigation plan for each level crossing.
- hold a Level Crossing Steering Group which will oversee action plans for level crossing risk mitigation to ensure we implement the best risk reduction option, that milestones are being achieved and that the collective risk is reducing.
- work with our users and neighbours in order to raise awareness of the risks around level crossings, and via our dedicated Community Safety Manager improve level crossing awareness in known crossing hotspots and within risk community groups in conjunction with our route partners.
- deploy level crossing managers to develop and improve our level crossing inspection and maintenance regime including the use of remote monitoring equipment to enable improved consistency and efficiency in our management of level crossing assets.
- develop and standardise our use of Closed Circuit Television (CCTV) monitoring across the route to reduce equipment cost and improve operational roll-out.

MCB-OD

- The MCB-OD level crossing technology is a fully automated system requiring no intervention from the signaller in normal operations. As a standalone level crossing scheme or as part of a re-signalling, MCB-OD provides a re-control opportunity for locally controlled crossings. The technology has been successfully trialled on an operational crossing at Filey. It is approved for use across the network and will be rolled out in Kent in CP5.



MCB-OD Radar (top), Lidar (bottom left) and the area of obstacle detection provided

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Passenger safety

The route will implement plans in respect of a number of elements that contribute to passenger safety.

Platform train interface

We will work with our customers and the RSSB Stations Safety Working Group to identify and implement best practice arrangements to reduce risks at the platform/train interface; in particular those associated with train despatch.

Signals passed at danger

We will maintain the strategy of reducing the risk of Signals Passed at Danger (SPAD) by ensuring signals are correctly placed, line side vegetation is managed to maintain visibility, sighting inspections are carried out consistently and that TOC/FOC customers are continually engaged with us in actively monitoring the effectiveness of all signals across the Route. Specifically we will:

- Actively promote and seek funding for signal renewal schemes on the Route and look for opportunities to improve the asset.
- Deliver the five-year rolling Signal Risk Assessment plan for the route.
- Continue to replace existing signal heads with LED replacement of filament lamps, or full LED signal head conversion where appropriate. We will refurbish and replace signal back boards to enhance signal visibility where beneficial.

We will maintain historical data of signals encroached by vegetation ensuring persistent offenders have maximum sighting achievable through fitment of signal sighting plates to the infrastructure and management of line side vegetation.

Station management

In Kent we manage three stations, (London Bridge, Cannon Street and Charing Cross), with a further 204 stations managed by train operating companies. These are all maintained by us. Millions of customers pass through these stations every year. Passenger risk at stations represents 83% of total passenger risk on the entire network. The main cause of accidents is slips, trips and falls; with platform/train interface accidents whilst alighting and boarding and assaults also contributing.

We will work to reduce these risks by:

- Implementing best practice and slips/trips/falls reduction schemes
- Reducing passenger assaults through identification of “at risk” areas
- Improving our station capacity modelling and enhanced crowd management processes
- improving signage warning of the hazards of crossing tracks at stations
- implementing initiatives to tackle alcohol induced risks

Key to the above will be the continuation of our station renewals work and ongoing maintenance activities at our stations.

Seasonal management

Our aim is to implement appropriate controls at the right time of the year, and in the right place to minimise risks associated with seasonal differences. We will build on our work in CP4 to better manage the risks that arise from extremes of weather.

We aim to achieve this by:

- Delivery of an annual route vegetation management plan in conjunction with train operators and other stakeholders
- Reviewing the effectiveness of the rail head treatment programme and technology to maximising safety and availability of the asset
- Maintaining our conductor rail and points heating
- Building greater understanding between our operational and maintenance staff on the requirements and safety benefits of effective seasonal management initiatives

Sustainable Development

In Kent we want to deliver higher levels of safety, reliability and transparency, as well as better value for money for our customers and stakeholders. Sustainable Development (SD) is integral to the long term success of the company and the railway.

We have one aim with Sustainable Development:
To deliver a better railway for a sustainable Britain

We believe that good management of our economic and environmental impacts is key to maintaining a strong and sustainable business. Through sustainable development, we will drive efficiency, build trust and create long term value for our stakeholders.

In Kent, our approach to SD needs to move from being transactional: based on achieving compliance with standards; to transformational. Knowledge and momentum of SD within the route is not as advanced as other issues such as safety and performance, and considerable focus is required to bring it up to those levels. With most areas of SD there is an element of legislative compliance, our aim during CP5 is to move beyond simple legislative compliance.

Kent's SD strategy is based on the Network Rail strategy for SD.

Sustainable Development Improvement Areas

There are a number of key areas where we can affect change in order to help us achieve our aim, these are principally:

- Safety & Wellbeing (see workforce safety section)
- Energy & Resources
- Climate Change Adaptation
- Buildings & Land
- Environmental Protection
- Communities
- Accessibility and Inclusivity
- Employees

Energy & Resources

Opportunities exist for us to reduce energy and water use, waste generation, and resource use in general. We invest significant amounts of money in projects to maintain and develop our infrastructure; and on the cost of day to day operations. Opportunities exist to become increasingly sustainable, through sustainable procurement, considering the whole-life cost of resource use, and waste generation.

Network Rail is one of the largest purchasers of electricity in the UK. As a route we recognise that the biggest impact on sustainable energy production can be achieved through the lead role that Strategic Sourcing and NDS will take, working with electricity suppliers to provide the most sustainable options for electricity for Network Rail at the best price. This may also be the case for other key resources we procure such as sleepers, track and ballast and we will maintain our use of central procurement, over potentially cheaper but overall less sustainable options, where the Network-wide business benefits and a sustainable approach to purchasing can be demonstrated.

We will work with our TOC/FOC customers to support energy efficiency improvements and consider the potential for part funding/benefit sharing of schemes. For other products we will seek to procure local resources in a sustainable manner.

Waste management is an important area for our route to focus on. We will work with the national Strategic Sourcing team to maximise the efficiency of national waste contracts so that we can collectively make full use of these services. We need to focus on managing waste through the life cycle of its creation by designing out potential waste creation in the design stages of projects, reducing the amount of materials we use, and maximising the potential for recycling waste from all our activities. We will work with internal delivery services to enable us to measure our waste so that this data is available by business unit and can allow us to focus our efforts on critical waste streams and areas where performance can be improved.

We will undertake activities to improve the knowledge and understanding of resource and energy management. This will include designing for energy use/waste minimisation; and through our culture change work streams improving behaviours associated with waste management and water/energy usage.

We will progress the installation of SMART meters across the route, and look to develop a suite of environmental performance indicators to challenge our energy and water use including identifying and reducing leakage and also our waste production and recycling rates.

Climate Change Adaptation

The impact of weather patterns, extreme events, climate change and the way they relate to the running of a safe and timely railway cannot be underestimated. In order to build better weather resilience of our assets there are a number of things we can do through our Route Asset Management Plans (RAMPs). We will seek to develop our understanding of the current resilience of our asset, identify risks and adapt our RAMPs to reflect any new or different requirements. We will need to test the adequacy of our knowledge of climate change effects on the route and its likely impacts on our asset base; review as necessary our approach to Climate Change Adaption locally and develop more mature asset protection plans as necessary.

We will support the industry programme FRACAS (Flood Risk Assessment under Climate Change) and set an agenda to educate locally to ensure that climate change is adopted into the 'consciousness' of the business. Our asset management plans will reflect any issues that are identified by Asset Management Services to optimise strategic opportunities to enhance the resilience of our route and the rest of the country's resilience via the rail network.

Buildings & Land

As the owner of a large number of buildings, we have the opportunity to make simple changes that contribute to energy efficiency as we replace and refurbish locations across the Route. We will seek to retrofit buildings with energy efficient technology to bring our estate up to more modern standards. We will work with Asset Management Services and Property to set minimum specifications for sustainable buildings, and to define and mandate the use of a common assessment tool (e.g. BREAAM) and a recognised carbon calculator.

We will support the use of this tool and compliance with specifications, and will also utilise the carbon calculator so that we can link our carbon output to how much money we are spending.

We will drive a behaviour change in people's approach to energy efficiency both at home and work.

As a large land owner the route has a responsibility to maintain the land appropriately. The route travels through 9 Sites of Special Scientific Interest (SSSI). Opportunities exist for us to continue to run, maintain and develop the railway whilst protecting the habitats we operate in and the land we own.

Network Rail will adopt a long term strategy on vegetation management which will be developed by the S&SD team. We will support this approach, with the appropriate investment being made available, so that we can work towards managing vegetation rather than maintaining it without a net loss to biodiversity. We recognise the ongoing need to comply with the legislation associated with for example protected and invasive species and SSSIs. We will also establish, account for and quantify contaminated land on our route manage this at least in accordance with legislation.

Environmental Protection

We have a legal obligation to protect the environment and in Kent we will strive to minimise our impact as we enhance our infrastructure. We are committed to achieving this as well as compliance with all related Network Rail requirements. In part our success here will be achieved by including in our training, coaching and culture change programmes education and advice on these requirements.

We will ensure that environmental risks are considered for our route and managed accordingly. All our major projects will have environmental impact assessments and we will specify sustainable options from Investment Projects and our suppliers using the S&SD guidelines when these are produced.

Communities

The Kent Route runs through large tracts of London, the Medway towns and numerous other towns and villages. The route seeks to be a good neighbour to the communities we operate in and we will work with Local Authorities to improve our presence in the areas of social regeneration, community involvement and helping to change the public's behaviour around the infrastructure. We want to maximise the potential for our railway services in the sustainable economic development of Kent and will work with our Strategic Planning department in furthering this aim during CP5.

Accessibility and Inclusivity

The Route understands the important social role played by public transport. Public transport has a key role to play in improving accessibility for all individuals, thereby minimising social exclusion and enhancing social cohesion. We already have an 'access for all' programme at stations which we will be delivered in CP4.

Employees

Diversity, inclusion and investment in people are cornerstones of the Route's People Plan.

Route performance and capability improvement Plan

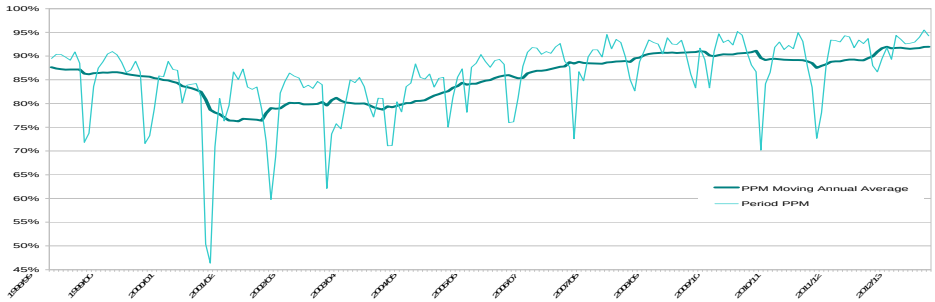
This section summarises the projects, actions and initiatives aimed at delivering Kent Route's performance targets in the remainder of CP4 and across CP5. It looks at capacity and capability improvements for both passenger and freight, and the key projects to achieve these.

Performance summary

The Route Performance Improvement Plan sets out forecasts of punctuality and reliability at a route level and key assumptions as to how this will be achieved – including actions by the route team, actions by others in Network Rail (NR), and actions by train operators.

The delivery of a reliable train service is what our customers, passengers and freight users rightly expect. The Kent Route is now delivering record levels of **punctuality**, with further improvements committed by the end of CP4. Against a background of continuing growth, the challenge will be to maintain this level of performance whilst accommodating the expected increase in passenger numbers.

The long term PPM trend for the Southeastern franchise



A priority will be to focus on reducing the effects of severe weather events so that the route can operate a reasonable level of service capacity with a good level of punctuality when they occur.

The Kent Route will see much welcome development in the next decade, with major capacity improvement works already underway. We will work with the teams delivering these programmes of work – particularly Thameslink and Crossrail – to minimise the impact of the works on train performance during the construction period. This collaboration is vital in ensuring we continue to run a highly reliable railway through a period of substantial change at critical locations in the route, most notably the reconstruction of London Bridge station, whilst at the same time passenger numbers are predicted to continue increasing.

Looking beyond the completion of the Thameslink programme, the operation of the 'core' route between London Bridge and St Pancras will be critical to the performance of Kent (and adjoining routes) as a whole. A very high level of **right time** performance for trains approaching the core section will be necessary. We will set asset policies and implement new operational procedures for the key Thameslink routes such that this can be achieved.

Traffic change and capacity utilisation will be a significant factor for Kent in CP5, with multiple major timetable changes resulting from phases of Thameslink Key Output 2 (KO2) delivery; along with the potential for significantly greater than the national average freight growth, potentially driven by growth in intermodal traffic through the Channel Tunnel. This will influence the levels of delay experienced within the route for these elements.

Kent Route Passenger & Freight Delays

Metric	2013/14 (CP4 Exit)	2014/15 (CP5 Yr1)	215/16 (CP5 Yr2)	2016/17 (CP% Yr3)	2017/18 (CP5 Yr4)	2018/19 (CP5 Yr5)
Passenger Operators						
Train Kilometres (000s)	**37,928**	**38,001**	**38,075**	**38,149**	**38,223**	**39,444**
Kent Route Delays (000s) – HLOS	**471**	**508**	**540**	**546**	**558**	**597**
Kent Route Delays (000s) – Downside	**520**	**569**	**612**	**614**	**633**	**651**
NR Delays/100 Kilometres – HLOS	**1.24**	**1.34**	**1.42**	**1.43**	**1.46**	**1.51**
NR Delays/100 Kilometres – Downside	**1.37**	**1.50**	**1.61**	**1.61**	**1.66**	**1.65**
Freight Operators						
Train Kilometres (000s)	**1,741**	**1,848**	**1,966**	**2,107**	**2,264**	**2,444**
Kent Route Delays (000s) – HLOS	**27**	**28**	**30**	**32**	**35**	**37**
Kent Route Delays (000s) – Downside	**31**	**34**	**37**	**39**	**43**	**46**
NR Delays/100 Kilometres – HLOS	**1.55**	**1.52**	**1.53**	**1.52**	**1.55**	**1.51**
NR Delays/100 Kilometres – Downside	**1.78**	**1.84**	**1.88**	**1.85**	**1.90**	**1.88**

Delivering CP4 performance

The Joint Performance Improvement Plans (JPIPs) for April 2012 to March 2014 establish the following expectations on CP4 exit performance for our main passenger operators:

2012-14 JPIP Commitments for CP4 Exit (All routes)

Train Operator	PPM	CaSL	Franchise Delays
Southeastern	**92.8%**	**1.9%**	**709**
Southern	**91.0%**	**2.5%**	**954**
First Capital Connect	**90.7%**	**3.0%**	**452**
London Overground	**97.0%**	**2.0%**	**152**

PPM and CaSL for Southeastern is aligned with the original Long Term Performance Plan (LTPP) for CP4. The franchise represents around 80% of the total traffic within Kent, so delivery of this is critical to the starting position in CP5 for the route.

London Overground is forecast to exceed the LTPP position, whilst Southern and FCC expect to deliver less. In all cases the total franchise delay minutes are expected to be greater than the original plans due to greater than expected traffic growth and changes in the delay-PPM relationship for most operators in the London & South East sector. Delays to freight trains are expected to remain broadly the same through to the end of CP4, as delivery of improvements driven by both the route and national initiatives (led by the dedicated Freight Recovery Board) are offset by additional traffic on the route, compared to the early years of CP4.

JPIPs

The JPIP for each operator contains a range of key deliverables to drive the improvements required to achieve the CP4 exit figure. Specific to Kent, some of these include:

- Creation of dedicated joint point care teams within each infrastructure maintenance delivery unit to combine specific track and signalling expertise for critical assets.
- Completion and commissioning of remote condition monitoring fitment phases 1 and 2 on points and track circuits.
- Mitigations on red (structurally high risk) bridges, which require blockage of the line after being struck, including fitment of CCTV to enable remote initial assessment of bridges after a strike and some reassessments to reduce those unnecessarily categorised as red.
- Realisation of the benefits from the winter resilience programme during CP4, including rollout of conductor rail heating, fitment of anti-ice treatment tanks on Southeastern class 375/8 multiple units, and the development of dedicated Snow & Ice Treatment Trains.
- Implementation of a new ‘cut and run’ policy for Southeastern drivers, to reduce the impact of failed trains at stations.

A full list of the planned schemes can be found in each operator’s 2012-14 JPIP. In line with established processes, it is expected that an update will provided on the plans for the 2013/14 year as part of the 2013-15 JPIPs.

Route Outputs

As part of the planning process the HLOS performance output of 92.5% England & Wales PPM at the end of CP5 was disaggregated to NR route and train operator level. Based on this starting position, routes have undertaken further analysis to distil their own figures based on an increasing understanding of the key factors that will affect performance during CP5. The current route view in terms of HLOS and worst (downside) case scenarios is as follows:

Metric	2013/14* (CP4 Exit)	2014/15 (CP5 Yr1)	2015/16 (CP5 Yr2)	2016/17 (CP5 Yr3)	2017/18 (CP5 Yr4)	2018/19 (CP5 Yr5)
HLOS						
Southeastern PPM	**92.8%**	**92.4%**	**92.0%**	**92.0%**	**91.9%**	**91.5%**
Southeastern CaSL	**1.9%**	**2.3%**	**2.4%**	**2.4%**	**2.4%**	**2.5%**
Southeastern Delays (Franchise)	**709**	**755**	**802**	**814**	**835**	**904**
Southeastern Delays (NR Only**)	**358**	**393**	**417**	**423**	**434**	**470**
Kent Route Delays (All TOCs)	**498**	**536**	**570**	**578**	**593**	**634**
Downside View *(worst reasonable outcome assuming normal conditions)*						
Southeastern PPM	**92.8%**	**91.5%**	**90.9%**	**91.0%**	**90.8%**	**90.4%**
Southeastern CaSL	**1.9%**	**2.5%**	**2.7%**	**2.7%**	**2.7%**	**2.9%**
Southeastern Delays (Franchise)	**709**	**834**	**898**	**904**	**934**	**1,007**
Southeastern Delays (NR Only)**	**358**	**434**	**467**	**470**	**486**	**524**
Kent Route Delays (All TOCs)	**551**	**603**	**649**	**653**	**676**	**697**

* CP4 exit position cureently assumed to be delivery of the second year forecast in the 2012-14 JPIP
** NR delays only include those originating from the NRIL controlled network, but not from High Speed 1 (but franchise delays do include HS1)

Delivering CP5 performance

There are a range of factors that can affect train performance. This includes things directly within the control of Network Rail, such as the condition of our assets, and external factors such as weather and acts of vandalism that can subsequently affect operations.

In CP5 each issue will require careful management to ensure we deliver a reliable and consistent train service.

Asset reliability

Other than occasional bouts of severe weather and seasonal delays in autumn, non-track asset reliability is the single biggest influence upon NR performance delivery. The condition, quantity and type of our assets in Kent are undergoing transformation, with Thameslink and East Kent Re-Signalling delivering significant change. Experience tells us that the transitional phase can be difficult as problems with design and installation are identified and rectified, but the net long term effect (potentially CP6 and beyond) will be improved performance due to newer and more reliable assets in many locations. Likely areas of focus for performance initiatives will be track circuit reliability (historically the biggest cause of non-track asset delays in Kent), critical cable condition and management of the conductor rail-train interface, where technology now exists to use on train software to monitor conductor rail condition and identify overall wear, and the potential for displacement or damage to shoegear.

It is expected that the benefits of remote condition monitoring on points and track circuits fitted in CP4 will be realised as the fitment is commissioned and processes for interpreting and responding to alarms are perfected. Further development of new forms of intelligent infrastructure (phases 3 and 4) will also provide benefit, particularly as technology moves from alarms and alerts to full condition and trend monitoring.

Track quality

Current models suggest the impact of track quality on performance (e.g. through the detection of rail defects, or reported rough rides, thus imposing speed restrictions) is unlikely to change much on current levels (with a minor blip in year 3). As well as efficiencies, the introduction of plain line pattern recognition is expected to help earlier identification of track quality issues and reduce the potential performance risk. The use of new high performance rail for renewals also has the potential to increase resistance to defects, although installation in CP5 may bring benefits in further control periods, as rail wear is improved. This links to the re-railing strategy within the route, which will have a specific focus on the corridor from New Cross Gate towards Norwood Junction in Sussex route during CP5, which has particularly high rolling contact fatigue (RCF) and defect clusters compared to the average in Kent. The specific clay banks risk for Kent is covered below. The production of drainage management plans will lead to a more targeted approach to drainage renewal and maintenance and therefore improvements to track geometry.

Weather risk

Kent has specific risks to manage across summer, autumn and winter. Track condition during high summer temperatures is a national risk, although Kent has a specific issue with long dry periods and the desiccation of the clay banks which key routes, such as the line from Ramsgate to Victoria, run along. In the past this has been a significant performance issue, although the past two years has seen the route's clay banks management plan (including targeted tamping) effectively control the risk. This will continue in CP5. The route will also continue to proactively manage the gauging of switch diamonds around the London area, which are a type of S&C that is particularly sensitive to temperature change.

Southeastern is one of the most affected operators by adhesion issues during autumn, with a PPM drop of between 4% and 6% most years. Routes from Tonbridge to Hastings and Paddock Wood to Strood amongst others are highly vegetated, with a number of cuttings surrounded by deciduous foliage. Improvements to the usage of traction gel applicators and onboard sanders have helped manage this risk, with further work to develop more strategic plans for vegetation management being developed. This could potentially include the use of eco-plugs and meshing to control re-growth after clearance works.

In the middle of CP4 the country experienced two consecutive abnormally severe winter periods, with Kent particularly affected due to its geographic location and a largely DC conductor rail based power supply. Since then an extensive winter resilience programme has been adopted with a new Key Route Strategy, the design and installation of conductor rail heating, development of dedicated Snow and Ice Treatment Trains and the fitment of anti-ice tanks to some Southeastern class 375 units. A review of the effectiveness of these arrangements is taking place with refinement likely to target further improvements.

Lightning has emerged as an increased performance risk in 2012, after the route experienced significantly more severe strikes than previous years. Further fitment of Furse surge arresters is already planned, but exploration of innovative new solutions is being pursued to further mitigate the impact in CP5, especially where Furse fitment would not be effective.

External risk

External risk (other than weather) has had an increasing impact on performance in CP4. Cable and metal theft of operational equipment has increased substantially, whilst the number of persons taking their own life on the railway has fluctuated. While the underlying trends in these areas are linked to issues outside the railway, mitigation efforts are detailed in this plan.

The mainlines from Kent and East Sussex into London have a relatively high number of bridges and viaducts and historically the performance risk arising from bridge strikes has been significant. It should be noted that, with rare exceptions, the majority of the performance impact of bridge strikes is as a result of operational mitigations to reduce immediate safety risks (e.g. line blockages or speed restrictions) and not a direct result of any structural issue.

Kent is pursuing changes to the way we mitigate the safety risk. This includes improved signage, the installation of CCTV to remotely assess bridge condition after a strike, and the reassessment of 'red' bridges to ensure each one has the correct level of dispensation applied.

Kent has comparatively few level crossings to other routes and, although a programme of risk reduction and closure is being progressed on safety grounds, the historic performance risk is low and is not expected to change significantly.

Incident response and Delay Per Incident (DPI)

DPI in Kent has marginally increased during CP4 – although the risk of large asset failures, in particular with track circuits in the London Bridge area, creates the potential for short term larger spikes. The presence of an integrated control centre with Southeastern has been crucial to this, and it would be expected for some kind of equivalent relationship to continue after Southeastern is refranchised (accepting the need to align with the NOS).

The route intends to explore the potential for more intelligent technology to aid decisions on response time based upon resource location and activity, rather than hard wired areas of responsibility – where the currently nominated 'owner' of the patch may not always provide the quickest response time. Technology also has a role to play in this area, where high remote condition monitoring alarms can be responded to in anticipation of an immediate asset failure. The current assumption is also that refranchising will not affect operator resource levels (e.g. drivers and fitters), which are key to minimising delays.

Nonetheless, aside from physical construction risks, the changes to the network (whether temporary or permanent) arising from Thameslink KO2 works create an additional risk, as options to work around failures become more limited and key routes (e.g. Herne Hill to Elephant & Castle) become significantly more congested. This is covered in the KO2 section, including resilience works to mitigate this risk.

Train operator performance

Given refranchising of three of the existing major passenger operators in Kent leading up to and during CP5, there is a great degree of uncertainty about the predictable levels of TOC-on-Self performance. It can be noted that FCC and Southeastern are currently experiencing improved fleet performance and a reduction of overall operational delays at stations and in depots. It is assumed that this current level will be broadly maintained through CP5 and the new franchises, as benefits from new technology and continuous process improvement are offset by some key rolling stock within the fleet reaching their mid-life (e.g. 375-377 units) and the introduction of new rolling stock for the increase in Thameslink capacity requiring a bedding in period.

For Southern, some upturn in fleet reliability is assumed, but only to the levels of the other franchises as industry good practice is adopted. The greater risk to train operator performance is around traincrew levels and the subsequent management of service recovery. This affects both NR and operator performance, as traincrew efficiency resulting in less flexibility and spare resource has a direct link to reactionary delay (and thus DPI). Again, however, in the absence of knowing the plans of any future franchisee, the current assumption is that resourcing will remain as it is currently.

As the lead route, Kent has briefed Southeastern at several stages though the established bi-lateral performance meeting structure on the CP5 planning position.

Freight operational performance is discussed in the freight capacity improvements section and the impact of the Thameslink Programme is covered in the projects section.

Targeted services to improve

Part of the HLOS commitment on performance is to reduce the differences in passenger experiences of train punctuality and reliability. In practical terms this means identifying and targeting specific groups of services which suffer from below average PPM, and delivering improvements to raise their PPM closer to the relevant franchise average. This, in turn, raises the franchise average. Currently the likely services to target would include Southeastern Mainline trains from Hastings and Tunbridge Wells, along with those from Ramsgate and Dover via Ashford International. These services are traditionally affected most by seasonal variation, so the management of autumn and winter risks will be critical to consistent delivery. Additionally, these services converge with each other and with other Southeastern services at several locations en route (Tonbridge, Sevenoaks, Orpington, Hither Green and North Kent East Junction), meaning the level of right time running at these nodes has a broader influence upon performance across numerous services. Additionally, peak Metro services from Gillingham/Dartford via Sidcup are also a target, with high capacity utilisation making them important services for Kent and South London commuters – again, Hither Green and North Kent East Junction are key nodal points for operational decisions.

