

PR13 Initial Industry Plan Supporting Document

Definition of proposed CP5 enhancements

September 2011



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Introduction

This document provides more detail of the possible enhancements proposed for Control Period 5 as summarised in the Initial Industry Plans (IIP), published in September 2011. It should be noted that this is an initial set of proposals. The portfolio of schemes and the scope of individual projects will be developed further in consultation with funders and train operators.

The enhancements proposed in this document underpin the strategies summarised in the Initial Industry Plan and described more fully in the Network Specifications¹. The infrastructure interventions proposed form part of a toolkit of interventions that are available to the industry and represent the most significant element of expenditure to deliver the required outputs. The Route Utilisation Strategies (RUSs) that have informed these strategies examine the gap between the required outputs and the existing capability and examine the most appropriate interventions including length of trains, the mix of services, train routings, access choices and infrastructure interventions.

A key milestone in the ongoing development of this portfolio will be the specification of outputs to be delivered in CP5. The High Level Output Specifications (HLOSs) will be published in summer 2012. In response to the HLOSs, Network Rail will publish its Strategic Business Plan in January 2013.

Many of the proposed schemes are in GRIP² stages 1 and 2 of development. At this stage, there is therefore a degree of variability in the definition of the outputs and scope of each project and this is reflected in the information provided in this document.

There are three categories of investment that are summarised in this document:

- schemes that are committed through the last periodic review and commitments made since then, these include the Thameslink and Crossrail programmes; Reading station area remodelling; introduction of the Intercity Express Programme and electrification on the Great Western and in the North West;
- proposed interventions to meet desired outcomes in Control Period 5. The IIP includes a portfolio of enhancements designed to achieve specific outcomes in a cost effective way. Within the sector strategies (chapters 4 to 7) the IIP highlights a number of strategic choices and trade offs to inform the specification of railway outputs in England and Wales. These strategies outline a number of investment choices to enhance the output of the railway, delivering better outcomes in areas such as safety, efficiency, economic growth, rail user satisfaction, and carbon. The choices have been informed by the programme of Route Utilisation Strategies (RUSs) and their relevant stakeholder management groups, route based discussions through the Route Investment Review Groups (RIRGs), and bilateral discussions between Network Rail and train operators;
- funds to deliver specific outcomes. Experience of using funds in CP4 has demonstrated the value of such an approach giving the industry flexibility to determine the most cost effective way to deliver outputs and providing the flexibility to respond to emerging risks and unforeseen circumstances.

¹ The Initial Industry Plans and Network Specifications, all published in September 2011, can be found at www.networkrail.co.uk

² Governance for Railway Investment Projects (GRIP) describes how Network Rail manages and controls projects that enhance or renew the national rail network.

Enhancement cost estimates

The IIP includes a portfolio of enhancements designed to achieve specific outcomes in a cost effective way. Aside from the committed schemes in the base plan, for example the Thameslink programme, the interventions proposed are primarily in GRIP stages 1 and 2 of development.

Reflecting the early stage of development of these schemes, the IIP includes a range as to the possible costs of the individual projects and the overall portfolio reflecting a range of risks and opportunities. These include:

- uncertainty of outputs: agreement with train operators and funders of firm outputs is iterative as operational assessments and economic appraisals are refined through the development process;
- scope definition: selection of a preferred single option usually occurs at GRIP stage 3. For the purpose of developing a forecast for the IIP Network Rail has selected a most likely scope of works for schemes in GRIP stage 2; this will need to be validated in due course through the option selection process;
- optimism bias: there is well accepted research that reveals a systemic optimism bias in estimating the cost of projects compared to their outturn costs. A review specifically of Network Rail's projects revealed that the degree of bias can be sensitive to the type of project and asset mix. There is therefore a choice to be made as to the level of risk to be included in the overall project estimate and at early GRIP stages this is a qualitative judgement;
- efficiency opportunities: as with other elements of cost forecasting in the IIP consideration needs to be given to the potential efficiencies that could be delivered including the impact of initiatives such as our efficient infrastructure delivery proposals, the impact of devolution, alliancing and the impact of our plans to encourage greater contestability of project delivery;
- portfolio risk benefits: there are risks that are low probability but high impact that can materially impact the estimate of any single project but when delivering a portfolio of projects this risk can be spread across the portfolio such that costing the projects as a portfolio is less than the sum of the individual projects; and
- other portfolio benefits: potential sources of efficiency include the benefits of delivering a portfolio of projects providing economies of scale in the market place and synergies in how projects are packaged.

Given the early stages of development of the proposed interventions it is not possible to be precise about the impact of each of these factors. Network Rail has provided a range as to the funding required at both a project and a portfolio level. This range takes into account the level of development and therefore the range of uncertainty in the individual project estimates and the risks and opportunities across the entire portfolio. At a portfolio level, the range around the projects' estimates is summarised below along with the expenditure forecasts for the committed projects. The latter are more robust, reflecting the maturity of the projects. The table also shows the provision for funds being sought.

The Initial Industry Plan, and the proposed projects described here, assume delivery of the CP4 enhancement programme as set out in the Network Rail Enhancements Programme: statement of scope, outputs and milestones document June 2011. This is a supporting document to the Control Period 4 Delivery Plan update 2011 and is subject to industry change control.

Enhancements expenditure in England and Wales £ million 2011/12 prices	Control Period 5 expenditure forecast
Committed programme Includes the Thameslink programme, Crossrail programme and Reading station area remodelling, committed electrification schemes, the Intercity Express Programme (IEP) and West Coast Main Line schemes	4,544
Proposed interventions See project summaries	2,067 – 2,342
Funds Includes Strategic Freight Network, level crossings, Network Rail Discretionary Fund, journey time improvement fund, performance, station improvement, accessibility, and customer information	2,514
Total	9,125 – 9,400