Capacity and capability

The route has experienced considerable growth in passenger numbers, with Southeastern recording 7.2% in the past 3 years alone. We are providing additional capacity on many suburban routes by extending platforms and upgrading electrical power supplies to accommodate more, longer, 12-coach trains.

The Kent RUS forecasts growth of 30% to 2022, set in the context of major housing development in Ashford and the Thames Gateway, along with substantial office development in the City of London and London Bridge areas. Key to accommodating this growth are the Thameslink and Crossrail Programmes, which together provide a substantial increase in capacity both into and across London from 2018.

Beyond this, we will consider further capacity upgrades, and determine with Transport for London (TfL) whether to proceed with transferring the Hayes branch to an extension of the Bakerloo line, and extending Crossrail to Dartford or beyond. Journey times are key to the competitiveness of rail transport, particularly for longer distance trips. We will consider opportunities for raising linespeeds as part of our asset renewal plans.

More than 99% of services in Kent are operated with electric trains, many of which employ regenerative braking to return electricity into the traction power supply network. The 750V DC third rail system, which is installed at track level, can be seriously affected by ice and snow. 25kV AC overhead electrification offers opportunities for increased and more efficient power, higher winter reliability, and an improved ability to accept regenerative power. We will develop our electrification and signalling asset plans with consideration to the possible future conversion to 25kV, determining which parts of the route, if any, offer sufficient benefits to support conversion.

Examples of the growth by Kent SRS include

Strategic Route Section	Title	Current Av EMGTPA*	CP5 growth – IIP to HLOS (Av EMGTPA*)	CP6 growth – IIP to HLOS (Av EMGTPA*)
A01	Victoria Lines	10.55	12.6 to 16.3	13.76 to 18.1
A05	Chislehurst to Ashford via Maidstone	7.06	10.66 to 15.91	12.68 to 19.76
A14	Tonbridge to Continental Jn	9.40	10.63 to 11.98	11.2 to 13.14
B03	London Bridge to Windmill Bridge	24.4	28.06 to 34.51	28.48 to 34.72
B07	South London Lines	10.09	10.72 to 12.09	10.96 to 14.94
B13	West London Line	10.00	10.00 to 14.94	10.3 to 17.24

** Equivalent Million Gross Tonnes Per Annum*

Capacity

The delivery of a high capacity, high performance railway that meets customer expectation relies on the expert operation and maintenance of high quality assets. To improve performance, whilst continuing to drive efficiency, we will increasingly be looking to technology to assist us in deciding how to operate and maintain the network.

The Kent Route has a large quantity of rail infrastructure, particularly on the approaches to London, some of which is used only in times of disruption. The asset plans have been developed to provide the infrastructure that is needed to operate the timetabled train service with high levels of reliability.

Our renewal plans will specify assets that are **simple and easy to maintain**, with equipment placed away from the trackside environment where possible. We will develop new processes to allow rapid, safe access to the track where required, with remote isolation and short circuiting of the conductor rail to become standard on the busiest route sections.

Asset failures are the largest source of train delay, and preventing failure offers the greatest potential in reducing train delay incidents. We will expand our **remote monitoring** of critical equipment so that on our busiest routes, all assets that can be monitored will be, and in real time.

To improve the operation of the network, we will develop a plan which sees operational control of all signalling equipment in Kent transferred to one of three centres (Ashford, Gillingham and Three Bridges). Intelligent **traffic management technology** will be employed on key routes to enable service priority decisions to be made more quickly; the Thameslink route will employ this from 2017.

Delivering CP4 capacity and capability

CP4 delivery

As part of the CP4 Delivery Plan, the infrastructure to support the suburban train lengthening programme is being delivered. This will increase capacity and capability of the network and deliver HLOS capacity metrics.

The programme includes platform extensions, traction power enhancement, repositioning of signals and refinement of the operational plan to explore opportunities for selective door operation to permit 12-car services. Delivery is being phased in line with Thameslink construction timescales and rolling stock procurement programmes.

Train Lengthening Scope	Milestone
Driver only operation stations	Completed December 2011
Platform extension works (London to Dartford)	August 2013
Platform extension works (Gravesend)	May 2014
Power supply enhancement	June 2016 (the potential to advance this date is under review)

Programmes

In addition to the work packages shown above, a number of schemes were specified to improve the capability of the infrastructure in CP4 to support potential performance and journey time improvements on the route.

- The Thameslink programme, which will deliver improvements in capacity and performance throughout the South East and reduce the need for passengers to interchange onto the London Underground system by providing direct journeys north of the River Thames. The Key Output 1 work package has been delivered during the current control period and comprises major improvements to London Blackfriars and Farringdon stations, as well as other enhancements on the core Thameslink route. The major work at London Bridge station is due to be completed during the next control period.
- The Crossrail project will interface with the Kent Route on the North Kent line, joining the network from the portal at Plumstead and running to a new station at Abbey Wood. Work has already started with final commissioning expected during the next control period.
- The final phase of the East London Line was completed in late 2012 when a new junction in the vicinity of Queens Road Peckham connected with the existing London Overground Rail Operations Limited network. This provides a 4tph East London Line service between Clapham Junction and Dalston Junction.
- The first phase of East Kent resignalling was commissioned at the end of 2011. The new signalling between Ramsgate, Margate and Faversham is controlled from the newly commissioned Gillingham Integrated Electronic Control Centre (IECC). The development work for the second phase will be undertaken in CP4 with delivery occurring in CP5.

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CP5 capacity outputs

The Kent Route Output Specification contains targets to support achievement of Network Rail's HLOS capacity metrics across the morning three hour peak and peak hour at London stations (London Bridge [Kent], London Victoria [Kent], London St Pancras [terminating], London Blackfriars [terminating] and London Blackfriars [via Elephant & Castle]). The majority of the additional capacity is planned to be provided through completion of the Kent Suburban train lengthening scheme and the Thameslink Programme.

The HLOS capacity metrics reflect assumptions made in the development of the 2018 timetable specification. It is noted that the allocation of capacity through London Bridge and the Thameslink core will be specified through the Thameslink, Southern & Great Northern and Southeastern franchises which will start in late CP4 or during CP5. Should these assumptions change to reflect amendments to each franchise specification, the metrics may be updated through a change control process.

The full list of schemes contained in the HLOS is as follows:

- Kent train lengthening programme
- Thameslink programme
- Crossrail
- Traction power upgrade
- East Kent Resignalling capacity enhancements, including relocation of Rochester Station

The HLOS committed schemes do not include provision for additional berthing and stabling capacity and provision for such facilities is not included in the Kent SBP submission. It is anticipated that the berthing and stabling requirement is funded and delivered separately once the outputs for the two new franchises are more closely defined.

The South London RUS forecast a significant increase in peak passenger demand on the suburban network. Delivery of the Kent Train Lengthening programme and Thameslink programme during the remainder of CP4 and CP5 will provide 12-car capacity on relevant routes to meet the increase in passenger usage and meet the HLOS capacity outputs.

Improving passengers experience of the railway

Working with train operators, we will assess new methods of providing passengers with the **information** they need before and during their journey to help them make informed decisions about their trip. Also, we will examine how new technology can assist people throughout their journey whilst also 'helping us to help them', for example in areas such as crowd and congestion management at key interchange points.

The process of **accessing the train** at a station can present a challenge for infrequent travellers and those with restricted mobility. In the past three years we have delivered a number of station improvement schemes including the provision of level access from the station entrance to platforms at eight stations across the route as a result of the Access for All programme. We will work with operators, funders and local stakeholders to identify further locations for station improvements that enhance the customer experience. This will consider opportunities for incorporating such work into our planned station renewal programme. We will develop our asset renewal plans based on an awareness of the available route strategies so that they support any future enhancement plans.

There is a fine balance between providing train services for all that want to use them at the time demanded, and delivering the necessary maintenance and renewal activity to sustain a high level of reliability. Working closely with train operators, we will identify when our engineering works can be accommodated with the lowest overall impact on passengers and freight users. We will also provide greater notice of forthcoming major works, for example as a result of the Thameslink Programme, and communicate our plans with stakeholders.

Freight capacity and capability improvements

On the Kent Route, the most significant market sectors driving anticipated freight growth on the Kent Route are construction and aggregates, and Channel Tunnel traffic. Incremental performance and capability enhancements are planned during the rest of the current Control Period.

Freight performance

Generally commercial freight traffic in Kent is around 2% of the national total, with limited scope for intermodal flows. However, CP5 sees freight flows in Kent grow faster than anywhere, driven partly by flows towards the LaFarge sidings, Grain and Hoo Junction in North Kent, but also by the potential for new flows through the Channel Tunnel. Detailed studies of the requirements for the North Kent area are being considered, with a view to reducing both direct freight impact and any reaction to Southeastern. Strategic option examples include full bi-directional signalling of the line to Gravesend, construction of a new freight loop and track circuiting of the Hoo Junction reception roads.

There are also tactical options around the management of movements by shunters within Hoo and Grain. There is less certainty of the flows coming through the Channel Tunnel in CP5 and whether they go onto High Speed 1 or across country to the West London Line, but this could be addressed by the development of an international freight corridor. If the growth is realised then the robustness of the paths is critical to ensure that congestion risks are minimised.

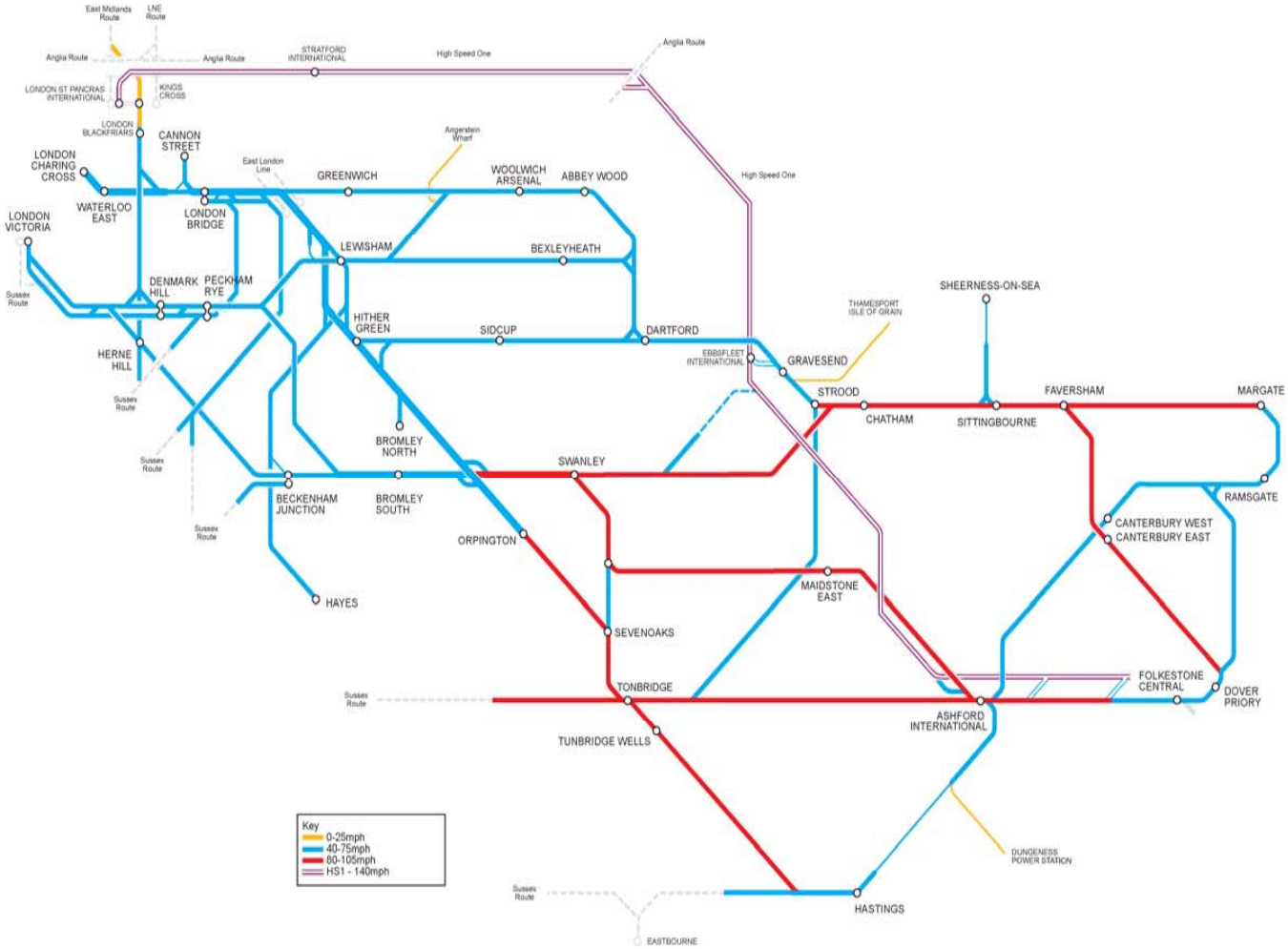
Freight development forecast for 2030

- Acceleration of current tentative growth in Channel Tunnel freight traffic following liberalisation, new entrants in near continent now delivering the service quality required to bring confidence in the Channel Tunnel through freight offer.
- Construction market led development of longstanding bulk aggregates traffic to/from established Kent railheads. Bulk haul of inbound stone coming from Peak Forest and the Mendips plus outbound movements of marine dredged material leaving Cliffe and Angersteins Wharf.
- Potential for realisation of frustrated demand for bulk rail haul of quarried shingle from Lydd to markets around and beyond London.
- Potential for re-direction of Thamesport traffics away from established North Kent routing via Medway Valley linking into Tonbridge mainline with gauge clearance on Medway Valley plus modified layout at Hoo Junction.
- Post 2013, commencement of domestic intermodal traffic from East Midlands to Isle of Sheppey, trunk haul moves for major retailer’s newly developed RDC.
- Post 2018, commencement of express freight temperature controlled deliveries from RDC to central London termini concourse stores.
- Potential overhead electrification of core Channel Tunnel route through Kent so linking Wembley to Dollands Moor, unlocks trailing weight improvements for class 92 traction and options for introduction of other AC traction.
- Development of post-Crossrail spoil traffics ex-newly reconnected LaFarge facility at Northfleet.
- Modification of inadequate legacy connection layout at Hoo Junction to meet NDS activity upswing and drive failsafe unstaffed train acceptance/dispatch.

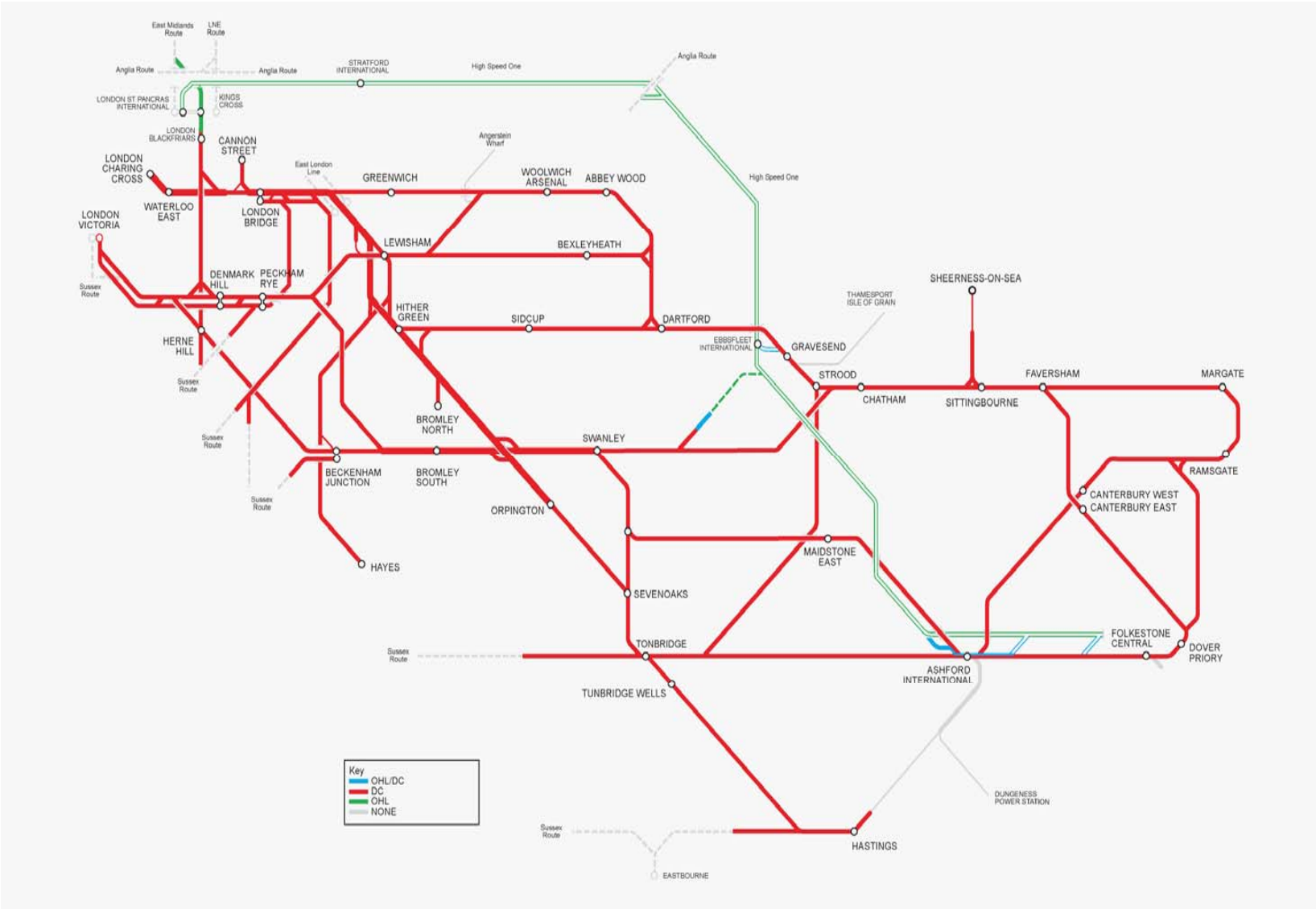
Capability outputs

The maps below display the current capability of the Kent Route. By the end of CP5, linespeeds on certain routes are planned to increase through a coordinated programme of interventions on certain lines and by the removal of permanent speed restrictions. Opportunities to optimise all capability measures will be exploited on the renewal of relevant assets.

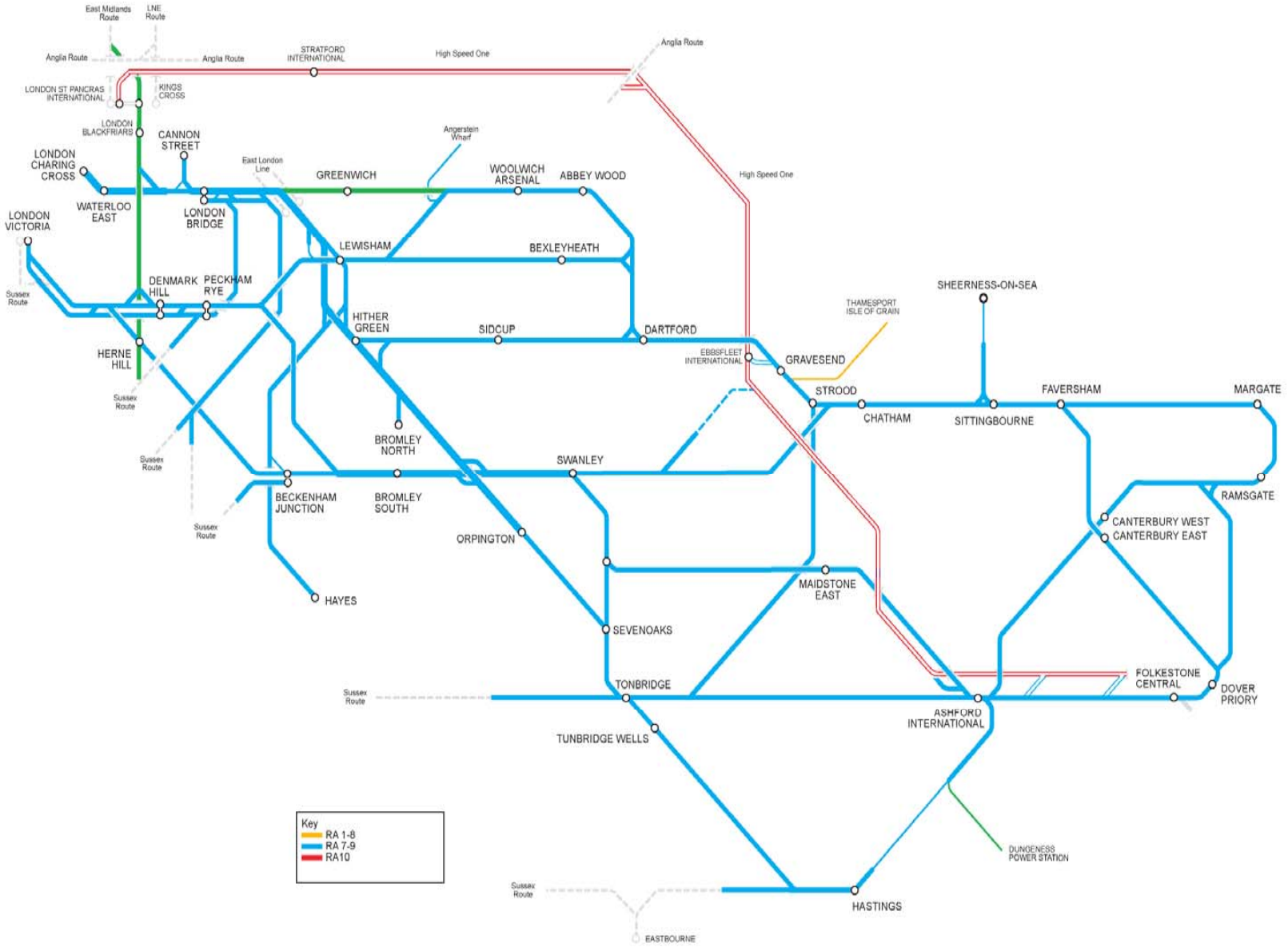
Linespeed



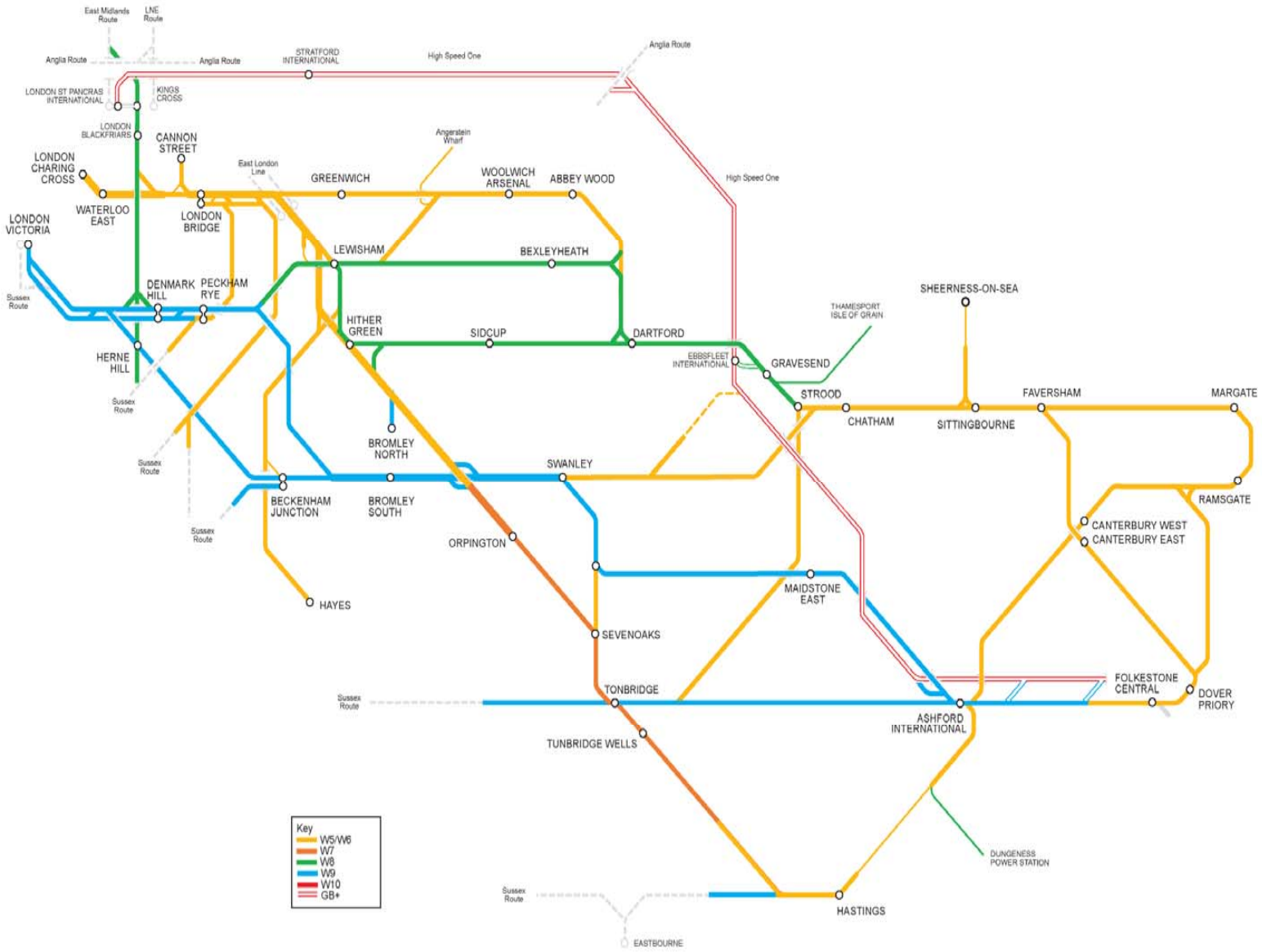
Electrification



Route Availability



Gauge


East Midlands Route
LNE Route
Anglia Route
Anglia Route
STRATFORD INTERNATIONAL
High Speed One
Anglia Route
LONDON ST PANCRAS INTERNATIONAL
KINGS CROSS
LONDON BLACKFRIARS
CANNON STREET
Angerstein Wharf
LONDON CHARING CROSS
East London Line
GREENWICH
WOOLWICH ARSENAL
ABBEY WOOD
High Speed One
WATERLOO EAST
LONDON BRIDGE
LONDON VICTORIA
LEWISHAM
BEXLEYHEATH
Sussex Route
DENMARK HILL
PECKHAM RYE
SHEERNESS-ON-SEA
THAMESPORT ISLE OF GRAIN
HITHER GREEN
SIDCUP
DARTFORD
EBBSFLEET INTERNATIONAL
GRAVESEND
HERNE HILL
Sussex Route
STROOD
FAVERSHAM
MARGATE
CHATHAM
SITTINGBOURNE
BROMLEY NORTH
Sussex Route
SWANLEY
RAMSGATE
BECKENHAM JUNCTION
BROMLEY SOUTH
CANTERBURY WEST
CANTERBURY EAST
Sussex Route
ORPINGTON
MAIDSTONE EAST
HAYES
SEVENOAKS
FOLKESTONE CENTRAL
DOVER PRIORY
TONBRIDGE
Sussex Route
ASHFORD INTERNATIONAL
TUNBRIDGE WELLS
DUNGENESS POWER STATION
Key
W5/W6
W7
W8
W9
W10
GB+
Sussex Route
HASTINGS
EASTBOURNE

Projects

The major programmes outlined in this section will provide significant capacity benefits and are likely to meet some of the immediate passenger demand challenges. However, incremental enhancements beyond the CP5 exit position will be difficult to achieve on the Kent Route without either considerable simplification of the peak timetable or major investment on specific schemes as train frequencies and lengths will be at a maximum for the current network.

In CP5, the Thameslink Programme will deliver the reconstruction of London Bridge station; the reconfiguration of the track layout on the approaches to London Bridge station including the construction of Bermondsey dive-under; and the re-signalling and re-control of London Bridge area.

East Kent re-signalling phase 2 will deliver the next stage of re-signalling and re-control of the East Kent area, deliver a re-located Rochester station, and provide necessary enhancements (track layout modifications and platform extensions) to deliver the 2018 timetable.

Crossrail will provide a re-built station at Abbey Wood to accommodate interchange with Crossrail lines running parallel to the Network Rail tracks from Plumstead Portal to Abbey Wood.

In addition to these specified schemes the route (in conjunction with Wessex and Sussex Routes) is developing proposals to deliver a step change in both safety and efficiency on dc third rail electrified lines. The proposals for implementation during CP5 and CP6 will introduce new infrastructure and processes to improve the taking of conductor rail isolations by significantly increasing the number of remotely operated devices employed. This should reduce both the time taken to implement an isolation and the level of direct person interface with the third rail.

The route has undertaken a review of where these devices offer best benefit and an outline scope has been produced. Further work will be undertaken to refine the scope, costs and programme between now and the end of CP4.

The proposals will provide:

- Remotely operated Negative Short Circuiting Devices (NSCDs) to replace/reduce the need to deploy manually fitted short circuiting straps.
- Remotely operated Controlled Track Switches (CTS) to replace manually operated hookswitches.

These will be primarily deployed on multi track high usage sections where line occupation is at a premium, time taken to establish the isolation is critical and requires staff having to access open lines.

The NSCDs will also improve the management of emergency switch off during running line incidents enabling the affected area to be quickly contained.

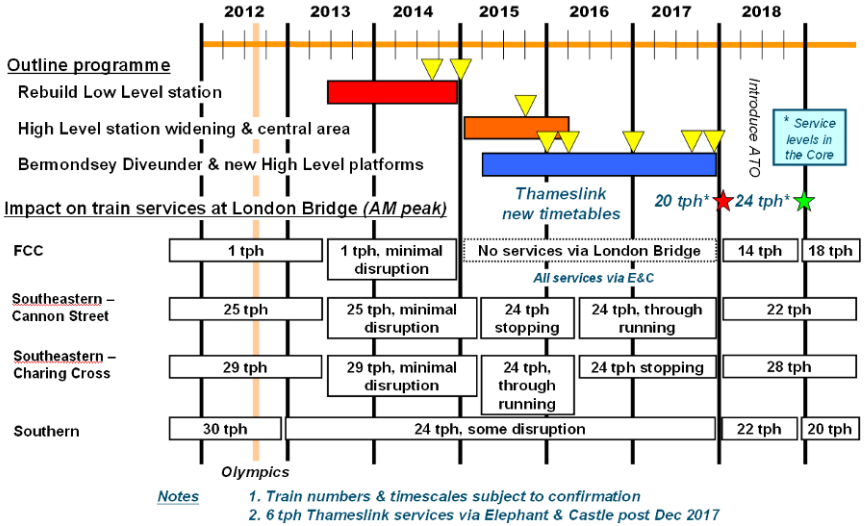
In addition, the number of conductor rail mounted manually operated hookswitches will be reduced replacing units with trackside disconnectors (TDs) which remove the need to expose staff to train movement hazards. This, in conjunction with process changes which can be deployed where all lines are normally blocked and isolated for engineering access (primarily two track railway) will again reduce the number of staff exposed to electrical and railway hazards and reduce the time taken to undertake isolations.

Thameslink Key Output 2 (KO2)

Thameslink KO2, and in particular the remodelling of London Bridge station, represents the single biggest performance affecting activity on Kent Route during CP5. The programme has the ability to influence performance in several principal ways:

- Disruptive access for the programme to undertake general construction activity, and the associated risk of overrunning possessions and potential for the handback of assets with latent defects or operational restrictions.
- Completion of specific major civil engineering aspects, such as the finishing of the Tanners Hill flydown and the creation of the Bermondsey dive under.
- Several significant timetable alterations – most notably the diversion of all FCC services via Herne Hill for three years and the non-stopping of Southeastern selective services at London Bridge, firstly those bound for Charing Cross, then those bound for Cannon Street, which will place much greater emphasis on the effective management of Cannon Street station.
- Limited operational flexibility during perturbation due to restrictions on the network layout and loss of assets that aid service recovery (e.g. removal of S&C facilitating crossing moves approaching London Bridge high level, resulting in the effective separation of routes to Cannon Street and Charing Cross from North Kent East Junction).
- Capacity limitations, particularly at London Bridge itself (e.g. the reduction of the available low level platforms for Southern to six), requiring the diversion and retiming of existing services and increasing capacity utilisation elsewhere.
- The introduction of a new high capacity timetable (and supporting rolling stock) as the construction works are completed. In particular the aspiration to commence a full 24 trains per hour service through the Thameslink Core in December 2018.

The current programme will see several stages of activity, each with a different impact upon the services currently operated by Southeastern, Southern and First Capital Connect:



In order to understand this impact, Steer Davies Gleave (SDG) was commissioned to undertake independent analysis of the potential performance impact. This included both the direct impact of the construction and timetable changes, but also the secondary impact of changes on wider performance issues (e.g. the ability to recover the train service after a major incident). SDG concluded that delay minutes may increase by as much as 22% during various stages of KO2 and that the adverse impact on PPM during some stages could be up to 2% for the main operators affected by the works. They also note that, assuming the December 2018 timetable change happens as planned, it may not be until CP6 before performance recovers entirely. The route believes that the SDG work is credible, given the current status of known issues and potential for further, as yet, unknown issues. However, some additional impact was added to cover change of scope (including benefits from service resilience works, as well as risks) in the overall route view.

In preparation for the KO2 stageworks, a programme of service resilience works (e.g. the renewal and replacement of key assets) will take place to support the diversion of all FCC trains via Herne Hill for three years, and potentially on the routes approaching London Bridge to support underlying performance in these areas:

- Refurbishment and renewal of points at Herne Hill, Loughborough Junction.
- Timber replacements at Loughborough Junction.
- Targeted re-railing along the Herne Hill and Sydenham routes.
- Removal of unnecessary breather switches.
- Replacement of incandescent lamps with LED equivalents on signals and banner repeaters.
- Upgrade of track leads at multiple locations.
- Changing of Ti21 track circuit receivers from analogue to digital (dependent upon the availability of the latest mod state).
- Commissioning of remote condition monitoring on further points and track circuits.
- Improvements to access points.
- Installation of Junction Lighting to improve night-time access opportunities at Loughborough Junction, Herne Hill and Borough Market Junction.
- Continued dedicated MOM response for the Thameslink Core at Farringdon (previously only funded until KO1 signalling commissioning) – although the location is subject to review.

There will additionally be contingency plans to manage disruption after London Bridge low level station capacity is reduced for Southern (with diversions into London Victoria), as well as the effective separation of Southeastern services into Charing Cross and Cannon Street.

Potential projects beyond CP5

A range of options have been identified for development in future Control Periods to meet forecast demand.

Crossrail extension to Dartford/Gravesend: Crossrail will provide significant additional capacity when opened in 2018 and by abstracting passengers from South East London, it will also provide crowding relief to services via London Bridge. Extending Crossrail to Dartford or Gravesend is likely to maximise these benefits. It is noted that such a scheme would require significant additional infrastructure investment and potentially the procurement of dual-voltage rolling stock. This aspiration is consistent with the London Mayor's Transport Strategy.

Hayes Branch conversion: The route between Orpington and London Bridge operates at maximum capacity during peak times. The improvements delivered by the Thameslink Programme will improve reliability and journey opportunities, but do not increase train frequency on the Kent Route. A potential option exists through the conversion of the Hayes branch to an alternative transport mode, such as extension of London Underground's Bakerloo line. This would release up to six paths into London in the high peak, which could be utilised by other services on the Sevenoaks/Orpington corridor. This aspiration is consistent with the London Mayor's Transport Strategy.

High Speed domestic development: The Kent Route Utilisation Strategy identified a strong case for developing the High Speed domestic network in Kent. The RUS recommendation of extending the services to Maidstone West via Strood has already been successfully implemented during the current control period. The provision of additional services to Ashford and lengthening of services to the Thames Gateway was also recommended to fulfil anticipated demand, particularly as there is significant housing growth planned in both regions. Such a scheme will also require additional high speed rolling stock and a long term strategy for the use of the international platforms at Ashford International station. The development of High Speed domestic services will need to be balanced against using capacity on HS1 for the emerging international passenger and freight markets, which is outside the scope of this document.

Network Availability Strategy

This section sets out our plans for developing the Kent Route and the capability requirements of our customers.

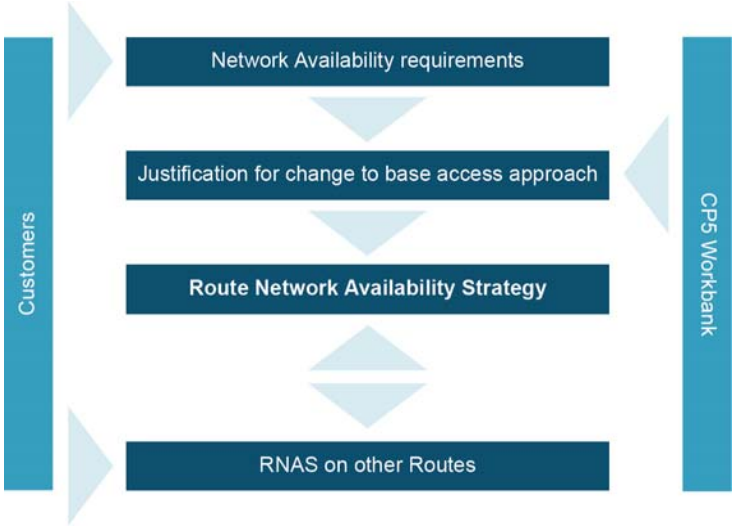
Network availability

The core objective of the Kent Route Network Availability Strategy (KRNAS) is to optimise access for improved service performance, enabling Network Rail and our train operators to succeed.

Kent Route Strategy

The principles that underpin the KRNAS are:

- **"Product" quality, availability and capability** – KRNAS recognises that network availability is a constituent part of customer satisfaction in that our customers want a product (train paths) that are:
  - Of consistent high quality – i.e. punctual services via high asset quality.
  - Available to buy when their customers need them – i.e. the network is available.
  - Capable of meeting customer needs – i.e. services of marketable speed and frequency, at a standard of comfort and facilities expected by the purchaser.



- **Joint working** – Kent Route has 11 franchised passenger, freight and charter/open access operators. Due to the interconnectivity of the Kent network effective access planning and negotiation must be based on partnership across different customers.
- **Cross route impact** – The South East network's interconnectivity characterised by cross route junctions and multi-operator London termini requires a South East regional overview in terms of access planning. South East Programme Delivery Group was created to facilitate a cross route view.
- **Multi-modal end to end journeys** – KRNAS recognises that many Kent passenger journeys involve more than one mode of transport particularly in inner/central London. Therefore due cognisance must be taken of planned service disruptions on DLR, London Underground and other modes.
- **Routes to Dartford** – Southeastern operate 3 routes to Dartford each serving a different part of the South East London commuter belt. The ongoing maintenance and renewal programme and enhancements in CP4, 5 and beyond will be planned to keep at least one route to Dartford available.
- **Crossrail** – Crossrail will interchange with the North Kent Line (NKL) at Abbey Wood from 2018, creating significantly enhanced availability to central London and enhanced journey opportunities beyond. The access strategy for NKL from 2018 will need to take account of increased importance of interchange via the NKL.
- **Protect high speed availability** – High Speed services from east and central Kent via HS1 are Southeastern's fastest growing service group. KRNAS recognises the importance of Southeastern High Speed, the service group's political and economic importance and the role High Speed services to St Pancras will play as alternative London destination during the Thameslink KO2 disruption in CP5.
- **Victoria and Blackfriars reliability and availability** – During the Thameslink KO2 works Victoria and Blackfriars (via Herne Hill) will be vital alternative London destinations. KRNAS recognises the increased importance of both termini during CP5.

Kent Route network availability requirements

There are 11 passenger and freight customers on Kent Route operating circa 2,100 trains per day: Southeastern, Southern, First Capital Connect (FCC), London Overground (LOROL), Eurostar, DBS, Direct Rail Services, GB Rail Freight, Colas Rail, Freightliner, and Europort2.

Customer priorities and expectations

Kent Route customers have been consulted throughout the development of the Kent Route Network Availability Strategy (KRNAS), and the strategy is governed via a joint Network Rail/Southeastern steering group.

Their key network availability issues and priorities for Kent Route customers are:

- Re-franchising – the Southeastern, Southern and FCC franchises are all due for renewal by April 2014 (subject to the outcome of the government's current franchising review). Customer input to the KRNAS is based on consultation with existing franchisees; the strategy will be amended as priorities for the new franchises emerge.
- Thameslink Key Output 2 – construction of KO2 (2013-2018) will affect a significant amount of Metro, Mainline and Thameslink services. The key impacts during construction will be:
  - Reduction in the quantum of Mainline and Metro services operating through London Bridge to Charing Cross and Cannon Street.
  - Diversion of all FCC services via the Blackfriars – Herne Hill route.
  - Reduction in capacity for Southern services which currently terminate at London Bridge.
  - Some Southeastern services to Cannon Street and Charing Cross will not stop at London Bridge.
- **KO2 Construction timetable** – the timetable for Southeastern and Southern services using London Bridge during KO2 is under consultation with all of the affected operators.
- **Service resilience and availability** – the reliability of alternative routes (that avoid) London Bridge is critical to customers and the CP5 access strategy will take account of the following:
  - Key junctions – Ashford, Rochester Bridge and Herne Hill are critical to the resilience of "non-London Bridge" services (including High Speed). Customers and the route asset management teams will work together to agree a maintenance regime that optimises asset quality and availability.
  - KO2 service resilience – The Thameslink Programme will fund a package of works to strengthen the FCC diversionary route via Herne Hill and to strengthen the resilience of assets in the London Bridge area critical to the effective delivery of the construction timetable.
  - Increased packaging – Customers will expect Network Rail to package works across the route taking maximum benefit from the reduced network availability generated by KO2.
  - 24 hour service via Herne Hill route – the maintenance/access plan for the Thameslink Core (St Pancras low level to Herne Hill and East Croydon) will need to take account of 24 hour Gatwick/Luton airport services.
  - Routes to Victoria & Blackfriars – The maintenance/access plan for the Rochester to Victoria and Swanley to Blackfriars route will need to take account of the increased importance of services on these routes to absorb capacity transferring from London Bridge services.
- Freight – The KRNAS recognises the importance to freight of the South London line and the regional importance of Hoo Yard. Projects are already underway to install junction lighting and utilise plain line pattern recognition, which will reduce the need for day time inspections on the South London Line. A feasibility study will be remitted to identify options to enhance access to Hoo Yard and reduce the exiting risk to Network Availability and punctuality.
- "Market based" approach to access – All passenger operators have aspirations to run later services on weekends and Thursday/Friday nights to capitalise on the increasingly important leisure market. Work is underway with Southeastern to review opportunities to potentially reduce frequency on late night services earlier in the week, creating longer access for maintenance whilst reducing access taken later in the week and at weekends.

Network availability strategy and access

Core objective	Scope	Owner
The core objective of the Kent Route Network Availability Strategy is to optimise access for improved service performance, enabling Kent Route and our train operators to succeed	See “sub strategies”	General Manager Kent & Head of Service Delivery Southeastern

Supporting “sub objective”	Scope	Owner
Asset Strategy	Where appropriate to specify assets that require reduced disruptive access and introduce new assets/techniques that require less disruptive collation of asset condition data	DRAM Kent & Director Engineering Southeastern
"Market-Driven" and innovative approach to access	Implement opportunities to alter historical access patterns that better recognise the current and future needs of the customer and what is required to maintain a safe and reliable service	REM Kent & Head of Passenger Services Southeastern
Stakeholder management	Keep all stakholders informed and enguged in development and delivery of the strategy	REM Kent
Planning Stability and Adherence	To provide customers with robust access plans, negotiated with the TOCs/FOCs in accordance with the industry framework and delivered as planned	Lead Access Planner Kent Route & Access Planning Manager Southeastern
Possession utilisation and efficiency	Seek opportunities for Network Rail and TOCs/FOCs to improve the productivity of all access taken	Route Maintenance Director Kent Route Access Planning Manager Southeastern
Major programme impact optimisation	To maximise the long term Network Availability improvement opportunities provided by major programmes planned on Kent Route in CP5 – Thameslink, Crossrail, East Kent Resignalling	Senior Programme Manager Kent Route & Project Delivery Manager Southeastern

Key routes and flows

- London Metro – services running on average 19 hours per day with only minor reduction in services on Saturdays.
- Mainline – services from London to Kent and East Sussex Coast, terminating/departing from Victoria/London Bridge/Cannon Street/Charing Cross or Blackfriars. Services run on average 16 hours per day.
- High Speed – services from East Kent to St Pancras International via HS1 and international services via HS1 and Channel Tunnel. Since the introduction of High Speed domestic services the attractive journey time reductions have driven a shift from mainline services and triggered growth overall. High Speed via HS1 provides a vital additional diversionary route for central/east Kent passengers. Therefore maintaining availability of High Speed during the significant London Bridge disruption planned in late CP4/throughout CP5 will be a core objective of the Kent RNAS.
- Thameslink – the Farringdon to East Croydon section represents the core of the Thameslink service, routed via either London Bridge or Herne Hill. For two years during KO2 construction all Thameslink services will be diverted via Herne Hill. During the diversion the route and operators must find the optimum balance between network availability and sufficient access to maintain the asset to high quality to deliver a robust level of PPM.
- Freight – significant freight flows utilise the South London line throughout the day with Metro services. For example up to 5 trains per day are planned to convey spoil from the western portal of Crossrail to Northfleet (east of Dartford). The South London Line will become more congested following the introduction of new East London Line (ELL) services on completion of ELL Phase 2 in December 2012. Hoo yard and its connection for Thamesport are strategically important for both freight traffic and as the South East hub for engineering trains. Due to gauge issues access to Hoo is restricted creating risk to PPM and Network Availability.
- Charter – VSOE and other charter operators operate regular charter services with frequency increasing in the summer, presenting availability strategy risks.

CP4 access risks and potential mitigations

Delivery of the HLOS Train Lengthening Programme in Kent by the end of CP4 will require significant volumes of possessions in late 2012 and throughout 2013, for both platform lengthening and power supply upgrade works. Additionally Gravesend remodelling requires a 15 day blockade at Christmas 2013 which will disrupt Southeastern High Speed services and heavily loaded metro services. Kent Route, Southeastern and Infrastructure Projects are working in partnership to design the access plan. Funding has been committed to install a turnback facility at Northfleet reducing the impact on Metro services.

Franchise renewal

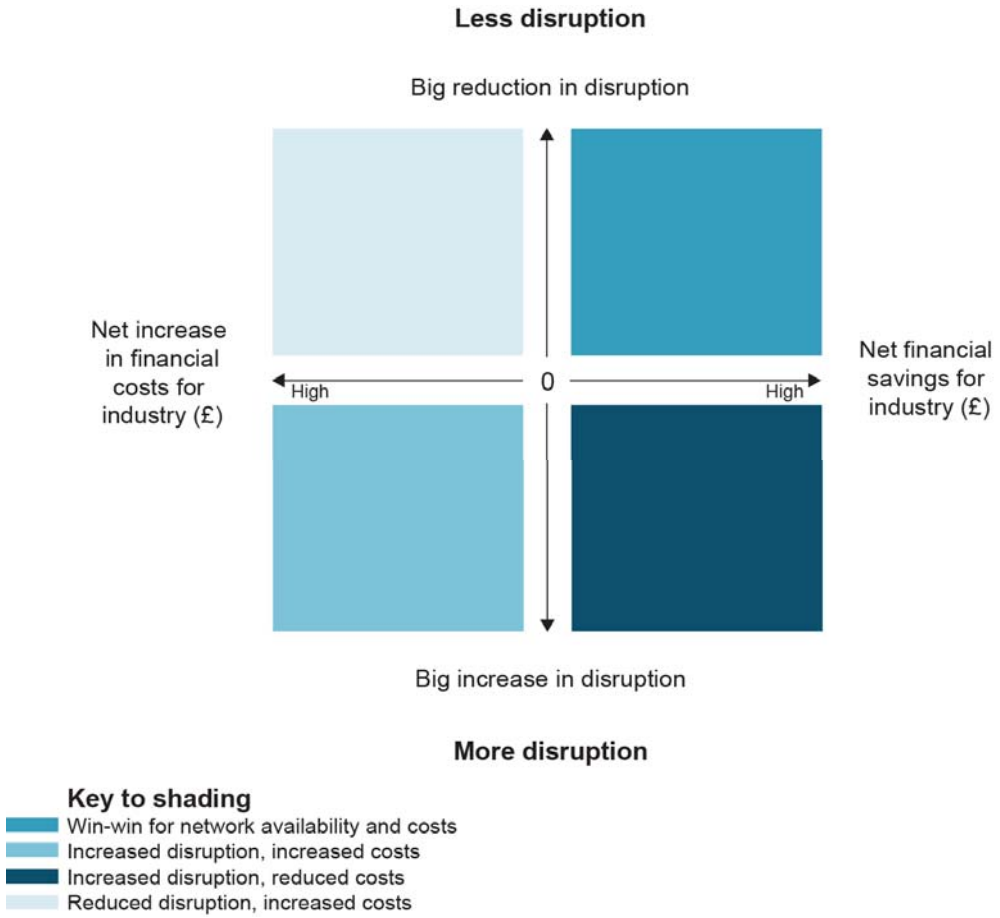
Network Rail will be seeking a collaborative approach to access decisions as current franchises come to an end, i.e. FCC (2013), Southern and Southeastern (2014). Given the back-loaded CP4 programme in Kent any deterioration in NR/TOC cooperation must be regarded as a risk.

Integrated Access Planning – Kent Pilot

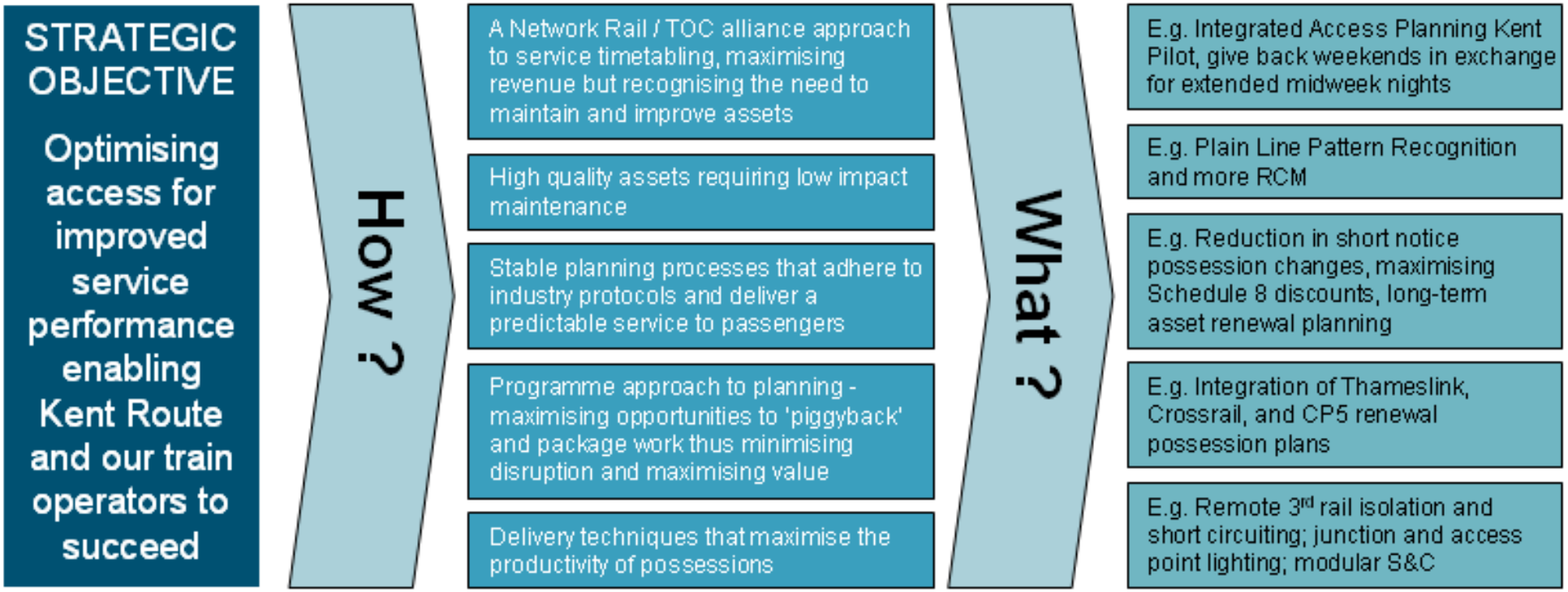
Sponsored by RDG and governed via the KRNAS Steering Group and Kent Route/ Southeastern Alliance protocol, Kent Route is piloting a zero-based review of access required for the 2013/14 timetable

The objective of the pilot will be to establish the optimum balance between access required to deliver a robust and reliable infrastructure, minimise disruption to services and the provide train paths that enable the passenger and freight operators to growth their business.

The “win-win” end result envisaged would be an access regime that is aligned to both the operator’s revenue growth/cost reduction strategy and the route asset management strategy.



Kent Route Network Availability Strategy – The strategy



Operate Plan

This section considers how the Kent Route will deliver its operational plans, including signalling migration initiatives.

CP4 and CP5 Operate Plan delivery

The opportunity exists to reduce Kent's annual operating costs by over £4m compared to baseline and deliver improved operational performance.

Some enabling elements of the strategy have been deployed in CP4 providing the capability to accelerate renewals investments to successfully reduce opex costs. Future benefits are split by Control Period and can be seen in the accompanying tables (Figures 1a-d show the number of SEUs per workstation split by technology type).

Figure 1a: North Kent (Gillingham) ROC – SEUs per workstation – Current (2012/13)

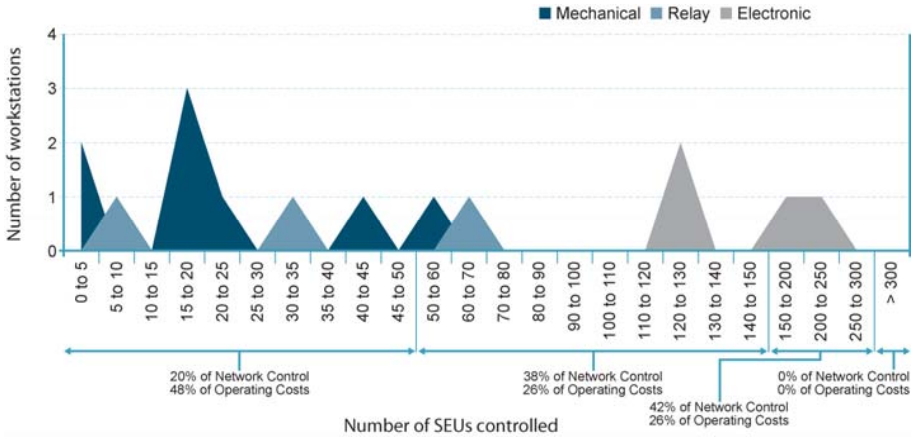


Figure 1b: South Kent (Ashford IECC) – SEUs per workstation – Current (2012/13)

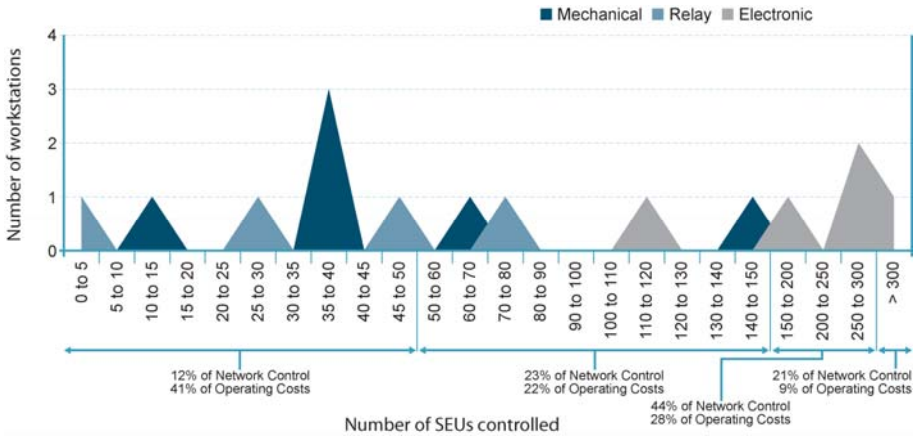


Figure 1c: North Kent (Gillingham) ROC – SEUs per workstation – CP7 (2028/29)

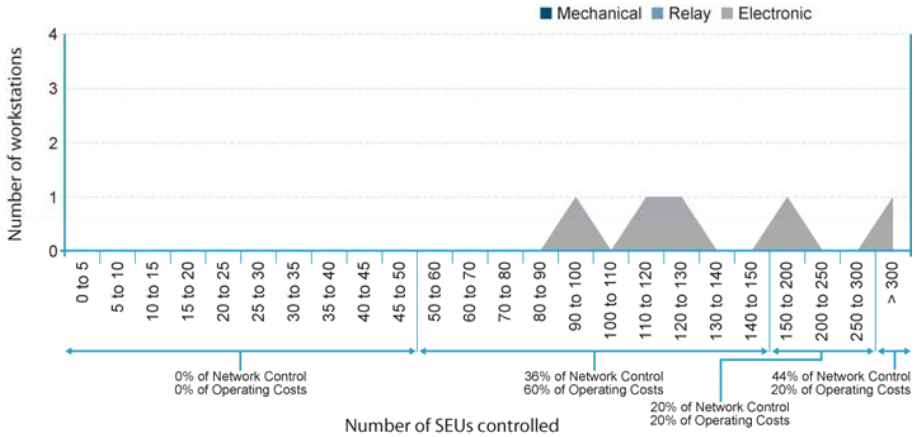
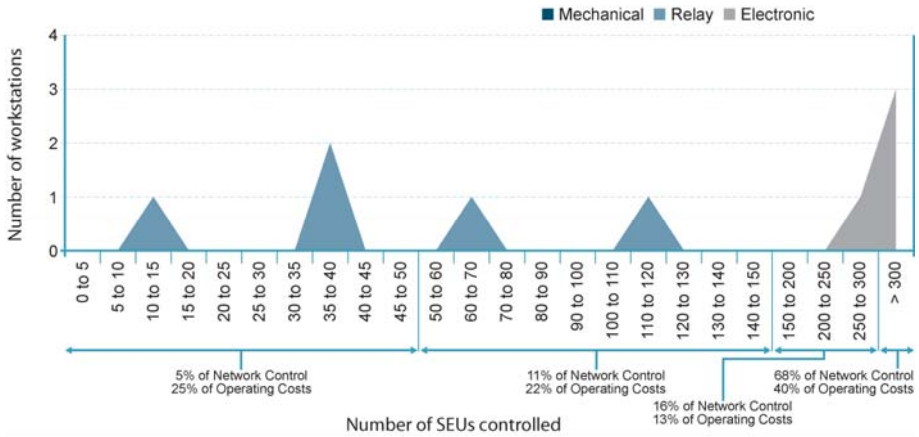


Figure 1d: South Kent (Ashford IECC) – SEUs per workstation – CP7 (2028/29)



CP5 delivery

The plan takes account of the impact of initiatives to drive further efficiency into operations, e.g. NOS, ROCs, electrical control. The vast majority of the efficiency gains in CP5 are derived from re-signalling and re-control projects on the route. Overall we expect to see a net headcount reduction of 95 signalling posts. This net figure includes 36 new posts being created in Three Bridges Rail Operating Centre (ROC) on Sussex Route with the closure of London Bridge ASC. The net reduction represents 36% of the establishment compared with CP4 exit.

Some Local Operations Managers posts have been factored into the overall efficiency, but the Operations Managers have not. This is in recognition that the workload which will need to be managed in the transition will be complex.

The main projects impacting on the route are the Thameslink Programme and East Kent re-signalling.

Nationwide all existing electrical control supervisory systems are due for replacement by 2022. The strategy is to migrate all existing control systems onto a common operating platform. This will provide an opportunity to rationalise the way we undertake electrical control activities and provide appropriate back up capability. It will also enable the electrified network to be expanded more readily. In line with a devolved organisational structure; the intention is to provide capability to align electrical control to one or more ROCs on each route.

In Kent the electrical control strategy will see the three current Electrical Control Rooms move to the North Kent (Gillingham) ROC. There is no headcount reduction envisaged and there is an assumption of increased cost due to payment of Personal Daily Travelling Allowance (PDTA) for those staff that will have moved.

Efficiency driven into the base plan

Opportunities for efficiency to be driven into the base plan arising from the Route Safety Improvement Manager's team and the Route Performance Manager's team, which aim to reduce headcount by around four posts in total.

Opportunities for further efficiencies to be gained from the General Manager's team have not been considered beyond those to be achieved through the NOS programme. As the process for managing and implementing the extensive changes resulting from the NOS programme becomes better developed, further opportunities for efficiency through smaller scale projects and rationalisation of teams in different areas are likely to emerge.

ROCs

The North Kent (Gillingham) and South Kent (Ashford IECC) 'ROCs on a page' are shown in figures a and b below (for migration details see ROC migration plan).

Figure a: North Kent (Gillingham) ROC on a page

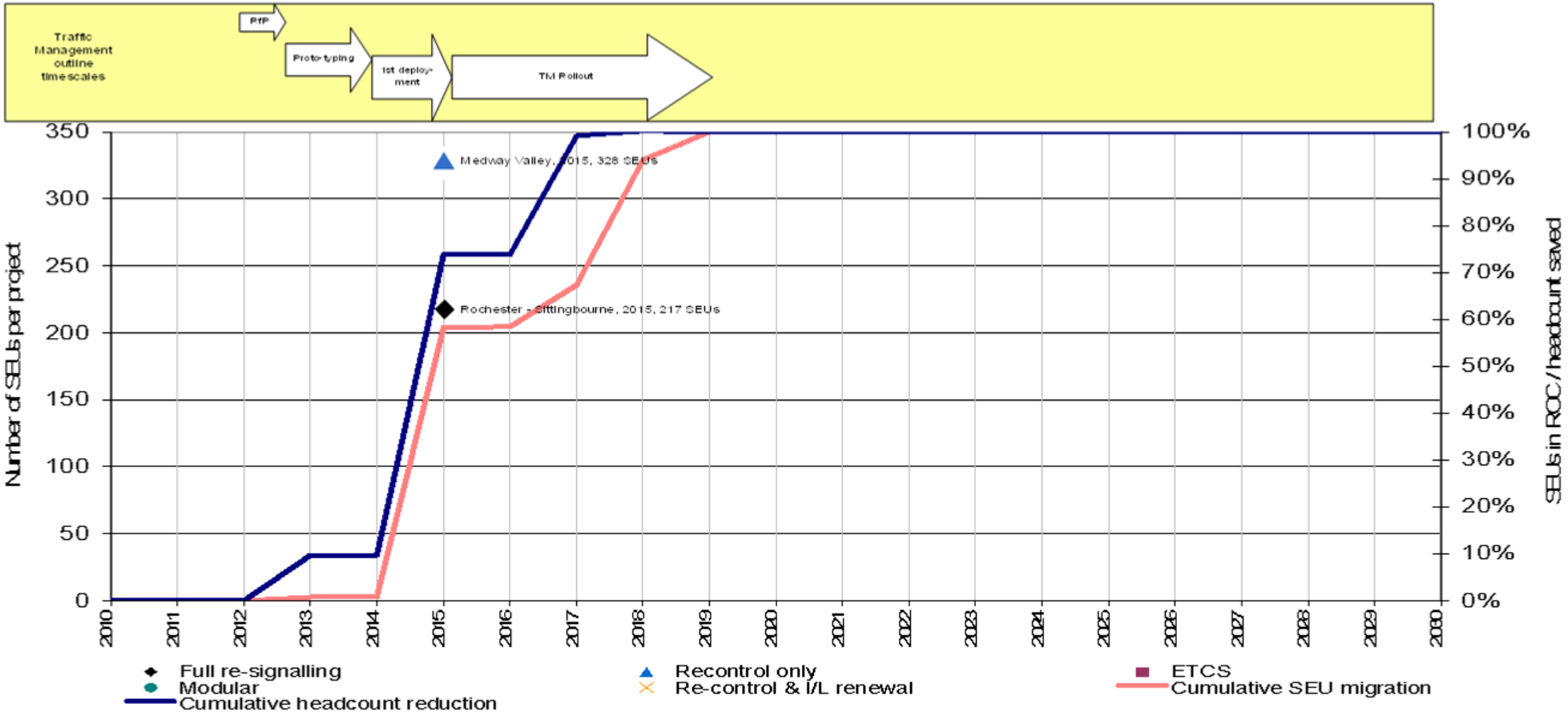
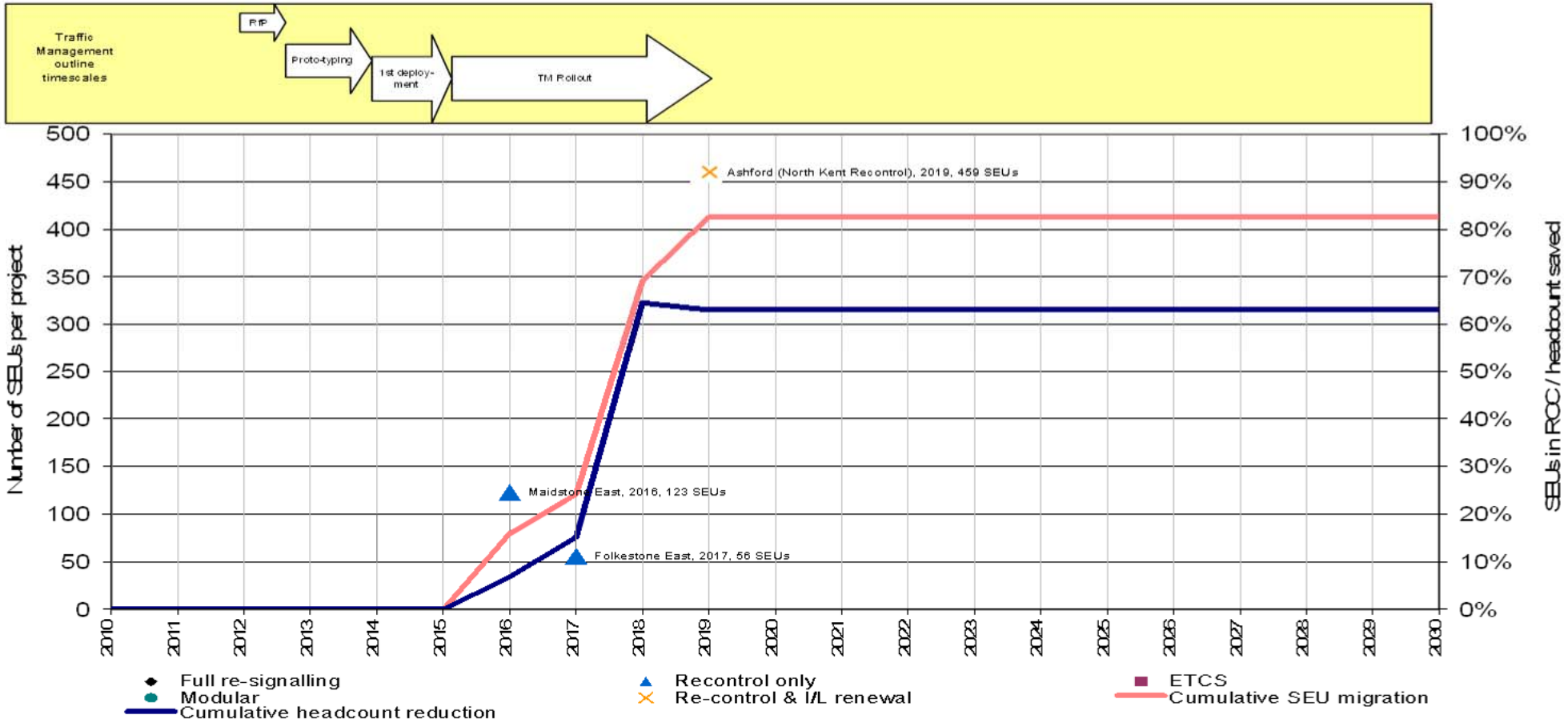


Figure b: South Kent (Ashford IECC) on a page



Signalling migration

Gillingham Rail Operating Centre (ROC) and Ashford IECC are already constructed and contain signalling and control functions. This section defines the signalling control areas at high level and highlights route boundary changes.

Gillingham ROC will see the migration of Rochester to Sittingbourne take place in 2015. The remainder of the migration will take place from 2017 onwards, including some Ashford IECC workstations moving into Gillingham ROC. Migration will be completed by 2019.

Ashford IECC will see the migration of Maidstone East and Folkestone East in 2016 and 2017 respectively, and the remainder of the route will be migrated from 2019 onwards.

Signalling control area
• Cuxton – Wateringbury

Areas of note

Signal box	Current route	Future route	Migration Year
London Bridge SB	Kent	Sussex	2018

Signalling control area
• Bo Peep Junction – Tonbridge • Sturry – Hastings • Dover Priory – Maidstone East

Areas of note

Signal box	Current route	Future route	Migration Year
Bexhill SB	Kent	Sussex	2013
Victoria SCC	Kent	Sussex	2015-2020

North Kent (Gillingham) ROC migration plan

Recontrol Year	Programme/Project Name	Signal Box and * where over multiple years
2013	Snodland [to Aylesford SB]	Snodland SB
2015	Medway Valley [to North Kent (Gillingham) ROC]	Aylesford SB
		Cuxton SB
		East Farleigh SB
		Maidstone West SB
		Wateringbury SB
	Rochester – Sittingbourne [to North Kent (Gillingham) ROC]	Gillingham SB (Kent)
		Rainham SB
		Rochester SB
		Sittingbourne SB
2018	Ashford (North Kent Recontrol) [to Gillingham or Three Bridges]	Ashford IECC NK*

South Kent (Ashford IECC) migration plan

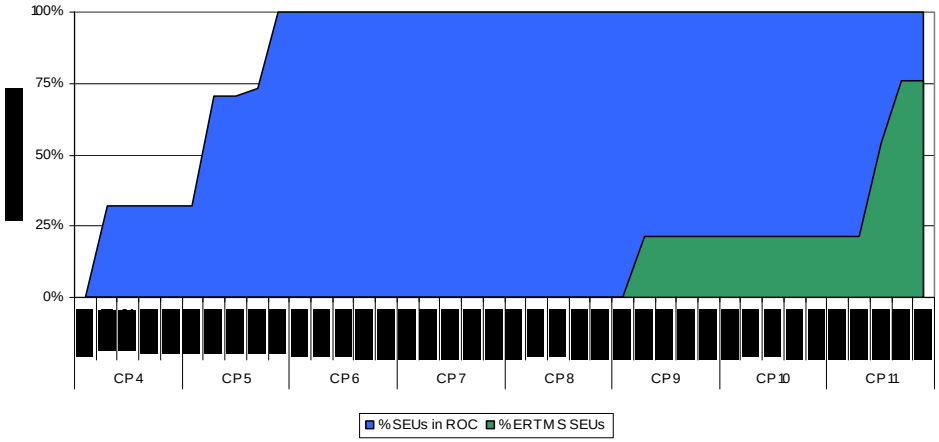
Recontrol Year	Programme/Project Name	Signal Box and * where over multiple years
2016	Maidstone East [to South Kent (Ashford IECC)]	Maidstone East SB
2017	Folkestone East [to South Kent (Ashford IECC)]	Folkestone East SB
2018	Ashford (North Kent Recontrol) [to Gillingham or Three Bridges]	Ashford IECC NK*
2020	Sturry & Canterbury West [to South Kent (Ashford IECC)]	Canterbury West SB
		Deal SB
		Sandwich SB
		Minster SB
		Sturry SB
	Wye Area Control Centre [to South Kent (Ashford IECC)]	Wye Area CC Interlockings (Chartham XGB)
		Wye Area CC Interlockings (Wye XGB)
		Wye Area Control Centre
2026	Tonbridge [to South Kent (Ashford IECC)]	Tonbridge SB
2048	Hastings Line [to South Kent (Ashford IECC)]	Bopeep Junction SB
2053	Hastings Line [to South Kent (Ashford IECC)]	Hastings SB
		Robertsbridge SB
		Rye SB

This map shows the proposed allocation of workstations to sections of route, following initial analysis by CCD Ltd. This map is for Ashford IECC only; a map has not been produced for Gillingham as this migration is largely understood. Indicative workstation areas of control within Ashford IECC following initial analysis:

ERTMS

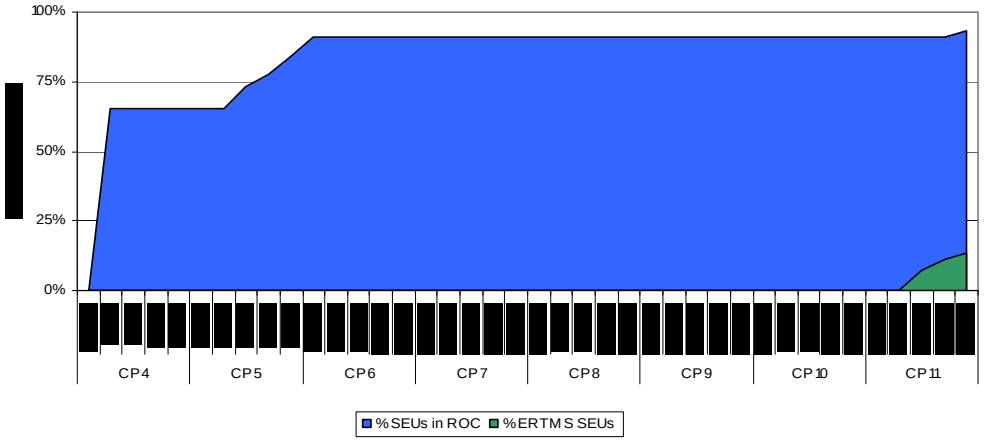
European Rail Traffic Management System (ERTMS) is not planned to be implemented on the Kent Route until 2034, as shown below.

North Kent (Gillingham) ROC SEU migration



	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11
% ERTMS SEUs	0%	0%	0%	0%	0%	22%	22%	76%
% SEUs in ROC	32%	100%	100%	100%	100%	100%	100%	100%

South Kent (Ashford IECC) SEU migration



	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11
% ERTMS SEUs	0%	0%	0%	0%	0%	0%	0%	13%
% SEUs in IECC	65%	84%	91%	91%	91%	91%	91%	93%

Headcount and expenditure

	CP4					CP5					Control Period Averages					
Headcount	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	CP6	CP7	CP8	CP9	CP10	CP11
Signaller/LX Keeper		274	232	266	262	258	226	257	249	171	60	60	60	60	60	60
Shift Signaller Managers		10	10	10	10	10	10	10	5	5	5	5	5	5	5	5
LOM/Ops Manager		10	10	11	10	10	10	9	9	5	5	5	5	5	5	5
Operational Controls		32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Electrical Controls		31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Mobile Operations Managers		40	55	42	42	42	42	42	42	42	42	42	42	42	42	42
Route Performance		20	24	23	23	21	21	21	21	21	21	21	21	21	21	21
Route Enhancements Managers		5	4	5	5	5	5	5	5	5	5	5	5	5	5	5
Managed Stations		47	51	48	48	48	48	48	48	48	48	48	48	48	48	48
Customer Relationship Executives		3	4	6	4	4	4	4	4	4	4	4	4	4	4	4
Operations Delivery		53	65	63	63	63	63	63	63	63	63	63	63	63	63	63
Other Route		21	25	24	28	28	28	25	25	25	25	25	25	25	25	25
Total	**0**	**548**	**562**	**561**	**556**	**552**	**520**	**547**	**539**	**452**	**341**	**341**	**341**	**341**	**341**	**341**

	CP4					CP5					Control Period Averages					
Expenditure £12/13m	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	CP6	CP7	CP8	CP9	CP10	CP11
Signaller/LX Keeper	12.1	13.6	14.2	14.4	13.8	13.7	13.5	12.4	13.9	10.2	6.1	6.1	6.1	6.1	6.1	6.1
Shift Signaller Managers	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5
LOM/Ops Manager	0.5	0.8	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Operational Controls	2.9	4.2	4.1	4.3	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Electrical Controls	1.8	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Mobile Operations Managers	2.1	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Route Performance	2.2	0.9	0.9	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Route Enhancements Managers	-0.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Managed Stations	4.4	4.4	4.4	4.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Customer Relationship Executives	0.0	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Operations Delivery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Route	0.9	1.0	1.6	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Total	**27.3**	**30.0**	**31.1**	**30.8**	**29.7**	**29.6**	**29.4**	**28.2**	**29.7**	**25.6**	**21.4**	**21.4**	**21.4**	**21.4**	**21.4**	**21.4**

Asset management plan

This plan sets out how Kent Route will maintain its asset base – from track and signals through to earthworks and drainage. It details challenges, opportunities and investment plans – and provides an overview of the work to be undertaken in the next 5 years.

Strategic overview

The discipline descriptions below give an overview of the assets on the route, their current condition, and where there will be a material difference – the expected condition at the exit of CP4.

The renewals plans for CP5 have been generated through the creation of bottom-up workbanks that identify the interventions required to safely and sustainably manage the assets on a minimum whole system, whole life basis.

The workbanks have been produced in alignment with asset policy and validated by the central asset management team. Where local circumstances dictate a variation to asset policy this has been documented and agreed as appropriate.

The primary challenge in delivering the asset management plan is securing the required access. This is not only an issue in the London Bridge area, where maintenance and renewals works need to be integrated with the Thameslink Progamme's activities, but also at a number of other locations where there are high demands on access. The drivers for this include works on major structures such as the Charing Cross and Cannon Street river bridges, Sevenoaks and Bo-Peep tunnels; the S&C renewal programme, the East Kent Re-signalling Project and its associated enhancements; and the power supply upgrade projects. The work referred to in the route Availability Strategy section of this document will assist in creating an integrated access plan. The route Delivery Strategy section of this document outlines the approach that is being taken to produce an integrated delivery plan.

Maintenance

The maintenance workbank has been developed to reflect the investment and renewal activity being undertaken on the route. Specifically, a wholesale review of track maintenance volumes has been completed for all the major work activities.

The impact of the enhancement schemes has also been taken into account.

Impact of Thameslink

The Thameslink Programme (TLP) has a significant impact upon the Kent Route. It will provide benefits through the installation of standard components in the London Bridge area, however, particularly in the Thameslink core area it has significantly increased the signalling asset population. Prior to the TLP KO2 works there will be investment to provide service resilience whilst the staging works are underway. This will include point refurbishments and re-railing activities.

Whilst the works are going on (until early 2018) key sections of the route will have reduced possession access available to limit clashes with the Thameslink possessions. Domestic renewals and maintenance work will be integrated with the Thameslink possessions where possible.

Once completed, the works will allow track inspections to be relaxed due to the installation of modern equipment and a simplification of the track layout. New technologies such as plain line pattern recognition (PLPR) will be in place to reduce the exposure of track workers to trains in the busy corridor around London Bridge. However, as the new trains are delivered and longer formations introduced, the annual tonnage on several routes will increase, leading to the need for increased inspection and maintenance.

Renewals and enhancements

Track renewals will be integrated into the East Kent Re-signalling Phase 2 project where possible.

Enhancements can present an opportunity for early intervention for signalling assets where a business case is justified to bring schemes forward. However, it should also be noted that the converse can be true in that where enhancements are planned in the future, but the asset needs renewing now, then life extension works provide the most efficient solution to ensure alignment with enhancements. Examples of this often include level crossing renewals where renewal is due (although subject to a re-assessment first to determine validity and priority) while there are also line-speed improvements planned and the possibility of increasing the number of trains per day on the lines concerned. Hence a review of the asset condition leads to some incremental upgrades with a view to aligning potential future closure or upgrade (to MCB or equivalent) with the line-speed and/or traffic increases planned.

By managing enhancements and route strategy this way it ensures that the asset condition remains both safe and reliable so that in the event of route aspirations or customer needs changing, we are not left with an asset that is not fit for purpose and dilapidated and can re-arrange a stand alone intervention in a controlled manner.

Consideration will be given to including linespeed improvements as part of renewals where there is an appropriate business case and associated funding to do so.

Track

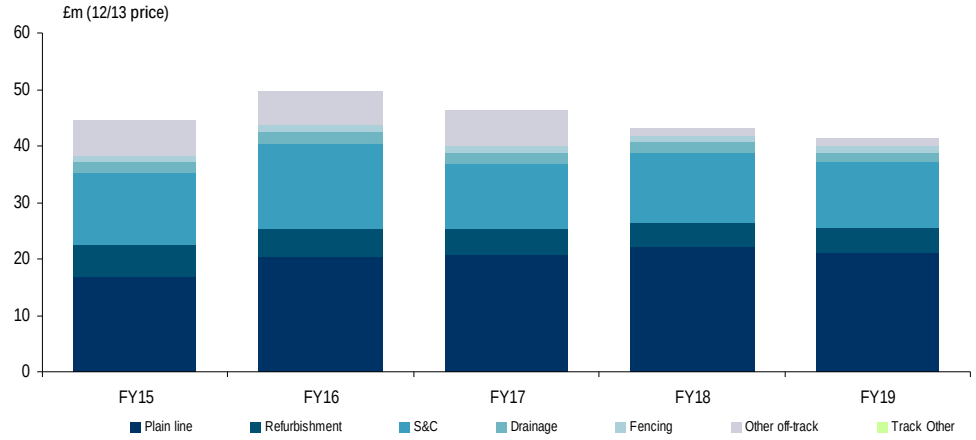
Kent consists of nearly 1,100 track miles with nearly 1,600 point ends. Included in these are a high number of critical S&C assets. Many have non-standard components due to their designed geometry and their complexity.

Particular critical sections include the routes into London from Grove Park to London Bridge, Cannon Street and Charing Cross, the routes between Swanley and Victoria and Norwood Junction to London Bridge. Other critical S&C locations include Lewisham, Sevenoaks, Tonbridge, Hastings, Ashford, Dartford, Gravesend, Hoo Junction, Rochester, Faversham, Ramsgate and Dover.

Track management, renewals, refurbishment and maintenance for the route will be based on the CP5 Track Policy. Re-ballasting activities will increase in both plain line and S&C, there will also be an increase in refurbishment including re-gauging of S&C. Plain line refurbishment will include significant lengths of re-padding that will improve asset life and track circuit reliability.

Due to various constraints it is not envisaged that high output renewals will be undertaken during CP5.

Track expenditure (post efficient) in CP5



Switches and Crossings (S&C)

The average used life of S&C in Kent is 53%, this reduces to 48% at the end of CP5. There are still high volumes of S&C on timber bearers on the route. Much of the S&C around London Bridge (140 units) will be remodelled in CP5 by Key Output 2 (KO2) of the Thameslink Programme.

The S&C in the New Cross to Orpington corridor is seen as one of the key sections of the route where some of the layouts may be able to be rationalised and, if possible, crossover speeds increased.

Refurbishment will concentrate on those other units of S&C that prove unreliable or suffer significant component degradation. Opportunity will be taken during refurbishment to correct any gauge variation through the moveable length of S&C. To facilitate the national stretcher bar replacement programme, using the newly designed tubular adjustable stretcher bars, an allowance of £1m has been made in CP5.

Rail

Rail life used is currently around 48%. It is planned to increase to 50.5% in CP5. There are still significant issues with Rolling Contact Fatigue (RCF) resulting in early renewal.

CP5 will see a far greater use of premium grade rail which will support the management of rail wear and RCF.

The route has seen a significant reduction in rail breaks from 41 in 1995/6 to 5 in 2011/12.

Although the number of rail breaks has reduced, there are still a significant number of defects that require the application of speed restrictions and short term changes of plans to remove them.

Renewal plans in CP5 will concentrate on the route from New Cross Gate to Norwood Junction (Sussex Route) where there have been a high volume of rail defects and a tonnage increase. These plans will also support the continued removal of severe and heavy RCF across the route, removal of defect clusters, and removal of older rail on axle counter sections of the route and removal of pre-1975 rail on the highest criticality routes.

Most of the route's rerailing will be delivered by maintenance works delivery teams as has been the case in CP4. However the route will establish if this is the most efficient delivery route or if greater efficiencies can be gained by using under utilised track renewals resources.

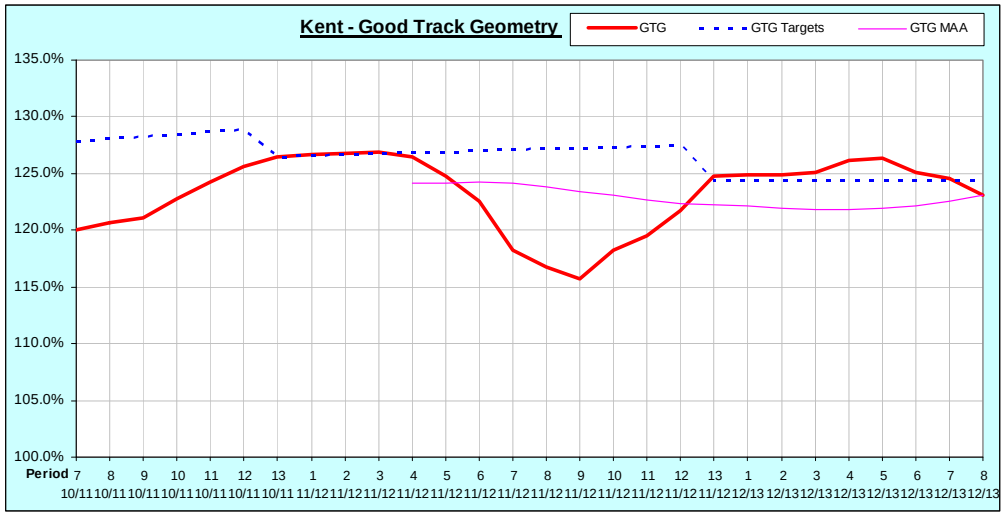
Sleepers

The route will continue with its removal of Pan 8 sleepers on the higher criticality routes and sharper curves. Methods of strengthening and refurbishing Pan 8 baseplated track are being considered.

The route has recently identified longitudinal cracking appearing in pre-1994 F28 concrete sleepers. Initial investigation into the cracking by Network Rail and the Transport Road Research Laboratory (TRRL) indicates that the cracks are unlikely to be detrimental to the integrity of the sleeper. The route has some 147 miles of pre-1994 F28 sleepers, although not all will have been produced by the same manufacturer. Based on Network Rail's findings, no additional allowance has been put in the plan for the removal of the older F28 sleepers.

Track geometry

The good track geometry (GTG) target for end of CP4 is 128%. The current GTG (Period 8 12/13) is 123.1%.



The poor track geometry (PTG) target for the end of CP4 is 3.2%. The current PTG (Period 8 12/13) is 4.2%.

The level 2 (L2) defects per 100km target for the end of CP4 is 38.8/100km. The current number of L2s (Period 8 12/13) is 44.5.

The track quality is a function of the ground support as well as the fouled ballast. The underlying geology of the Kent Route is predominantly clay which offers variable support to the track. The clays are very prone to seasonal shrinkage and swelling with the soil moisture deficit (SMD) having a significant impact in the late summer and autumn periods.

The intensity of S&C on the route and its associated design geometry impacts on the overall track geometry. Many of the track layouts in Kent feature severe designed geometry due to the nature of the through line route alignments, especially through London and the suburbs.

Despite good recovery in recent times, the Kent Route still struggles to meet its track quality targets especially following long hot dry summers as experienced twice in CP4. The summer of 2011 had a very significant impact whereas the most recent summer did not show the same level of deterioration.

Plans have been developed by the On Track Machine Engineer to meet the CP4 track quality targets. These include greater focus placed on maximising the output from OTMs. This will allow greater track geometry recovery. Initiatives such as faster isolations will help with maximising working time within possessions. ORBIS will further support the targeted use of OTMs, especially to allow intervention based upon predictive data. Other initiatives such as use of machine switch out (MSO) will also increase productivity.

Large trees on the upper slopes of clay embankments will be targeted for removal. These have been proved to accelerate desiccation of the clays which leads to deterioration of the track quality.

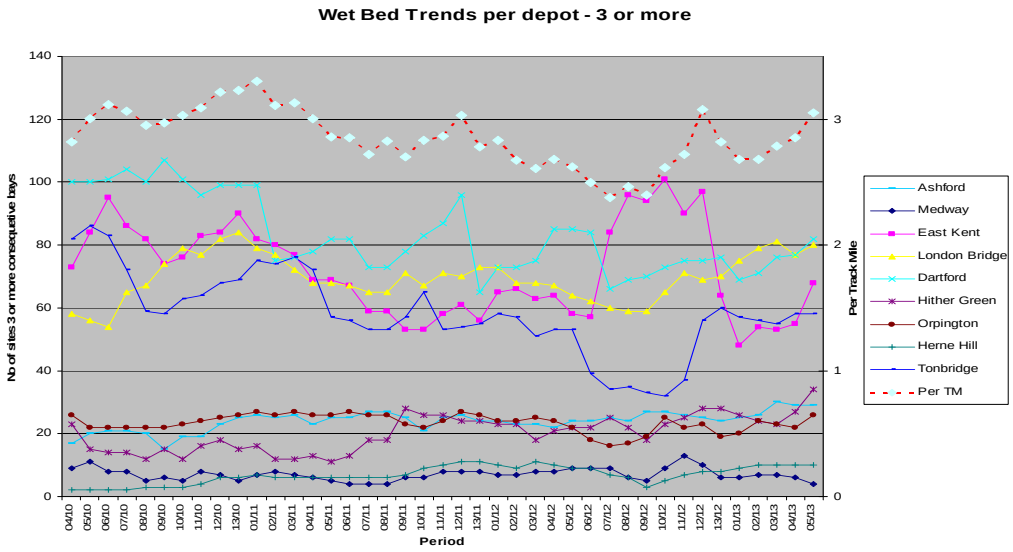
The CP5 plan is to retain the track quality at the CP4 target level where possible, making greater improvements to track quality in S&C. These will be achieved by increased use of the multi purpose stoneblower, improved manual maintenance including gauge correction, greater use of parallel or tandem tamping and less use of single machine tamping on S&C.

Ballast

The current ballast fouling measure for Kent is 51%. The plan is to slightly improve this level of fouling across the control period to 50%. London Bridge and Dartford TMEs have the highest numbers of wet beds. Many of the London Bridge wet spots will be dealt with by the Thameslink programme. The CP5 plan will remove most of the Dartford wet spots.

To remove the levels of fouled ballast currently present it is planned to introduce increased ballast cleaning on the Kent Route as a plain line heavy refurbishment activity.

Numbers of wet beds of three or more sleepers in length



Non-volume activity

Longitudinal timbers

Kent Route has a high density of structures. 157 of the under bridges are non ballasted and have the track mounted on longitudinal timbers. Softwood longitudinal timbers on the route have a life expectancy of just 12 years. Hardwood timbers have a life expectancy of 20 to 25 years. Where possible the route is taking the opportunity to renew with hardwood timbers. The route is also investigating the use of plastic longitudinal bearers to replace timber bearers.

The route is looking to convert longitudinal timber structures to ballasted decks where there is a business case. Thameslink works will remove four of these longitudinal timber structures and replace them with ballasted decks.

London Bridge DU has some 2,000 restraining cleats on their longitudinal bridges that are corroding. Further work is required to establish the overall condition and integrity of the timber restraining cleats.

Slab track

Slab track repairs will be required within Mountfield and Grove Tunnels on the Tonbridge to Hastings Route. £1m has been included in the plan for repairs to the slab track.

Fencing

Fencing on third-rail DC routes is critical. The route averaged £900k spend per year in CP4. The annual spend has increased in 2012/13 to £1m and 2013/14 to £1.1m. In order to remove all of the fencing classified as very poor, an increase in annual spend to £1.2m is required.

The route will erect more efficient stock proof fencing types in our rural areas in line with the policy.

Delivery plan for the final year for CP4

There have been a number of issues with the delivery of track renewals on the route in CP4. This has resulted in the temporary suspension of the contractor during 2012/13 resulting in the loss of a number of renewals. Some have been delivered by the Maintenance Works delivery Team. The others are being re planned in 2013/14.

Amongst the losses were 8 units of S&C at Crofton Road Junction which will not now be delivered until CP5.

Efficiencies

The additional investments are as those assumed in the IIP for Track:

- ORBIS, which enables better targeted work, and an increase in the volume of refurbishments due to a better knowledge and understanding of track characteristics, ballast condition and track geometry.
- Development of S&C criticality statistics, to provide the justification for more S&C abandonments.
- Training in refurbishment activities.
- Investment in plant for the refurbishments.

The ORBIS programme will result in a reduction in volumes as the improvements in data management will allow better supported engineering decisions.

The other key areas of potential efficiency for track in Kent are:

- A greater use of serviceable materials.
- Increased volume of in house delivered renewals.
- Maintenance delivered abandonment of S&C including where possible the new Aurora process for signalling alterations.
- Pan 8 baseplate strengthening.

Signalling

Signalling assets in Kent are wide and varied, ranging from mechanical equipment and open block signalling, to the latest computer based interlocking systems and digital track circuits.

The majority of Kent is conventional colour light signalling with track circuit block and a summary of the predominant track circuit and point operating mechanisms is set out later in this section.

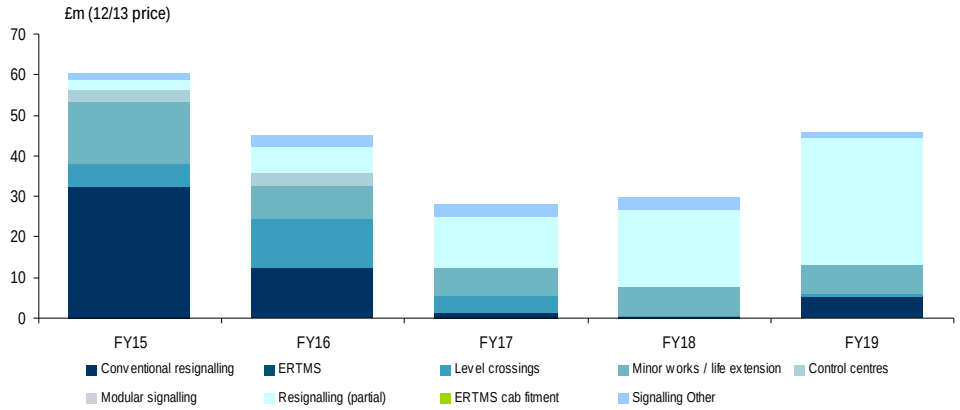
The majority of interlocking on the inner area is relay based (37%) while the outer is mainly electronic (41%) with the majority of mechanical signalling and signal boxes (22%) within and surrounding the Hastings area.

The electronic interlocking systems are at the mid-life stage while the relay based (geographical and free-wired) interlocking are approaching the end of their nominal life, these being the GCB Interlocking(s) serving the Victoria ASC area and the GCA Interlocking(s) serving London Bridge ASC.

Signalling asset populations

Points	Track Circuits	Axle Counters	Signals	Interlocking
1,586	4,232	256	2,612	91

Signalling expenditure (post efficient) in CP5



East Kent has some of the oldest conventional signalling on the route and as such has been subject to significant renewal and upgrade which has been started in CP4 and will continue in CP5 subject to final determination. The improvements so far have been to close a number of mechanical boxes, removing the open block signalling and replacing this with signalling equipment and axle counters in modern equivalent form. The replacement of long line-side cables with data links, with significant safety improvements as a result and the abolition of several relay based interlocking with obsolete relays that were no longer able to be maintained and serviced.

In the inner area the renewals landscape is dominated by the Thameslink Programme (TLP) and other national projects such as Crossrail. TLP is renewing a number of the interlockings at London Bridge, Blackfriars and Snow Hill and will significantly increase traffic flow through the core. Improvements and innovations proposed include new technology to assist in times of perturbation such as signaller's route release and "proceed on sight" signals.

To date, Snow Hill has been decommissioned and Blackfriars has been substantially renewed with London Bridge Central and Eastern, North Kent East, New Cross Gate and Cannon Street subject to renewal in CP5.

Train detection

Track circuits in Kent are varied with the two main types being AC track circuits and TI21, both of which offer challenges going forward as the infrastructure evolves.

TI21 track circuits are an analogue circuit based design and components are increasingly becoming obsolete and as such a new design of Digital TI21, re-named EBI200 is being developed to replace the analogue equipment. The technology is still evolving and we are working with the manufacturers to improve reliability and availability.

AC track circuits (double and single rail) are very reliable but are increasingly becoming incompatible with new and advanced rolling stock and as such heighten the need to get the issues with digital (EBI200) track circuits resolved as digital track circuits and axle counters are the inevitable way forward, as compatibility issues are all resolved.

Axle counters are the train detection of choice for all new schemes, within asset policy, and through complex S&C digital track circuits are a secondary consideration to alleviate re-set constraints during times of perturbation.

Points

Of the two main types of point systems (machines and clamp-lock), Kent Route is predominantly populated with HW machines, with other types in operation such as RCPL (conventional clamp locks), HPSS, M3 machines and IBCL (in-bearer clamp locks), but these are relatively low in population.

Asset policy for point operating equipment (POE) is now IBCL for new S&C and as such the population of HW machines will begin to diminish while the numbers of IBCL will increase. Although the merits of IBCL are clear, there are unresolved issues of whole-life-cost and skills and competency to be fully explored and consolidated into the policy decision making process. Safety is the highest priority, which at present is the main driver for IBCL, as opposed to HW since IBCL incorporates open switch detection.

The development of a new improved robust stretcher bar system will improve the safety of all machine controlled POE and we will be offering several trial sites as the design nears the prototype stage. Reliability of HW POE is in advance of RCPL/IBCL by some distance and if we are to meet CP4 exit reliability targets then improving the HW system provides the more likely solution.

Asset obsolescence

The key strategic assets in the Kent Route for signalling are mainly concerned with control systems (TDM) such as TDM69 and ERSE and plans are in place to manage these in both the short and long term. Renewals are planned for the abolition of TDM69 under the Thameslink Programme and life extension works are planned for the ERSE system.

Due to the continuing pace of advancing electronics, modern systems are almost obsolete on installation and as such asset policy needs to dictate a whole-life approach to systems support at the contract stage of projects so that we are fully covered for the life of the asset.

Obsolete assets are managed by domestic renewals and signal renewal projects and the assets listed below form the main priorities. Where asset numbers are high the policy is for spot renewal of a number of items to release spares to keep the remainder operational until a renewal scheme takes place.

Obsolescence items (not exhaustive):

- Mk2 SSI TFM modules
- GAKS sets
- Electro-mechanical banners
- M3 point machines
- ERSE
- Mk1 AHB (Penguins) pedestals
- GETS MCS system
- VHLC interface cards
- Various block equipment

Asset reliability

Some of the initiatives and innovations to target signalling asset reliability include, roll-out of RCM for points and track circuits, Upgrade of track circuits from TI21 (analogue) to EBI200 (digital), upgrade of conventional signals with LED and earth monitoring of power supplies.

The signalling asset stewardship index (ASI) has been disaggregated for each route and we are currently reviewing the impact of TLP and other major programmes on the overall asset condition. The current ASI forecast is in line to meet the CP4 exit target.

Delivery plan for the final year for CP4

There are no further interlocking commissioning(s) planned for the remainder of CP4 with the emphasis on project development for East Kent Phase 2 and advanced works for the move to the ROC at Three Bridges.

CP5 renewal plan

The plan is significantly influenced by the Thameslink Programme, NOS and the re-control to the new ROC at Three Bridges. There are no plans to diverge from asset policy, although there are plans to influence asset policy to maximise efficiencies. The renewals for London Bridge and the Victoria scheme have been chronologically transposed due to wire degradation at the latter. The signalling renewals policy has three key aspects to it:

- Condition of the asset
- Business drivers (e.g. for centralisation control)
- Synergies with other works (where accelerated renewals provide opportunities for enhanced output and/or more efficient delivery)

The scope of what to renew is generally limited to the individual components that need renewal. However, the scope of renewal can be expanded where justified by improved outputs and/or increased delivery efficiency.

Small scale renewals (e.g. individual component renewals) will be undertaken in a modern equivalent form (e.g. LED signal for a lamp signal). Where the scope of renewal is larger, improvements to the overall configuration will be made (e.g. enhanced overrun protection when renewing an interlocking) and ultimately a full re-signalling provides the opportunity to reconfigure the system to provide for current and proposed operating requirements using new technology (e.g. axle counters vice track circuits).

Major renewals

The two major areas of intervention for Kent are London Bridge (1976) and Victoria (1982) which serve Charing Cross and Cannon Street to Dartford/Dover and Victoria to Swanley, Herne Hill and Maidstone respectively.

The Thameslink Programme (TLP) is dominating the signalling renewal programme during CP5. The project runs right through the core of the Kent Route through London Bridge, Borough Market, Met Junction, Blackfriars and is a vast and complex undertaking offering significant engineering challenges. Given the size and complexity of the project all traditional major possession opportunities are allocated to TLP, i.e. Bank Holidays, Easter, Christmas, etc. The rules of the route dictate that both London Bridge and Victoria are not closed for engineering works at the same time and as such we have reviewed the condition of all our interlocking(s) to determine whether intervention after TLP (2018) is sustainable.

Despite the Victoria interlocking(s) being of a later vintage than London Bridge, asset condition is such that we have revised the proposed renewal programmes so that the renewal of Victoria will take place before London Bridge. This is alleviated by the fact that TLP will renew a number of the London Bridge interlocking(s) by default although asset condition was such that they would have remained safe and reliable should they have been deferred until Victoria is completed.

The East Kent Re-signalling Project will take up the remainder of CP4 and continue through into CP6. With Phase 1 about to conclude, early planning works for Phase 2 are underway and currently within GRIP stage 4. Future phases are in the early stages of development. These will convert the remaining lines in East Kent not yet controlled by an existing power box.

The signalling renewal work-bank has been reviewed with the route Enhancement Team to align all schemes with the route migration strategy and planned enhancements and an integrated plan is now proposed to take us into and beyond CP5. CP5 will be dominated by re-control projects to realise the national ROC strategy although our intervention opportunities for major renewals are restricted by TLP.

Minor renewals

In addition to the major renewals detailed above, there are also a substantial number of minor works projects. As part of the minor works programme we will be seeking to implement a Decision Support Tool (DST) approach to POE renewal as part of mid-life upgrades as this targets the most important points strategically and is based on track condition and category amongst a number of other key parameters.

These projects are predominantly “like-for-like” renewals which assist in improving the reliability and availability of the network.

Minor works projects include:

- Point operating equipment renewals
- Relay re-servicing
- Life extension works (like-for-like renewals of external equipment)
- Wire degradation and line side cable renewals

During the option selection stages decisions are taken on application of asset policy to find the right solution, although there are examples where it is operationally more beneficial to have track circuits rather than axle counters (complex S&C for example). Project reviews with stakeholders to consider local and operators’ conditions, will ultimately dictate the right choice of asset, depending on the situation.

Application of policy

There are no variances to the application of asset policy per se, however the base plan has been reviewed and where a positive business case exists we have tailored renewal plans to incorporate re-control, hence closure of small signal boxes in favour of either a direct move to the ROC, or as part of enabling works to allow such a future move, which often result in work type changes.

There are three specific approaches to signalling renewals envisaged for CP5 that are aligned with asset policy, NOS and ROC aspirations, enhancements and life extension. Each is planned to be implemented as appropriate.

An overview of the RUS and future customer requirements has enabled efficient incorporation of enhancements within these accelerated and enhanced renewals.

Where there are no NOS/ROC or enhancement requirements we have reviewed the status and compliance aspects of the remaining renewals and aligned with asset policy by using a targeted approach to spread the cost of impending renewals over an extended period on a “spot” renewal basis or, where appropriate, mechanical life-extension, although all such schemes are subject to whole life review studies within CP4.

HLOS Submission

During CP4 the Kent Route team has carried out a re-profiling of the entire route to look at advancement opportunities for NOS schemes and tailoring all required renewals works to meet aspirations for migration to the new ROC at Three Bridges and to align delivery with national objectives and those of neighbouring routes.

The base plan is aligned to pure asset condition and takes no account of migration plans, NOS or route enhancements within the route Utilisation Strategy (RUS), and so it only maintains the status quo. However, this can be more costly in future Control Periods as the accelerated NOS schemes serve to deliver signal box closures and new signalling systems that take the route through to ERTMS.

Efficiency plans

Planned efficiencies vary depending on project types and include framework contracts, partnering, intelligent infrastructure, scope reduction, use of modular concepts, train ready to start unit rate reduction, improved GRIP processes and greater control on project updates to manage costs.

- Framework contracts:
  - The supplier's efficiencies are variable and we have taken a pragmatic view on how this will manifest itself in Kent as our principal contractor has the highest starting rate (Atkins).
  - For Level Crossings there is a significant risk of increased costs due to the risk assessment process, often mandating upgrade and/or additional signals.
  - Scope reduction already has a 10% national accepted (built-in) figure and the proposal to consider a further 3% offers a significant challenge.
  - Grip 1-4 & 5-8 improved working processes with Infrastructure Projects (IP) is expected to realise a full 1.5%.
- General items:
  - The new rate for Train Ready to Start equipment (TRTS) offers a robust efficiency.
  - Use of modular concepts where full modular is not suitable is accepted at 1%.
  - Improved driver training will only be applicable to full renewals as opposed to minor works or targeted renewals and as such has been applied to the portfolio where applicable.
  - There are a notable number of "improve current process" type initiatives, which are in development and we have therefore included efficiencies for these in a conservative form pending further analysis.
  - Efficiencies provided by improved frameworks and partnering in CP5 will have limited impact on projects already in development, minor works and targeted renewals as works have either already commenced or will start before the efficiency improvements impact, although we expect to begin seeing the benefits of the other efficiencies outlined.

In addition to the efficiencies outlined above further stretch efficiencies related to value engineering and the benefits of ORBIS have been applied across the signalling portfolio.

As we progress through CP5 and introduce the NOS scheme (full re-signalling) and re-control, the main efficiency initiatives are expected to provide the planned benefit. The London Bridge (re-control) and Victoria signal schemes planned towards the end of the control period offer the greatest opportunity for scope reduction, framework benefits, and use of modular concepts, ramping up to the full commissioning of Victoria in the first year of CP6 under the current deliverability review and CP5 submission.

Geotechnical assets (earthworks)

Kent has a number of earthworks made from clay that are either susceptible to landslip in wet weather or shrinkage in dry weather. Many of the rock cuttings are made from chalk which is a soft rock and prone to weathering in very cold weather.

Geotechnical assets (earthworks) comprise embankments, soil cuttings and rock cuttings. Earthworks, defined as greater than or equal to 3 metres deep or high, are known as 5 chain or 100m long sections on either side of the railway. The natural geology can affect track quality, particularly in the summer, and embankments that suffer from such shrinkage have been termed “clay banks”. Most earthworks date from the age of construction of the railway over 150 years ago.

Kent has 478 miles of earthworks of which 6.2% are classified as being in a poor condition, the national average of poor condition earthworks is 4.9%.

Where the condition has degraded significantly techniques such as piling, gabion retaining walls, granular replacement, re-grading, soil nailing, rock bolting and meshing are used to strengthen and refurbish the asset. The decision to remediate earthworks is based on information on condition (soil slope and rock slope hazard index), results of sophisticated geotechnical monitoring, track quality (for embankments) and slope stability analysis.

Rock cuttings present the largest safety risk of all earthworks, particularly where they are located on high speed lines on curved track on approaches to tunnels. The enhanced spend programme will remove many of these locations in CP4. Remedial works at these locations include rock netting and scaling, maximising the number of poor 5 chains fixed and earthwork risk reduction. In CP5 a roughly similar proportion of soil embankments, soil cuttings and rock cuttings will be stabilised. Large repairs will take place at Bearsted, Longfield and Barming in the early part of CP5.

The route continues to manage the risk of summer shrinkage on clay embankments by removing trees from the top two-thirds of clay embankments. Locations at risk of shrinkage will be managed by the use of soil moisture deficit (SMD).

Minor works will be carried out more often on earthworks. Minor works interventions are defined in the earthworks policy. Minor works includes vegetation removal, monitoring/alarms, shallow mine workings, climate change adaptation and adaption for increased loading/traffic.

Kent has a geology that is conducive to deep seated failures of earthworks. We will continue our policy of initially monitoring these locations to ensure that remedial works are prioritised, risks are mitigated, works are carried out on a just in time basis and are properly designed. These deep failures can be costly as remedying them requires significant structural works. Whilst the route’s ambition is to maintain condition profiles, spend on maintenance activities will not match the modelled requirements. This will result in a slight deterioration of marginal condition locations.

A bottom up plan (route) has been created. This uses information on condition combined with consequence to calculate a risk based priority score for works. The volume of work required has then been estimated and multiplied by a unit rate to give cost of works.

Unit rates have been provided by the Central Asset Management Team uplifted by 3% for Kent. The cost of development for years 1 and 2 of CP5 has been included in those years and will need to be brought forward into CP4 to support effective delivery.

The Enhanced Spend Programme (ESP) has been implemented in Kent in 2012/13 and 2013/14 and will particularly focus on scaling of rock cuttings.

Efficiencies

Efficiencies will be delivered by the following: Investment Projects Efficiencies (10.35% Earthworks), Maintenance Efficiencies (7% earthworks other and earthworks drainage), Asset Management Efficiencies (BCAM transformation) (5% of all).

Outputs

Outputs are based on condition and performance. These include maintaining condition profiles, minutes delay and number of earthwork failures. In addition there are a number of programmes to be completed.

Structures

The key structures assets include underbridges, overbridges, tunnels, culverts, retaining walls and coastal defences amongst others. The structures CP5 policy will be risk based, making use of asset condition as a proxy for likelihood and route criticality as a proxy for consequence.

Background

The condition of key assets is measured by standardised scoring methods. For bridge assets this is the "Bridge Condition Marking Index", (BCMI), and for tunnels, the "Tunnel Condition Marking Index" (TCMI). These measures incorporate specific observed defects into a score for each structure element, which can then be aggregated to either large constituent parts or into the overall structure. This enables access to the detailed information behind a headline condition score to scrutinise the extent and severity of defects in key structural members.

The condition records do not include the actual strength of the structure. Measured strength is important as bridges were built to varying standards and are subject to differing intensity and weight of traffic. Strength parameters have to be established from detailed surveys and calculations known as "Capability Assessments".

Current levels of renewal activity, whilst historically higher than those seen in the last three decades, nationally only allow for approximately 0.15% of the asset base to be replaced or heavily refurbished each year. The number of structures requiring additional examinations in Kent has ranged between 48 in 2008/9 to 63 in 2009/10. The target for both 2012/13 and 2013/14 is 55, to achieve this we will focus on removing the current examination backlog, planning proactive maintenance and effective prioritisation of remedial works.

The main items of expenditure are bridges and there are 1,157 overbridges and 386 viaducts in Kent. Some of these are listed and include the impressive Hungerford, Cannon Street and Rochester River Bridges. Kent also has 56 tunnels. These include Sevenoaks Tunnel which is almost 2 miles long and Lydden Tunnel which is almost 1½ miles long.

Like earthworks, many of the structures date from the construction of the railway, with the oldest being constructed between London Bridge and Greenwich in 1836. The main coastal defence is at Folkestone Warren where the railway passes along the side of the English Channel between Folkestone and Dover through 3 tunnels. This location has a management plan.

Our structures plan is based on:

- An assumption that the volume of activity would need to increase in CP5 to maintain asset condition at lowest whole-life cost
- The mix of work in CP5 would be broadly similar to that in CP4
- Planned preventative maintenance would be undertaken in CP5
- The point of intervention for work items would be lowered for maintenance items.

The final volumes and cost have subsequently been reviewed against the modelled numbers and other routes' submissions to align and rationalise the workbank.

The asset count for structures in Kent is as follows:

Bridges	Culvert	860
	Footbridge	177
	Overbridge	520
	Pipe	41
	Underbridge	1,157
	Viaduct	386
Ancillary		762
Tunnels	Bore	56
	Portal	18
	Shaft	56
Walls	Catch	2
	Coastal	8
	Retaining	1,580
Total		**5,623**

For the current railway scenario policy, the assumption is that assets are not managed through the imposition of temporary speed restrictions (TSRs) to defer intervention. It is expected intervention thresholds on lower line speed, lightly trafficked routes will be at a lower condition state than for assets on high speed routes.

The Enhanced Spend Programme (ESP) has been implemented in Kent in 2012/13 and 2013/14. This is focused on 4 key areas:

- Spandrel Wall repairs
- Scour mitigation
- Bridge painting
- Location of hidden critical elements (HCE) of the bridge structure.

Underbridges, overbridges and footbridges

For bridge capability, management interventions will be explored first e.g. Network Change before strengthening works.

Bridges will typically be repaired or strengthened and only as a last resort be renewed. This is because whilst renewal gives the longest life it has a unit rate 6 times higher. However where whole-life costs indicate that a renewal is more beneficial this will be undertaken. This particularly applies to cast iron and wrought iron bridges. Where there are other works planned to a structure and there is an opportunity to remove wheel timbers, they will be replaced with a ballasted deck. Bridge painting and waterproofing will be carried out on a reactive basis where condition is affected.

A bottom up plan has been created. This uses information on condition combined with consequence to calculate a risk based priority score for works. The volume of work required has then been calculated and multiplied by a unit rate to give cost of works. Unit rates have been provided by the Central Asset Management Team.

The proxy for condition is the Bridge Condition Marking Index (BCMI) for the Principal Load Bearing Element (PLBE). Intervention levels are set in the national structures policy for Route Criticality Bands. Volumes in CP5 have been calculated using this process.

For future control periods (CP6 onwards) volumes and costs are modelled and provided by the Central Asset Management Team.

Structures unit rates provided do not include development, design, possession management or IP costs and a 14.4% uplift has been added for this. Development costs for projects in years 1 and 2 of CP5 has been included in those years and will need to be brought forward into CP4 date to support effective delivery.

Minor works will often be carried out on bridges. Minor works interventions are defined by a risk score detailed in the structures policy. This also includes for timber walkways, vehicle incursion, scour, vegetation removal, structures monitoring, voided structures investigations and graffiti removal.

The amount of vegetation removal will be increased through CP5. This is due to an increase in buddleia related incidents where bricks have been displaced from structures. Kent Route has recently decided to create a Vegetation Management Group to provide clear focus for this and other vegetation related spend.

Tunnels

Tunnels will always be repaired or strengthened and because of the safety risks involved we will do this on a proactive basis. A number of long tunnels are included in our bottom up plan.

For future control periods (CP6 onwards) volumes and costs are modelled and provided by the Central Asset Management Team. A rolling programme of tunnel hidden shaft identification and repair and tunnel maintenance will continue. Monitoring of the Abbotscliffe, Shakespeare and Martello Tunnels will continue. Drainage works in tunnels has been included in earthworks drainage renewals to recognise our integrated approach to drainage management.

Major structures

Kent has 3 major structures requiring works, at Hungerford (Charing X) – strengthening, Cannon Street – painting; and Southborough Viaduct – scour. The cost and volumes of these works have been estimated in the same way as for the other bridges.

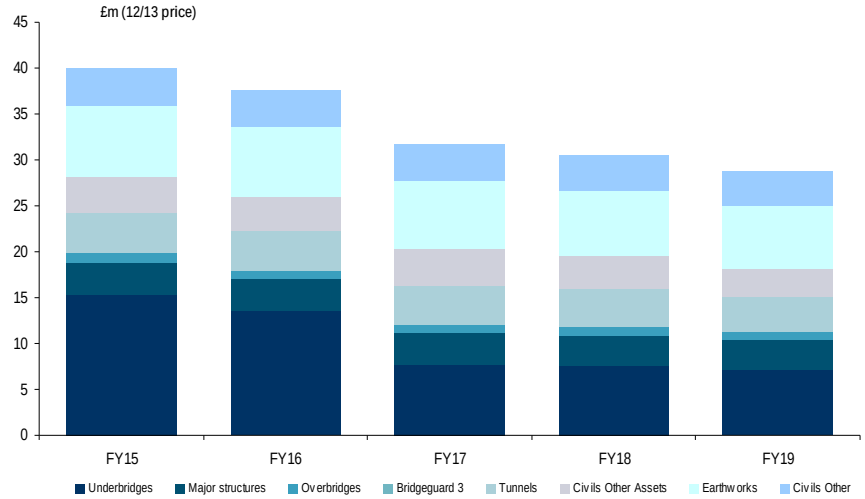
Culverts and retaining walls

The Central Asset Management Team has provided modelled costs and volumes for these.

Coastal and estuarine defences

Kent has 3 coastal and estuarine defences. A 10 year strategy has developed to lay out the priorities between Folkestone and Dover. This builds on the previous strategy and will prioritise works along the line. These works will typically be to the sea defences, apron and chalk cliffs. Monitoring of the Folkestone Warren landslide will continue.

Civils expenditure (post efficient) in CP5



Efficiencies

Efficiencies will be delivered by the following:

- Investment Projects Efficiencies (10.35% Underbridges, Overbridges, Major Structures, Tunnels)
- Maintenance Efficiencies (5% Structures Other Assets and Other)
- Asset Management Efficiencies (BCAM Transformation) (5% of All)

In addition we have determined that ORBIS will generate an efficiency on Structures CAPEX.

Outputs

Outputs are based on condition, capability and performance. These include maintaining route availability, BCMI and minutes delay. In addition there are a number of campaigns resulting from recommendations from investigations to be completed.

Delivery Plan for the final year of CP4

It is likely that there will be an under spend of £1.5m on underbridges in Kent in CP4. This is due to possession and road closure challenges for a couple of bridges.

Buildings

Stations

The station portfolio is critical to service provision and directly used by many millions of people. They are among the most complex of our buildings and demand the greatest level of expenditure and management time. The assets were mostly constructed in the Victorian and Edwardian periods, with further construction work carried out during the inter-war and post war periods. The age of the assets and the diverse design and construction practices that were used throughout these periods brings with it asset management challenges. Through CP4 our intervention strategy has been to maintain station assets at 'steady state' in line with regulatory targets. Southeastern have 173 franchised stations and there are 4 Network Rail managed stations.

Light maintenance depots (LMDs)

There are eight LMDs within the Kent Route which are all are leased to Southeastern Railway (Ramsgate is on a full repairing lease). These 8 depots provide facilities for the servicing, maintenance, repair, cleaning, tanking, effluent discharge and berthing of rail vehicles. The need to replace the wheel lathe at Slade Green LMD has been identified in CP4 and provision is made for this within our CP5 plan.

Lineside buildings

The lineside building portfolio is the largest and most diverse of all the managed building types. There are approximately 600 operational lineside buildings that support the network in Kent. It is made up of critical (operational equipment) and non critical buildings (stores/huts etc). There are no regulatory targets for line side buildings. Asset condition is established through an annual inspection and PPM programme which enables the asset steward to identify repair and renewals work on a prioritised basis. CP4 inspections have identified the need for an accelerated roof renewal programme to critical lineside buildings in CP5.

MDU/NDS depots

MDU and NDS depots have developed according to the type of work carried out at each location, they include a diverse range of type and size of facilities. CP4 funding has enabled a 'steady state' to be maintained. Future requirements are subject to maintenance delivery unit geographical delivery strategies, therefore CP5 funding requirements have been kept at steady state.

Current Asset Condition

The condition of our franchised stations – as evidenced by the Station Stewardship Measure (SSM) – is improving across some of the station categories. This is due to a combination of factors, including:

- Improved station surveying: more accurate capture of asset remaining life and risk data
- Cumulative beneficial effect of CP4 customer-focused enhancement projects A4A, NSIP etc.
- Effective asset stewardship
- The better and improving condition of peripheral assets is masking the condition of key assets.

For lineside buildings and other assets where asset data is unavailable, technical risk is determined by the criticality of the route served and equipment housed.

The asset management policy dictates that we will only intervene when justified by technical risk, business risk, asset criticality, customer imperative or a combination of all four. Our interventions will be sustainable, efficient and will deliver lowest whole-life cost solutions. Our intervention modes are renew, refurbish and maintain.

The regulatory outputs for CP4 are Station Stewardship Measure (SSM) and Light Maintenance Depot Stewardship Measure (LMDSM). In each case we are contracted and funded to maintain them at April 2009 levels. Network Rail reports aggregate scores to the ORR as part of a national portfolio report.

The current performance in relation to the CP4 targets is as follows for Kent:

	Average stewardship measures	
Station Category	CP3 exit	November 2012
A – National hub stations	2.33	2.40
B – Regional hub stations	2.42	2.50
C – Important feeder stations	2.49	2.37
D – Medium staffed stations	2.53	2.39
E – Small staffed stations	2.54	2.54
F – Small un-staffed station		2.53

	Average stewardship measures	
LMD Station Category	CP3 exit	March 2012
A – Multifunctional/Heavy Engineering		2.13
B – Day to Day Component Change		2.61
C – Covered Cleaning/Minor Maintenance	2.54	2.38
D – Open Cleaning/Berthing and Watering	2.52	2.47

Safety is managed using proactive and reactive approaches. The proactive approach defines thresholds at which maintenance interventions are undertaken, whilst the reactive approach uses fault reporting to monitor and manage safety outcomes. It is intended that outcome measures will be tracked and proactive thresholds adjusted to deliver agreed targets.

The Average Risk Score (ARS) is used to understand the asset criticality rating based on two inputs comprising asset performance and asset safety.

Reports of safety-related events on buildings, civil engineering infrastructure (NR/l3/CIV/028), and other reactive fault measures (TSRs and reactive faults etc.) will be managed carefully to identify defects and determine their influence on railway safety and performance. The number and type of events can be used as a measure to understand the effectiveness of maintenance and management strategies.

The criticality of lineside buildings is determined according to the route served and equipment housed.

The regulatory output target for CP4 is to achieve a 3% reduction over the control period in the risk of death or injury from accidents on the railway for passengers and rail workers. Our CP5 policy analysis of SSM and LMDSM indicated a steady improvement in both measures. At the time of the IIP submission it was viewed that this improvement related to a number of factors, including: improved completeness of asset condition data, and a masking of poorer condition key components relative to non-key components at franchised stations.

It was concluded that the algorithm used to generate SSM and LMDSM was inappropriately weighted between key and non-key assets. We are currently working with the ORR to design improved asset condition reporting measures. Our CP5 policy development has resulted in improved asset management decision making at route and asset level.

Delivery Plan for the final year of CP4

The CP4 workbank remains on programme to be delivered with one scheme, London Charing Cross platform structural repairs, requiring to be split and part rolled over into CP5 to align with civils planned work and to take advantage of a Thameslink blockade. The CP4 workbank delivery is through IP or Route Property works, depending on complexity of scheme.

By the end of CP4 the majority of concrete footbridges (Exmouth type) will have been replaced, reducing the volume of footbridge renewals required. Thameslink scheme remodelling of London Bridge together with work completed at Cannon Street means a reduction in work planned for Managed Stations. A re-franchising ‘Schedule of Dilapidations’ exercise was undertaken in CP4 including remedial works to the CP5 key blocks (buildings, canopies, footbridges, platforms and train shed roofs).

Summary of activity of CP5

CP5 work bank summary for managed and franchised stations, light maintenance depot (plant and fabric) and lineside buildings:

- Complete renewal of footbridges, canopies, station roofs, lifts, wheel lathe and water main.
- Refurbishment/repairs of footbridges, canopies, platform resurfacing, lighting rewires and relight, station building rewires, carriage washers, CET and cantilever rewires and relight.
- CEFA 5 yearly detailed and annual visual inspections.
- Minor emerging work and PPM.

In line with our CP5 Policy there are nine interventions; five are based on specific activities relating to meeting thresholds based on condition and risk. The aim is to establish degradation rates on key assets and develop optimum interventions to maximise the life of the asset.
The main investment in LMDs was c1980, creating an overdue requirement for investment to renew or refurbish. Consequently there is an increased requirement for investment into LMDs, particularly carriage washing machines at Slade Green and Gillingham LMDs, together with the replacement of the wheel lathe at Slade Green LMD and new CET facilities at Gillingham LMD.

Additional provision has been made for removal/demolition of redundant buildings to reduce squatter/trespass /vandalism, which is aligned to Operational Property Policy.

The minor emerging works budgets increase continually post 2016 for lifts and escalators due to an increase in the number of maintainable assets following continued access for all enhancements and planned Thameslink improvement works at London Bridge.

There are a small number of schemes (<10%) that do not meet policy requirements. This divergence is centered around availability of information on M&E assets, Asset Risk Score (ARS) being inconsistently applied across asset blocks and asset remaining Life (ARL) incorrectly scored due to hidden elements.

HLOS submission

The route hopes to identify through dialogue with Southeastern a number of locations where we are planning footbridge refurbishments and renewals which might be enhanced with the inclusion of lifts at the same time as the proposed renewal works. Opportunities for station improvement works will also be proposed. This enhancement work sits outside the Buildings CP5 expenditure plans but we believe it will qualify for funding from HLOS enhancement funds.

CP5 Efficiencies

Efficiency plans have been developed in line with national efficiency business cases.

These asset management – building efficiency cases have been applied to the Kent CP5 work bank using the efficiency calculator providing a consistent and transparent methodology for estimating efficiency savings across the whole of the CP5 plan. The use of the above has enabled the Kent team to produce a robust financial case.

Electrification and plant

Kent is a DC third-rail electrified railway consisting of 1,678km of electrified track plus a further 9km of 25kV AC overhead line at Ashford and Dollands Moor. Traction power supply distribution on the route consists of some 2,500 items of main distribution plant and 745km of HV cables controlled from 3 Electrical Control Rooms. The equipment is from 1-60 years old and of varying condition. Plant assets range from a major lifting bridge at Kingsferry to some 1,700 point heaters plus a varied portfolio of pumps, lighting and water supplies.

Measured asset condition and performance

Around 45% of DC substation equipment assets in Kent are between 50 and 55 years old. Condition has deteriorated to 2.78 (target 2.56). Delays >10mins resulting from failure of traction contact systems infrastructure are on target for 2012/13 and below target for delays > 300 minute threshold. Most failures are related to electric track equipment defects.

Asset policy in CP5

Electrical power asset policy encompasses the majority of Kent E&P assets and the policy has been substantially revised for CP5 moving from a primarily age based, to a condition and route criticality based policy. Where sufficient data can be obtained, modelling has been undertaken to determine the point at which whole-life costs (WLCC) increase. Intervention levels are set from this data for the principal asset types. These have been reflected in selecting Kent assets for renewal or refurbishment. Where there is insufficient data to construct such models for an asset type, local maintenance condition and/or performance information has been used to determine the interventions required.

Asset base increase/capacity constraints

The volume of equipment has increased during CP3 and CP4 with the introduction of new and longer electric trains and the completion of HS1 and its interfaces. The additional equipment and normal renewals in Kent has reduced the overall age of equipment on the route.

The system is designed to provide redundancy such that an unplanned outage of a single item of plant will not prevent full timetable operation. Introduction of new types and numbers of trains since 2001 has increased load cycles on equipment and reduced capacity headroom so that on certain lines system redundancy is no longer available and results in reduced power running impacting on services. Equipment performance has been contained in CP4 but failures of distribution and electric track equipment have been directly attributable to increased load. Load management and reinforcement measures are being implemented.

High Brooms and Grove Hill substations have suffered from load related failures and temporary management regimes have been implemented until asset upgrade is undertaken in CP5. During CP5 further enhancement is proposed to address existing power supply deficiencies requiring Class 395 restrictions between Canterbury and Ramsgate and DC track equipment upgrades to address issues between Ramsgate and Faversham.

Class 465 12 car operating routes are to have additional works (Kent Power Supply Enhancement) to Dartford and Hayes lines and then extension of the 12-car Class 465 services from Dartford on to Gillingham. Renewal and enhancement of New Cross Grid supplies in 2015 will support the latter phases.

Kent Routes where future growth will be constrained by present traction power supply capacity are:

- Tonbridge – Bo Peep Junction
- Paddock Wood – Strood via Maidstone West
- Ashford – Ramsgate via Canterbury
- Dover – Ramsgate

Renewal and upgrade programmes already in implementation in CP4 and CP5 will reduce the number of affected sites but will not entirely eliminate them. In addition the development of winter precautions has added some 46km of conductor rail heating since 2010, substantially increasing this asset group and absorbing system capacity overall.

CP5 interventions

Contact systems

Management of contact system interfaces with rolling stock is a principal driver of electrification performance. Whilst performance of the conductor rail is within key performance, targets the overall asset condition has declined and issues with mechanical joints of the pre-1957 types have been emerging. Welding up or replacement of conductor rail will be undertaken during CP5 concentrating on sections on the 3 routes to Dartford which constitutes the largest population and highest performance risk.

Conductor rail cables and components (Electric Track Equipment – ETE) have experienced load related failures and a series of new and enhanced components have been developed. Additional analysis has been undertaken to identify sections of route where demand indicates equipment rating is being exceeded. Proposals in CP5 include sections where ETE re-inforcement is proposed.

Management of the asset requires more consistent data and the following initiatives are being developed and will be extended in CP5:

- Conductor Rail Monitoring System (measuring wear and spatial position)
- Shoegear Impact Monitoring System (impact forces imposed by infrastructure design and maintenance – jointly with TOC).

Condition led renewals proposals which will improve overall infrastructure safety and performance will be developed which:

- improve electrical safety
- improve general safety in removing switching devices to lineside
- increase remote operation of lineside isolating devices

HV Traction supplies and distribution

Renewal of the assets in modern equivalent form based upon the updated policy will increase the capability of the assets and enable future capacity increases to be more readily realised. Certain renewals will be delivered in association with capacity upgrades for increase services to gain maximum efficiency and to provide a coherent approach to the required improvements.

Supply point renewals at Hastings Grid supply will be undertaken by UK Power Networks (UKPN).

The main traction electrical supply in feed point at New Cross is critical to Kent Route services. Replacement is being progressed for completion in 2015. Limited life extension will be undertaken to existing NR assets until replacement.

Issues impacting on the safety and performance of distribution equipment currently are:

Condition issue	Control undertaken
HV Cables sheath degradation in fluid filled cables	Partial or full renewal
Electrical discharge on HV oil filled switchgear	Refurbishment or renewal
Transformers – degradation through age/ leaks/internal fault	Repair or renew
Polychlorinated bi-phenol (PCB) contamination of oil filled transformers/switchgear	Reduce content until renewal

Electrical Control

Performance has been impacted by decreasing spares availability for the two processor based (SCADA) systems at Paddock Wood and Lewisham Electrical Controls. Existing components are no longer available due to advances in technology. The 1954 electromechanical equipment at Canterbury Electrical Control remains maintainable in the short term but is severely constrained in capability for us to add additional controlled assets. Due to similar component obsolescence, the replacement of 1980 designs of remote termination units. Remote Termination Units located at controlled locations (substation etc.) has also been proposed for CP5. The National SCADA Project as part of the NOS will replace Lewisham, Paddock Wood and Canterbury Electrical Control Rooms during CP5.

Plant

Non-traction supplies in London Bridge area will be replaced by the Thameslink Programme but will be sustained during the works.

Management of trackside signalling distribution has improved during CP4 but until all insulation monitoring equipment is fitted throughout Kent in the next year condition of the asset will remain uncertain and performance risks cannot be fully evaluated. Provision has been made in CP5 to renew the oldest signalling distribution cables not renewed as part of a resignalling scheme during CP5. Funding will be allocated in CP5 for the condition led removal of defective cables reducing signalling power supply failures. Changes in design to double insulated units will reduce safety risks of the 650V independent earthed (IT) systems.

Points heating performance has varied according to the severity of the weather and heating has been overwhelmed by blown snow forming ice at point ends. New types of controller modules have suffered from generic equipment failures which have been addressed. S&C design requires modification to improve heating at tips. Recent developments in heat retainer fittings are to be rolled out across the route to improve effectiveness of heating. 40% of the route remains fitted with cartridge type.

Efficiencies

E&P efficiencies are derived from a study of options undertaken by the Head of Asset Management E&P, involving external consultants. The target asset groups within Kent were adjusted to that considered achievable at this time.

The efficiencies will be primarily delivered in the electrification portfolio as plant opportunities are less due to smaller volumes and expenditure. Efficiencies due to standardisation of traction designs were reduced to 3.5% from a national target of 4.1% overall as design ranges for dc contact systems are more limited than OLE. Procurement efficiencies were reduced to 3.04% from a national target of 5.3% overall based upon comparisons with efficiencies achieved for recent procurement of dc switchgear which is a major renewal category in the Route Plan. Common procurement against framework contracts across routes for certain asset types (e.g. 33kV switchgear) offers best efficiencies and will be pursued.

Work profile

- CP4 E&P renewals and enhancements (e.g. Kent PSE and New Cross Grid Supply replacement) will continue through 2013/14 into CP5 as presently programmed.
- CP4 renewals where delivery is now not expected by the end of CP4 will be co-ordinated with the CP5 renewals and enhancement workbanks.
- CP5 renewals are being programmed to be co-ordinated at sites impacted by Thameslink, Crossrail, and Kent Power Supply Enhancement works to reduce risk of conflicting works and maximise efficiencies.

Telecoms

Route telecommunication assets characteristics

The telecommunications assets/services present on the route are categorised into three main groups:

- Network services
- Railway operational telecommunications
- Station Information Security Systems (SISS)

Network services

Network services on the route are provided by a mixture of legacy transmission, and fixed telecoms network (FTN) with some moderate use of leased services. Legacy transmission is currently present in a variety of forms and currently supports the majority of the routes requirements. Legacy systems are approaching the end of their operational life and hold a number of risks associated with the availability of some components to support faulting and maintenance. The FTN infrastructure for Kent is part of Completion Area 15 of the FTN project. Build is complete with the final commissioning and snagging activities ongoing. The FTN system is a new build and the system has a high level of supportability. The migration of circuits to the FTN system will facilitate the continuation of network services and reduce the reliance on leased services such as BT and Level 3 (formally Global Crossing). The FTN project may not achieve complete migration for the remaining life of the project therefore this activity will become the responsibility of Network Rail telecoms. Some systems are being migrated as part of the delivery of projects such as East Kent re-signalling. The national SCADA project is installing an independent fibre network and there is the potential for network integration.

Railway operational telecommunications

Telephone/voice recording

Operational telephony is provided at the following locations – Ashford IECC (renewal 2012/13), London Bridge (moving to Three Bridges ROC under Thameslink Programme), Victoria SC (Eastern Panel) (planned for replacement but may transfer to Three Bridges) and Gillingham signalling centre (recently renewed).

The three Electrical Controls for the route have operational telephony is provided via an Ericsson MD110 all of which are owned by level 3 (formally Global Crossing) and leased by Network Rail. The national SCADA project and the overall Electrical Control Strategy should lead to the cessation of these third party services.

All operational voice communications via both telephone and radio are recorded. There are no planned full scale renewals of voice recording facilities. These assets will be maintained, faulted and renewed by the maintainer in line with asset policy on an ongoing basis.

Operational radio

Operational radio services are provided by cab secure radio (CSR) and national radio network (NRN). GSM-R infrastructure is in the process of being installed/commissioned. Full go live is dependent on the completion of the radio units within the fleet. Currently the proposed date is August 2015. NRN Service will be switched off January 2013.

Crossing communications

The automatic half barrier (AHB) crossings present on the route are provisioned with Whitley Public Emergency Telephone System (PETS) technology. There are 23 crossings in total with this system.

Driver Only Operation Closed Circuit Television (DOO CCTV)/DOO Mirrors

DOO CCTV currently exists at 78 stations with various car stop configurations. All of these systems are now utilise colour cameras and monitors. The route has 7 DOO Mirrors 4 (installed 2011) on the Grove Park to Bromley North line and the remaining 3 installed in 1999. These assets are maintained by both E&P and telecoms.

Cable troughing

Line side cable troughing is in place throughout the route. The route is in generally good condition.

The operational telecommunications assets hold very limited risk and due to the utilisation of common equipment types supportability is high. The age profile of the majority of the operations telecommunications assets show them to be in the mid life area. Assets such as the CSR and legacy transmission equipment are in the later part of the life cycle but will be replaced by the ongoing introduction of FTN-GSM-R.

Station Information Security Systems (SISS)

Customer Information Systems (CIS) and security CCTV are present at all of the stations located on the route. CIS Systems are a mixture of display technology with the obsolete CRTs being addressed through NSIP, TOC funded projects and Network Rail Telecoms funded projects from CP4 through to CP5. The majority of the CIS element of the SISS asset is either at or approaching its end of life. The renewal of the central control equipment is being undertaken. The Security CCTV element of the SISS asset has no renewals activities planned until CP5; alterations to the system have been undertaken by enhancement projects and or the TOCs. The DfT are currently negotiating future changes to asset responsibility for SISS assets when new franchises are awarded. SISS assets may therefore be handed over to the incoming franchise operator and responsibility in terms of ownership, faulting, maintenance, repair and renewal will established as part of any refranchising activity.

Delivery Plan for the remainder of CP4

The final year of CP4 sees the following deliver works being undertaken:

- Ashford Concentrator plus all remote nodes will be commissioned (November 2013).
- The renewal of the PETS at 21 sites.
- Minor cable works will be undertaken on a reactive basis as agreed with the Route Comms Engineer.

Output objectives

Telecoms Assets are planned for renewal to deliver continuous service availability ranging from 99.99% to 99.97%. The availability of telecoms assets is pivotal to underpin a number of other discipline performance KPIs. The current output of the CP5 business plan supports the required availability of the asset in line with the telecoms policy.

Route specific influence

The acceleration of the signalling migration plan within the Kent Route will have a direct influence on the renewal of telephone concentrators as signal boxes migrate to centralised route controls.

GSM-R technology supported by the FTN infrastructure will support the future signalling technology requirements. Train fleet fitment (currently due 2015) will be the key factor.

Minor copper cable renewals may be required should shortfalls in the network be identified following the migration work. Renewals of DOO CCTV is currently planned for 2017-2021. All signal box telephone concentrators will be renewed or life extended in line with NOS or any route initiative that supersedes NOS.

Maintenance is a mixture of predominantly planned preventative maintenance, inspection and condition based reactive maintenance. The renewal of PETS systems to KETS (Kestrel Emergency Telephone System) will see some reduction in maintenance activities as the new system does not require power supplies at the remote ends, not all sites will be suitable for this system. Maintenance of the SISS asset is the responsibility of the TOC.

The only enhancements planned for within the route that will influence the telecommunication asset base are platform lengthening, NSIP and access for all based work packages.

There are no plans to undertake work at variance to national telecommunications policy.

Asset risks

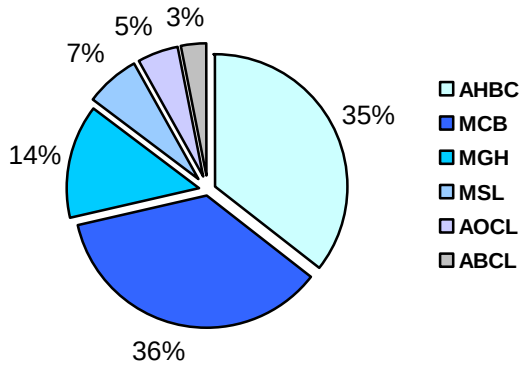
The following are the key safety and performance risks for this route section. Planned mitigations are detailed in the Interventions section.

Risk	Location	Mitigation
Current NOS plan not being met resulting in current telephone concentrator being required to remain for a longer period.	London Bridge Signalling Centre	Spares from renewal of Ashford and Victoria SC concentrators to be managed by maintenance to support system.
Legacy copper cable not being replaced by FTN project.	Route wide	Heavy maintenance activities to life extend further or replacement by either future projects with a requirement to use the network or replacement by NRT.

Level crossings

There are 59 level crossings with some form of signalling control in Kent which consist of eight main types ranging from full barriers – Manually Controlled (MCB) to rural gates with the majority types being Automatic Half Barriers (AHB) and MCB.

There are 266 passive crossings (e.g. footpaths) in the Kent Route. These are subject to risk mitigation as an ongoing activity and subject to safety initiatives such as improved access, sighting and signage as examples. Kent Route is currently reviewing the top 38 (by risk) identified by the Operational Risk Advisor team to determine whether any further enhancement is appropriate, such as Miniature Stop Lights, which will deliver further safety benefits.



Level crossings are reviewed for safety improvements at all intervention opportunities and not just as stand-alone renewals dictated by asset condition, the first consideration is always to seek closure, if this is not possible then the application of local and national safety initiatives is considered. As a result we have seen a number of assets proposed for upgrade to MCB (from AHB) and other improvements during CP4 include upgrading the road and boom lights to LED, new sealed battery supplies, upgraded audible alarms, improved signage and enhancements to road surfaces.

Level crossing policy

The policy for level crossings aligns with asset policy and is as follows, number one priority – closure, following that any renewal includes a census and an assessment and re-evaluation of risks and as such the majority of crossings receive incremental upgrades at times of intervention and therefore obsolescence is managed by constant review and upgrade which releases spares to accommodate installations awaiting review/renewal.

The opportunity for level crossing upgrade is also to now be presented as part of any re-control schemes (Type 12) where a suitable and sufficient risk assessment will be required to determine future suitability. This requires an uplift to the business plan to cover the additional costs incurred for upgrades since where the number of crossings can vary, a manual adjustment is required to the unit rate.

Delivery during CP4 has been fully aligned to route enhancements (RUS), NOS strategies and ROC aspirations. Where there is an opportunity to upgrade immediately (for an NOS scheme) that has been implemented, but where that has not been viable or practicable then enabling works have been implemented that provide for future provision for NOS upgrade, as and when it becomes viable. We have completed a full review of all crossing renewals and enhancement requirements and have aligned the vast majority with impending schemes, in CP5 and beyond, for maximum efficiencies. Specific examples include crossings at Snodland, Aylesford and Aylesford Village, Gillingham, Cuxton, East Farleigh, Rainham, Teynham, Teston and Wateringbury.

Maintenance and life extension

The DC third-rail electrified railway suffers from increased risk of corrosion due to stray return currents. This necessitates a robust and often more onerous inspection regime than that required on other parts of the network. To minimise rail corrosion through road crossings the ballast will be replaced when the decks are lifted on those crossings that have a history of rail corrosion. Level crossing surfaces will mainly be managed by maintenance activity with complete renewals limited to those decks that require the replacement of a significant proportion of the surface and support structure.

Strategic assets in terms of level crossing equipment are managed by spot replacement, CAPEX upgrades and the domestic renewals programme. Contactor relays (Enbray) have been an issue during the Control Period and so have been renewed with an operational equivalent and some obsolete timer relays and circuits have also been upgraded. LED road lights have been installed at a number of sites and where we have Mk1 “Penguin” type pedestals we have carried out strategic renewals to release spares for use at other locations.

Charlton Lane offers significant challenges with some of the longest booms in the country and work in CP4 includes upgrading the mechanical controls with electrical equivalents.

Drainage assets

A better maintained drainage asset can reduce the number of wet beds, landslips and flooding events.

The drainage asset has historically been undervalued. Investigations in recent years have quantified the importance of the drainage asset to the performance of Network Rail's other principal assets. These include the track formation and earthworks (embankments and cuttings).

The railway drainage asset includes all components designed to collect surface and groundwater which runs towards, falls onto or issues from the railway asset, and deliver it to a suitable outfall, whether that be a river or stream, a public sewer or a soakaway. The drainage asset includes earthworks drainage, track drainage, tunnels drainage, structures drainage, stations, depots and other buildings drainage including foul and waste water disposal but excluding above ground gutters and downpipes.

A drainage asset inventory has been completed (July 2012) by the Integrated Drainage Project (IDP). Drainage is funded and owned by Track, Buildings and Civil Engineering assets. The route has detailed examination records for approximately 50% of the route undertaken prior to commencement of the IDP. The surveys demonstrate that the drainage nodes' condition is Good (30%), Fair (33%) and Poor, Bad or Collapsed (7%) with a further 30% requiring further detail to allow complete classification. Drainage connections (pipes) have not had a condition assessment and will be CCTV surveyed during CP5.

The IDP has built on the current, most detailed and up to date data that has originated from the recent (2005 to 2010) CEFA/JBA earthworks surveys which covered 50% of the surveyed network. The IDP set out to:

- Record the location and type of all track and earthworks drainage assets
- Define the drainage system that each asset belongs to and the NR owner
- Assess the connectivity and flow direction within each drainage system
- Assess the performance of each drainage asset

The data will ultimately reside in the Ellipse maintenance database. Schematic drawings of the drainage assets for each 10 chain section of route will be produced. The inspection is now substantially complete.

These schematic drawings will also be issued in Drainage Management Plans (DMPs). The DMPs will detail all drainage along a section of railway, its history of performance, its criticality and maintenance requirements. The DMPs will be held in the Maintenance Delivery Units and will be owned by the Track Maintenance Engineers.

Kent's varied geology presents some difficulties with drainage management. Its relatively dry climate means flooding occurs rarely.

Asset knowledge of drainage is incomplete and thus site selection in CP4 is based on previous incidents and local knowledge. After the remaining asset inventory has been provided by the IDP it will be prioritised in accordance with the CP5 drainage policy. A proactive approach to managing drainage will then be taken.

Major drainage works will take place in Bo Peep and Sevenoaks Tunnels. Works will continue to identify cutting crest drains through earthworks examinations and to maintain these.

Drainage works in tunnels has been included in Earthworks Drainage Renewals.

The route will use the DMPs to support the management of track drainage.

Detailed investigations will be undertaken by either the depot maintenance teams or by specialist drainage contractors at problem drainage sites. Drainage contractors will be brought in on the more complex drainage locations where specialist expertise is required.

Use of new technologies to survey and undertake drainage works will deliver a possible efficiency saving of £1m across the control period. This will allow the precise location of drainage faults to be identified.

Efficiencies

Efficiencies will be delivered by the following:

- Maintenance efficiencies (7% Earthworks Drainage)
- Asset management efficiencies (BCAM Transformation) (5% of E/D)

We have not identified any efficiency from ORBIS for Earthworks or Drainage.

Outputs

Outputs are based on condition, and performance. Drainage Management Plans should be produced in CP5 but Kent Route aims to complete them in CP4.

Delivery Plan for the Final Year of CP4

It is anticipated that all drainage works planned for CP4 will be delivered.

Maintenance

The work profile for Kent Route will be set out in the form of a delivery plan for the final year of CP4 and a strategy going forward for CP5. Detailed below are the route specific factors driving the plan which will be taken into consideration in its further development.

E&P maintenance

The E&P asset base on the route will increase with the Power Supply Enhancement Project, Thameslink, Crossrail and other capacity and performance schemes (e.g. conductor rail heating, junction lighting etc). GSM-R commissioning will also increase the number of operational supply points.

Renewals will introduce modern switchgear with less maintenance but the overall volume of equipment and duty cycles will increase. The numbers of fluid filled cables will decrease reducing the requirement for cable maintenance.

Overall maintenance policy will continue to be a mixture of time based and condition/inspection led during the Control Period. However, policy changes for CP5 will require additional processing of condition measurement by maintenance to facilitate the increased use of reliability centred maintenance where such asset data can be consistently collected, measured and assessed.

NOS will reduce the Electrical Controls on the route from three to one and will require retraining of E&P maintenance staff on the new SCADA systems.

Extension of intelligent infrastructure to points heating will enable the eventual reduction in monthly checks during the winter season and provide theft loss monitoring of the equipment.

The measurement train use of the Conductor Rail Measurement System (CRMS) will be employed to determine conductor rail condition where the train operates on the route. Manual measurement will still be required where the train does not operate or is unable to measure the rail.

Policy on the measurement of signalling supply cables condition will require 5 yearly testing necessitating a minimum of 5 extra staff plus planning resource and transport to undertake the work.

Longitudinal timber structures

The route has a high volume of longitudinal timbers with over 150 longitudinal timber bridges. All are multi track structures, many with multi-spans. These arrangements require significant additional maintenance input. The additional maintenance activities include:

- Inspection – the arrangements are not currently suited to PLPR due to their bespoke design.
- Maintenance – includes additional activities such as tightening of tie rods and holding down straps, manual track lifting on the run on and run off tracks where OTM need to run out, additional lateral restraint on approaches to longitudinal timber structures, packing and alignment of baseplates, additional design schemes and renewing individual longitudinal timbers and all timbers on short single span bridges.

S&C

Kent Route has a high intensity of S&C with 1.5 S&C units per track mile. Many of the track layouts in the London and suburban areas feature complex S&C with non standard components and severe designed geometry due to nature of the route alignments through London and the suburbs.

The complexity and density of the S&C, combined with the restrictions imposed by a third-rail DC railway make the S&C maintenance particularly difficult and add significantly to the route's maintenance costs. They also reduce the overall track quality as the current track recording systems and track quality statistics fail to differentiate between sharp designed geometry and defective track alignment.

Many of the crossings are non standard and have long delivery lead times if they require replacement. These non standard components will become the focus of the S&C welding activity to maximise their service life.

Regauging of S&C though the switch panels and installation of new stretcher bars will form a key part of both the maintenance and CAPEX activity during the control period with the need for a closer working between the track and signals teams. These activities will improve both the safety and reliability of the S&C. We are looking to set up S&C teams which will undertake duties such as gauging, grinding and S&T maintenance. This will prolong the live of the S&C and will reduce material costs and failures.

PLPR

The benefits associated with PLPR and video inspection of S&C will be established within CP5 following the introduction of the trains in the final year of CP4. Any limitations of recording around the conductor rail need to be established, particularly with the difficulty in clearing ballast from the rail foot between the running rail and the conductor rail. The route has significant sections of track including pan 8 baseplated track and longitudinal timbers and unrecorded track that are not currently suitable for PLPR.

Vegetation

The route has a risk based vegetation clearance plan. This is based on reducing the key risks of SPADs, adhesion, dangerous trees and sighting of signals and crossings. Savings will be made by using the Bracke tree cutting head. Development work is being carried out on larger tree harvesters and jumbo chippers, however many of these attachments are “bolt ons” to RRVs some of which are not third rail compatible.

We will be looking to make further savings using the following innovations:

- The arisings from chipping machines will be spread and used as mulch, limiting future vegetation growth.
- The Bush fighter will have some benefit but this is limited in Kent due to access opportunities and line side cables in third rail areas.
- We are aiming to increase the use of back pack weed sprays. These are quieter, safer and not affected by the bird nesting season restrictions.
- We will proactively target Japanese Knotweed to reduce the annual treatment costs.
- We will be spraying all cuttings to prevent the re-growth of vegetation.

The above innovations require access to the track. Currently, due to access constraints, we continue to clear trees by hand using chainsaws. This will always be less efficient and less safe than using mechanised removal. We will continue to use cluster analysis as a tool to target vegetation hot spots. A high level of maintenance is required for SSSI sites. Significant works are planned at Folkestone Warren, Dungerness, and Combe Haven. We have a legal requirement to maintain the SSSI sites and in CP4 we have already spent up to £1million on maintenance.

Fencing

Savings can be made in rural area where a new type of class 3 stock fencing will be used. However much of our “inner” area is urban with trespass and vandalism risks. The route will continue using chainlink and palisade type fencing in these locations where appropriate.

Remote Condition Monitoring (RCM)

Asset failures are the largest source of train delay, and preventing failures offers the greatest potential in reducing train delay incidents. RCM will be utilised to move maintenance practice to a more proactive approach and reduce the reliance on manual intervention and inspection on site. RCM will be fitted, as a minimum to all key route strategy assets, i.e. critical points, track circuits in Kent, using the Intelligent Infrastructure system.

RCM will be required for any new installation of points, track circuits, or axle counters, in a critical location. We have planned by March 2013 to fit RCM to 307 track circuits and 328 critical points. In CP5, we are aiming to additionally fit RCM to a further 1,750 circuits and 740 critical points. The principle of utilising RCM for other vital systems will continue to be implemented, where possible, to allow a move to condition based maintenance in the future. This will include temperature monitoring of rail, axle counters and busbar monitoring and remote equipment rooms.

Red Zone Working

In the 2011/12 the route operated with an average of 70.39% overall green zone working – broadly in-line with the national average. With the introduction of plain line pattern recognition in CP5, further significant reductions in red zone working are expected. Over the course of CP5 we will seek to minimise red zone working where possible by targeting specific activities. The use of Lookout Operated Warning Systems (LOWS) will be explored and maximised where possible. Due to the geography of the Kent network, in complex, multi-track lay-outs the use of LOWS is not felt to provide a safety benefit and could introduce inefficiencies of working. However there are certain activities that could benefit from this technology. As an example, lifting and measured shovel packing represents the most common work arising activity undertaken in red zone on the route. Red zone working can be further reduced by installing junction lighting at high-impact locations.

Cable theft prevention

Cable theft in the Kent Route has occurred relatively infrequently in recent years in comparison to other routes, however due to the density of traffic on the network the cost of cable thefts when they do occur is high. To further reduce the number of cable theft incidents in CP5, the route has developed a strategy based on implementing a combination of recommended technologies to target harden key assets, for example cable tremblers, trough locks and cable/trough bandings. Targeting known hotspots will include access points and key buildings on critical strategic route sections. It is hoped that this approach in conjunction with wider external and national initiatives will lead to a reduction in incidents of cable theft throughout the next control period.

Mobile maintenance unit

The introduction of the mobile unit will deliver a new approach to maintenance through the provision of a mobile, covered, powered and lit working environment with all tools, facilities and required materials on board the unit. The mobile unit will facilitate safer working and provide significant benefits as it will facilitate the delivery of standard maintenance tasks including rail changing and welding, allow for fewer possessions and reduce the overall delivery costs allowing customers to run more trains. It will reduce the reliance on RRVs and other small plant and associated safety risks. Due to manufacturing lead times the introduction of the unit is not anticipated until midway through CP5.

Efficiency

The annual cost base will be reduced to £6.8m (CP5 exit rate). This will be achieved for example through:

- Reduction of direct staff over-time (£760k)
- Reduction of indirect labour (£642k)
- Maintenance staff used on property works station maintenance (£300k)
- Standardisation (£475k)
- Centralisation of planning at route (£880k)

Route Delivery Strategy, deliverability, data and assumptions

This section summarises the key outputs, activities, risks and assumptions behind the Kent Route Plan.

Delivering CP4 and CP5 plans

The volume of work to be delivered in Kent during CP5 requires a step change in the way that work is planned to ensure that the use of available access is maximised.

To achieve this a number of workstreams are already underway. This plan details the work that is being done to integrate access with the timetable aspirations of the TOCs. The work on Integrated Access Planning (IAP) will take a fresh look at the best pattern of access across the route taking account of the needs for inspection, maintenance, renewals and enhancements. The initial outputs from this project will feed into the engineering access plan and timetable for 2014.

The South East Programme Delivery Group provides a means for reviewing and agreeing the major possessions and blockades across Kent, Sussex and Wessex to make sure that there is effective co-ordination between the routes involved and the project delivery teams. At the moment the focus is on reviewing the latest information from the Thameslink Programme to make sure that their access requirements are integrated with other work affecting London termini.

Work with Infrastructure Projects has focused on integrating the various elements of the renewals workbook. This started with developing asset specific workbanks and assessing the best means of optimising delivery by looking at such things as resource constraints, contract packaging and procurement efficiencies. Work is now ongoing to integrate the individual asset workbanks into an overall plan for Kent. This considers opportunities to share access, wider contract packaging efficiencies and the best order to carry out works on a particular line of route. Whilst a good start has been made on this workstream, it will continue over the next 12 months so that an overall programme for the CP5 delivery plan can be established prior to the start of the control period. The early outputs from this work are now being fed into the IAP.

Maintenance Delivery

The level of enhancement work, particularly associated with the Thameslink Programme and East Kent Resignalling Phase 2 changes the available access for maintenance and renewal activities. We recognise that development of the right maintenance delivery programme is a continuous process building on our delivery on CP4 and reacting to developing customer requirements. Integrated work plans will align with our access plan to make the best possible use of cyclical access to the network thereby minimising the impact on our customers.

Asset Management Renewals

CP5 sees a noticeable shift in renewals interventions with a move toward targeted renewal and refurbishment over full renewal. This will require more frequent, but potentially shorter duration, access to the network and therefore the work that is being done on creating longer midweek night opportunities is key to the deliverability of this strategy.

The key risks to deliverability are as follows:

- Access constraints due to the Thameslink KO2 works are already proving a challenge in terms of dating key items of S&C renewal within the track renewals plan.
- Resource constraints such as the availability of tilting wagons and kirow cranes.
- Ensuring that sufficient access is safeguarded for maintenance to avoid any maintenance backlog arising, this will be a particular challenge in the London Bridge area.
- Delays in delivering the safer and faster isolations project will hamper the realisation of efficiencies that are needed to deliver more work in midweek night possessions.
- Ensuring sufficient capacity is available around engineering access

Expenditure

Renewals

The activity volumes for CP5 have been developed via comparision between top down policy based modeling and bottom up workbank development. The bottom up workbank has been created from detailed asset knowledge and application of Network Rail asset policies; hence the small levels of variance to the top down modelled volumes. The minor variances seen across the disciplines related to route specific structural factors and areas where the current asset condition varies from what is expected for its age and utilisation.

Operations

The cost to operate the route during CP5 reduces with the implementation of East Kent re-signalling phase 2 and the resignalling of the London Bridge area as part of the Thameslink Programme. By the end of CP5 we will have made good progress towards consolidating signalling control in Gillingham ROC and Ashford IECC with the final phase of East Kent re-signalling planned for mid-CP6.

Operations

£m (12/13 prices)	2014/15	2015/16	2016/17	2017/18	2018/19	CP5 Total
Signaller	21.4	21.3	20.2	21.7	17.5	**102.1**
Non-Signaller	8.1	8.1	8.1	8.0	8.0	**40.4**

Maintenance

Our maintenance plan includes application of remote condition monitoring, risked based maintenance and the benefits from better asset information through the ORBIS programme to achieve the required efficiencies. This is offset by additional expenditure on cable theft prevention including substation security.

The table below set out the high level, post efficient, costs of delivering the route plan.

£m (12/13 prices)	2014/15	2015/16	2016/17	2017/18	2018/19	CP5 Total
Maintenance Function Controllable Costs	48.3	46.9	45.6	44.8	42.7	**228.4**
RAM Function Controllable Costs	1.5	1.5	1.5	1.5	1.5	**7.7**
CEFA element of RAM Function Controllable Costs	5.7	5.7	5.7	5.7	5.6	**28.4**

Renewals

HLOS post-efficient	FY15	FY16	FY17	FY18	FY19	CP5
Track	44.6	49.6	46.1	43.3	41.5	**225.1**
Plain line	16.9	20.4	20.7	22.1	21.1	**101.2**
Refurbishment	5.6	4.9	4.6	4.4	4.3	**23.8**
S&C	12.6	15.1	11.5	12.2	11.7	**63.2**
Drainage	2.2	2.0	2.0	1.9	1.8	**9.8**
Fencing	1.2	1.2	1.1	1.1	1.0	**5.6**
Other off-track	6.2	6.0	6.2	1.5	1.5	**21.4**
Track Other						
Signalling	60.3	45.2	28.1	29.6	45.7	208.9
Conventional resignalling	32.4	12.4	1.4	0.4	5.1	**51.6**
ERTMS						
Level crossings	5.6	12.4	4.1	0.2	1.0	**23.2**
Minor works/life extension	15.3	7.8	7.1	7.1	7.1	**44.4**
Control centres	2.9	3.3				**6.2**
Modular signalling						
National projects	0.7	0.6	0.6	0.6	0.6	**3.2**
Resignalling (partial)	2.5	6.3	12.5	18.9	31.1	**71.3**
ERTMS cab fitment						
Traffic Management		1.5	1.5	1.5		**4.5**
Signalling Other	0.9	0.9	0.9	0.9	0.8	**4.4**

Total staff

	2014/15	2015/16	2016/17	2017/18	2018/19
Kent	1,509	1,443	1,459	1,451	1,364

Civils	40.1	37.6	31.6	30.5	28.7	168.5
Underbridges	15.3	13.5	7.7	7.5	7.2	**51.3**
Major structures	3.6	3.5	3.4	3.3	3.2	**17.0**
Overbridges	1.0	0.9	0.9	0.9	0.9	**4.6**
Bridgeguard 3						
Tunnels	4.5	4.4	4.3	4.2	4.0	**21.2**
Civils Other Assets	3.9	3.7	4.1	3.6	3.0	**18.2**
Culverts	*0.5*	*0.5*	*0.4*	*0.4*	*0.4*	***2.2***
Footbridges other assets	*0.9*	*0.8*	*0.8*	*0.8*	*0.8*	***4.1***
Coastal and estuary defences	*0.7*	*0.6*	*1.0*	*0.6*	*0.2*	***3.1***
Retaining walls	*1.9*	*1.8*	*1.8*	*1.7*	*1.7*	***8.9***
Earthworks	7.8	7.5	7.3	7.1	6.9	**36.6**
Civils Other	4.1	4.0	3.9	3.8	3.7	**19.6**

Buildings	19.5	17.5	16.1	17.2	12.5	82.8
Managed Stations	2.9	4.1	3.9	2.3	1.5	**14.8**
Franchised Stations	10.3	10.4	8.6	11.2	8.7	**49.2**
Depots	1.0	1.3	1.3	1.3	0.9	**5.9**
Lineside Buildings	2.4	1.6	1.6	1.5	1.4	**8.5**
Depot Plant	2.8	0.0	0.7	1.0		**4.5**

Electrification	41.4	37.3	27.5	24.8	20.5	151.5
Overhead Line						
Conductor rail	6.2	4.1	5.3	4.1	2.0	**21.6**
AC distribution						
DC distribution	24.3	21.1	18.0	18.4	16.3	**98.1**
SCADA	3.1	3.0	2.9	1.8	1.7	**12.6**
Energy Efficiency						
System capability	7.1	7.4	0.1			**14.6**
Electrification Other	0.6	1.7	1.3	0.5	0.5	**4.6**

Telecoms	4.7	7.1	13.4	5.9	6.5	37.7
Station I&S	3.5	5.3	9.6	2.8	2.8	**23.9**
Operational	1.2	1.7	3.8	3.2	3.8	**13.7**
Telecoms Other						
FTN						

Plant & Machinery	4.3	3.6	7.6	3.4	3.5	22.4
Fixed Plant	3.4	2.7	6.1	2.2	2.1	**16.5**
Mobile						
Intelligent Infrastructure	0.9	0.8	1.5	1.3	1.4	**5.9**
Maintenance						
High Output						

Other Renewals	12.3	12.6	12.2	12.5	12.2	61.9
Orbis						
Property	1.9	2.3	1.9	2.2	1.9	**10.1**
R&D (incremental)						
Isolation	10.3	10.3	10.3	10.3	10.3	**51.7**
LOWs						
Other Renewals						
Rollover						

Key outputs

Safety

Our plans for CP5 do not include specific safety targets, but programmes of work designed to reduce risk and improve safety metrics in a continuous and sustained way. We will focus on the following areas:

- Safety leadership and culture
- Improved asset management of our structures assets
- Track worker safety
- Level crossing risk reduction
- Route crime, theft and vandalism
- Irregular working
- Platform-train interface safety improvement
- Station management – slips, trips and falls

Asset Reliability

The challenge for CP5 is to maintain our current level of performance through the construction period of Thameslink KO2 and the increase in traffic associated with the train lengthening programme and the completion of the Thameslink. Increased volumes of S&C renewals and targeted rail replacement will remove some of the life expired and less reliable track assets. Re-signalling of the London Bridge and East Kent phase 2 areas will address some of our life-expired and least reliable assets, however, making sure that the new assets perform at the highest level from commissioning is often a challenge with signalling equipment and the avoidance of early stage failures will be a key focus.

Continuing progress will be made with replacing old and unreliable cables (both traction and signalling power supply) and the commissioning of GSM-R and FTN at the end of CP4 should see a significant reduction in the number of telecoms failures. RCM continues to be a significant factor and we will further develop its use to predict and prevent failure. The increased spend on earthworks through the enhanced spend programme in CP4 and then targeted works in CP5 will reduce the number of sites categorised as being in poor category and the likely risk of service impacting failures.

Capacity and Capability

Key capacity and capability schemes in the control period are:

- Thameslink KO2 which will provide better segregation of service groups on the approaches to London Bridge through the construction of Bermondsey diveunder and the bringing into use of Borough Viaduct. The re-configuration of London Bridge station to provide nine through platforms will give dedicated platforms for the Thameslink services and an additional platform for Charing Cross services.
- Kent train lengthening programme – the completion of this programme will see platforms and the associated power supply reinforcement provided for the progressive introduction of 12-car trains on the metro service as existing rolling stock is released by the new Thameslink rolling stock.

Key assumptions

The key assumptions made in the production of this plan are that:

- enhancement funding will be made available for the implementation of the safer and faster isolations project.
- franchise commitments i.e. the new Southeastern and Thameslink, Southern, Great Northern franchises will align with the HLOS commitments and that the current pause in the franchising process will not have an effect on the CP5 expenditure plans.
- an integrated access plan can be produced that facilitates the delivery of the major enhancement works (Thameslink, Crossrail, train lengthening and East Kent Re-signalling) alongside the significant renewals and maintenance workload that there is in CP5.
- industrial relations issues associated with the changes proposed in the operations and maintenance organisations can be managed without any significant impact on the business.

Key deliverability risks that have been identified are as follows:

- Access constraints due to Thameslink works at London Bridge will make the track renewals plan a challenge to deliver, especially some of the S&C work; also an issue for delivery of day to day maintenance
- Resource constraints (e.g. tilting wagons and Kirow cranes)
- Operations efficiencies are not realised because of delays in the delivery of NOS
- IR Issues delay implementation of operations and maintenance efficiencies
- Changes to the Thameslink construction strategy and timetables undermine the performance assumptions and impact on the wider route delivery strategy
- Performance improvements assumed for traffic management are not realised

The performance outputs identified by Kent Route are predicated on several critical assumptions. If these prove untrue or inaccurate then the route's view on the achievable outputs will be materially affected:

- The achievable level of performance is based upon the investment plans set out in this document. If there are changes to these plans then the achievable level of performance will need to be adjusted accordingly.
- The forecast provided by the route is based upon the 25th and 75th percentiles giving the HLOS delivery and downside scenarios. It is therefore improbable that performance will deviate beyond these levels, but not impossible. This is particularly true of the downside, where severe or sustained realisation of risks will significantly affect performance metrics.
- The Southeastern delay-PPM relationship significantly shifted when the December 2009 timetable change occurred, with major changes to service patterns and the introduction of domestic high speed services. This invalidated the assumed achievable delays for CP4 for Southeastern. Given traffic growth and congestion approaching London Bridge, it is expected that the maximum delays required to achieve a given level of PPM will shift modestly upwards. However, given that several further major timetable changes will occur in CP5 – not least in December 2018, just 4 months before the end of CP5 – it is possible that another step change could occur at these points.
- No change in the relationship between above and sub-threshold (less than 3 minutes) delay is assumed. Experience in Sussex and Wessex in CP4 has identified this is a specific risk to the delay-PPM relationship when changes do occur.
- PPM delivery is based upon the stated expected levels of TOC-on-Self and TOC-on-TOC delays being achieved, as well as NR delays.
- It is assumed that the new Southeastern and Thameslink-Southern-Great Northern (TSGN) franchises will have aligned plans and committed performance outputs with Network Rail in their bids. Any risk of deviation is unknown and therefore the impact upon the deliverability is also unknown. Risks could be direct, in terms of PPM levels funded for, or indirect, in terms of operator resource and management of perturbation (e.g. train crew efficiency).
- Aside from general risks around the unknowns of the refranchising processes for Southeastern and TSGN at this point, it should be noted that some Southeastern services transfer to TSGN in CP5, and that these are above average performers. This is a minor risk for Southeastern and a minor benefit for TSGN.
- Thameslink KO2 scope and timing has been assumed verbatim against the current published plan. Any major scope change, such as a delay in the introduction of the December 2018 timetable into CP6, will have an associated impact upon forecast performance (either positive or negative).
- It should also be noted that the exact timetable specifications for all of the major changes as a result of KO2 are not finalised. As train performance is a measure of delivery of the timetable, this has significant implications.
- Normal seasonal variation in weather conditions has been assumed. This is particularly relevant to winter, where the resilience programme will largely only be effective to a certain level of severity in conditions. An abnormally harsh or prolonged winter is likely to severely affect the operational capability of the network.

For calculation of Southeastern PPM and CaSL, assumptions are made on the level of performance to be achieved on High Speed 1. In no way can this be considered a commitment, as Network Rail (High Speed) is subject to **its** own regulatory **regime** (CP2 **will be** for 2014 to 2019).

Investment to achieve efficiency

The efficiency assumptions on which this Plan is based are reliant on the delivery of a number of key investments:

- Operating cost efficiencies are almost entirely predicated on the roll out of the NOS, the associated closure of small signal boxes and the consolidation of signallers in ROCs.
- Maintenance efficiencies are driven by the introduction of new technology and the move to risk based maintenance. The main technology changes consist of:
  - ORBIS – the company's new asset information system which will improve decision making and reduce office based administration (see section below).
  - Plain Line Pattern Recognition and video inspection of S&C which reduces the amount of manual inspection.
  - Intelligent Infrastructure – the installation of Remote Condition Monitoring which allows asset interventions to be targeted based on asset health.

  All of these will combine to allow the implementation of a more agile and focused maintenance organisation.
- Renewals efficiencies are as a result of better asset information (see ORBIS section below) and a range of asset specific design, procurement, delivery and process improvements that will be progressively implemented during the course of the control period.

More details on all of the efficiencies are given in the relevant sections of this document and are summarised below.

Efficiencies	FY15	FY16	FY17	FY18	FY19	CP5
Track	-1%	3%	7%	10%	13%	7%
Signalling	4%	8%	13%	17%	22%	12%
Civils	3%	5%	7%	10%	14%	7%
Buildings	5%	10%	13%	14%	17%	12%
Electrification	6%	9%	14%	18%	19%	12%
Telecoms	3%	6%	9%	12%	15%	10%
Plant	6%	9%	13%	16%	17%	12%

Other risks and opportunities

Although Thameslink will be the single most influential factor upon performance in Kent during CP5 (see projects section), there are additional non-business as usual factors that will also affect the trajectories, which when taken together contribute about half the risk/opportunity during the control period.

In many cases, the ability to discretely quantify the performance change resulting from the above is very challenging due to uncertainty over timing, scope or interrelationships. However, more broadly the size of impact and the likelihood of realisation can be put into context for all factors (business as usual and specific issues).

Relative Importance of Factors Affecting Kent CP5 Performance

< Probability >	Negative	< Performance Impact >		Positive
Highly Likely	London Bridge Congestion TC Failure DPI TLP Key Output 2	Ashford Station Layout Cable Theft / Fatalities North Kent Freight NOS London Bridge ASC	Cable & Wire Renewals Closer Classic / HS1 Re-Railing Strategy Safer / Faster Isolations	Red Route Strategies
	Autumn Management DC Winter Resilience SE Train Lengthening TTH Limitations	Channel Tunnel Freight EKRS Phase 2 (During) EKRS Phase 3 Passenger Growth Refranchising Unknowns TSRs	EKRS Phase 2 (Post) HP Rail Renewals RCM on Points / TCs	Con Rail Monitoring Thameslink ATO / TMS
	Crossrail Abbey Wood NOS ECRO Strategy Red Zone Working Ban	Clay Banks Track Quality GSMR Deployment Mid-Life 375-377 Reliability Other Re-Signalling SLL Capacity	Cannon Street Peak TT Level Crossing Closures PL Pattern Recognition Project Mountfield	Integrated Access Planning Orbis Benefits RCM Phase 4
Unlikely	Folkestone Sea Defence			Alliancing Timetable for Performance

ORBIS

SBP plans for CP5 include a variety of efficiencies which vary in impact across different routes and asset types. ORBIS is a key enabler for many of these efficiencies. ORBIS is focused on providing routes with better asset information, in a readily usable form, and advanced decision support capability, enabling routes to achieve efficiencies through improving decisions and is required to effectively implement CP5 policies. The level of efficiencies attributable to ORBIS across routes is consistent with the £270m identified in the IIP business case.

Where ORBIS is split out as a separate efficiency component it is expected that additional changes will be required within route asset management and infrastructure maintenance to realise the efficiencies. Where ORBIS is not split out it is acknowledged as a key enabling component required to achieve identified efficiencies.

ORBIS Overview: ORBIS is a major programme of Asset Information capability enhancements that provides a vital enabler for condition-led asset policy implementation, enabling us to better manage our asset base for less, and better exploit existing railway system capability.

Efficiency Treatment: Routes propose two different treatments for recognising ORBIS efficiencies, either: to split out ORBIS as a separate efficiency component, acknowledging that additional process or working practice changes will be required within route asset management and infrastructure maintenance to realise the efficiency; or to leave ORBIS embedded as a key enabling component across identified efficiencies. Most routes have applied a combination of these two treatments.

Renewals: ORBIS will provide better information to support CP5 asset policies, focusing effort on critical assets, identifying opportunities for refurbishment and life extension, while assisting with effective prioritisation of renewals activities. ORBIS supports routes in Track, Signals, E&P and B&C renewals. Full Track efficiencies are recognised from 2016/17, other efficiencies are expected to ramp up from 2015/16.

- Track renewal plans have been reduced based on ORBIS capabilities; including Linear Asset Decision Support (LADS), which overlays different sources of information to enable a better understanding of condition, degradation, impact of interventions, and underlying root cause; S&C verification and S&C criticality; enabling routes to make better informed choices.
- Signals renewal plans have been reduced based on ORBIS decision support using full asset inventory and condition information, rather than the current sample, identifying optimum renewal points, creating scope and value engineering efficiencies across maintenance delivered renewals, minor works, and major schemes.
- E&P renewal plans have been reduced based on ORBIS improving asset information and providing decision support capability. Better condition data supports a fundamental E&P policy shift from time to condition based intervention, leading to a move from renewals to refurbishment in a number of major asset types including DC distribution, AC distribution/ OLE, electrical traction equipment, and signalling power cables, as well as fixed plant.
- B&C renewal plans have been reduced in structures, buildings and earthworks, based on ORBIS support for risk based renewals policies providing better understanding of asset risk profiles, and decision support in conjunction with the BCAM transformation.

Maintenance: ORBIS better information and decision support tools will enable maintenance efficiencies in a number of ways: by volume reduction across budget lines, by reductions in administration across asset disciplines, through to improved asset and incident location information enabling maintenance and incident response teams to respond more effectively. Based on early availability of capability including mobile access and productivity-focused applications, efficiencies are expected to ramp up from 2014/15.

- Track Opex: ORBIS provides a multi-layered view of linear asset data, which enables us to better predict faults and understand the effectiveness of previous work, will create a range of efficiency opportunities dependent on route plans and asset condition. A range of expected benefits has been identified across a number of track and off-track budget lines.
- Non Track Opex: ORBIS will create significant efficiencies in Maintenance Indirect. Routes have identified up to 50% reductions in administration across CP5 due to ORBIS enabling direct data capture, eliminating elements of rekeying, automating and optimising work orders and providing a platform for other applications. Direct Opex efficiency opportunities in Signals and E&P are limited where teams are sized for rapid response or other working practices. Additionally ORBIS has been recognised as an enabler within Rapid Response, providing planning support and mobile applications to facilitate information sharing.

Financial benefit: ORBIS financial benefits, c. £270m in efficiencies, are primarily achieved through reduction in asset renewal volumes, implementation of lowest-whole-life cost management policy for each asset type, based on driving effective CP5 policy implementation decisions. In making this readily accessible ORBIS smart-phone and tablet-based handhelds will eliminate paperwork, avoid future cost of positive reporting, improve incident response time and accuracy, and improve operational safety. These reductions will be enabled by ORBIS but require different processes or working practices within route asset management and infrastructure maintenance to realise the benefits. ORBIS is funded to support the business change activity required.

Non-financial benefit: ORBIS will support a range of non financial benefits, including: Asset Management policy optimisation, better management of safety risk, safer working documentation, location improvement, improved investment planning, improved RAMPs, improved operational performance, regulatory compliance and reputation benefits. ORBIS will help routes to avoid recording asset condition information on locally held pieces of paper, unnecessarily renewing infrastructure assets, planning work from outdated schematics, wasting time trying to locate an incident, rebuilding a network model each time it is required, re-surveying project sites and assets that have already been recently surveyed, unnecessarily printing and distributing thousands of tons of paper.

Benefits-led: The ORBIS programme has accelerated activity in advanced decision support across Track, Signals and E&P. ORBIS will continue to be benefits-led and work closely with routes to ensure optimum realisation of benefits and efficiencies. Typically for a benefits-led programme, which is creating and exploiting new capabilities, the efficiencies mix identified in SBP shows changes from IIP. Further change can be expected over the course of CP5 as new opportunities for information exploitation emerge.

Activity volumes

Track	FY15	FY16	FY17	FY18	FY19	CP5
Plain Line Conventional						
Complete Trax (km)	17	14	12	14	14	**71**
Rail renewal (km)	20	20	20	20	20	**100**
Single rail (km)	5	5	5	5	5	**25**
Heavy refurb (km)		20	28	32	32	**112**
Plain Line Refurbishment						
Heavy refurb (km)	7	5	5	5	5	**26**
Medium – concrete (km)	17	17	17	17	17	**85**
Medium – other (km)	5	4	4	4	4	**20**
Switches & Crossings						
Abandonment (#)	3	4	3	2	2	**14**
Full (#)	24	30	24	27	27	**132**
S&C Refurbishment						
Heavy refurb (km)	28	27	25	25	25	**130**
Medium refurb (km)	32	32	32	32	32	**160**

Signalling	FY15	FY16	FY17	FY18	FY19	CP5
Conventional (SEUs)		281				**281**
Level Crossings (#)						
ABC (#)		1	1			**2**
Obstacle detection (#)	2	11	3		1	**17**
MCB-OD(#)		5	1			**6**
Partial Conventional		2	46	68	93	**209**
Targetted component	55	8	8	17	19	**108**

Civils	FY15	FY16	FY17	FY18	FY19	CP5
Underbridges (sq m)	4,817	4,388	2,559	2,559	2,559	**16,880**
Overbridges (sq m)	262	262	262	262	262	**1,310**
Bridgeguard 3 (sq m)	50	50	50	50	50	**250**
Tunnels (sq m)	1,524	1,524	1,524	1,524	1,524	**7,622**
Culverts (sq m)	59	59	59	59	59	**293**
Footbridges (sq m)	180	180	180	180	180	**901**
Coastal/Estuary Defences (m)	700	700	700	700	700	**3,500**
Retaining Walls (sq m)	517	517	517	517	517	**2,584**
Earthworks (5 chain-length)	225	225	225	225	225	**1,125**

Buildings	FY15	FY16	FY17	FY18	FY19	CP5
Franchised Stations						
Footbridge (m^2)	1,105	750	825	430	810	**3,920**
Canopy (m^2)	1,844	895	1,530	2,795	1,769	**8,833**
Platform (m^2)	4,055	1,914	1,680	3,700	3,850	**15,199**
Building (m^2)	381		176	669	110	**1,336**
Managed Stations						
Train Shed (m^2)		2,500	5,900			**8,400**
Canopy (m^2)			5,380			**5,380**
Platform (m^2)	275	2,365	1,615	150	125	**4,530**
Building (m^2)			156			**156**

Electrification	FY15	FY16	FY17	FY18	FY19	CP5
Overhead Line				1		**1**
Mid-life refurbishments				1		**1**
Conductor rail (km)	16	7	18	8	2	**51**
DC distribution	73	83	74	75	53	**357**
HV switchgear (#)	2	6	3	9	3	**23**
HV cables (km)	18	18	18	18	18	**91**
LV switchgear (#)	42	50	41	40	25	**198**
LV cables (km)	9	7	7	8	7	**37**
Transformer/Rectifiers (#)	2	1	5			**8**

Telecoms	FY15	FY16	FY17	FY18	FY19	CP5
Station Information and Surveillance Systems						
CIS	5	59	153	15	85	**317**
Public address	694	562	779	723	679	**3,437**
CCTV	168	330	709	122	103	**1,432**
Clocks	10	2	5	2		**20**
Operational Telecoms						
Driver-only operation CCTV				64		**64**
Legacy Radio					1	**1**
Power (#)		2				**2**

Capacity Data

High Level Output Specification (HLOS) route or city: London Bridge (Kent Routes)

	AM 3 hour peak			AM 1 hour peak		
	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19
Number of passengers*	92,300	13,600	105,900	48,700	8,000	56,700

	Passenger vehicle arrivals	Number of seats	Total passenger capacity**	Passenger vehicle arrivals	Number of seats	Total passenger capacity*
Forecast capacity at end of Control Period 4	1,146	79,300	133,000	521	33,700	60,800
Additional capacity enabled by the plan	176	10,500	24,700	74	4,800	9,900
Forecast capacity at end of Control Period 5	1,322	89,800	158,000	595	38,500	70,700

High Level Output Specification (HLOS) route or city: Victoria (Southeastern)

	AM 3 hour peak			AM 1 hour peak		
	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19
Number of passengers*	20,100	900	21,000	10,100	400	10,500

	Passenger vehicle arrivals	Number of seats	Total passenger capacity**	Passenger vehicle arrivals	Number of seats	Total passenger capacity*
Forecast capacity at end of Control Period 4	296	22,400	32,000	116	8,800	12,100
Additional capacity enabled by the plan	16	1,300	2,000	16	1,300	2,000
Forecast capacity at end of Control Period 5	312	23,700	34,000	132	10,100	14,100

High Level Output Specification (HLOS) route or city: Blackfriars (terminating)

	AM 3 hour peak			AM 1 hour peak		
	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19
Number of passengers*	0	8,000	8,000	0	3,800	3,800

	Passenger vehicle arrivals	Number of seats	Total passenger capacity**	Passenger vehicle arrivals	Number of seats	Total passenger capacity*
Forecast capacity at end of Control Period 4	0	0	0	0	0	0
Additional capacity enabled by the plan	216	15,800	23,200	72	5,300	7,700
Forecast capacity at end of Control Period 5	216	15,800	23,200	72	5,300	7,700

* Number of passengers as specified in the HLOS
** Total passenger capacity includes an additional allowance for standing on short journeys of 20 minutes or less

For further information please refer to the passenger capacity plan supporting document.

High Level Output Specification (HLOS) route or city: Blackfriars (through E & C)

	AM 3 hour peak			AM 1 hour peak		
	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19
Number of passengers*	21,100	-8,600	12,500	10,800	-5,000	5,800

	Passenger vehicle arrivals	Number of seats	Total passenger capacity**	Passenger vehicle arrivals	Number of seats	Total passenger capacity*
Forecast capacity at end of Control Period 4	256	18,400	24,800	112	8,100	10,600
Additional capacity enabled by the plan	-112	-10,800	-4,000	-64	-5,600	-3,700
Forecast capacity at end of Control Period 5	144	7,600	20,800	48	2,500	6,900

High Level Output Specification (HLOS) route or city: St Pancras – High Speed 1

	AM 3 hour peak			AM 1 hour peak		
	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19	Forecast demand in 2013-14	Extra demand to be met by 2018-19	Demand to be met by 2018-19
Number of passengers*	Not specified	Not specified	Not specified	Not specified	Not specified	Not specified

	Passenger vehicle arrivals	Number of seats	Total passenger capacity**	Passenger vehicle arrivals	Number of seats	Total passenger capacity*
Forecast capacity at end of Control Period 4	156	8,800	16,600	78	4,400	8,300
Additional capacity enabled by the plan	0	0	0	0	0	0
Forecast capacity at end of Control Period 5	156	8,800	16,600	78	4,400	8,300

* Number of passengers as specified in the HLOS
** Total passenger capacity includes an additional allowance for standing on short journeys of 20 minutes or less

For further information please refer to the passenger capacity plan supporting document.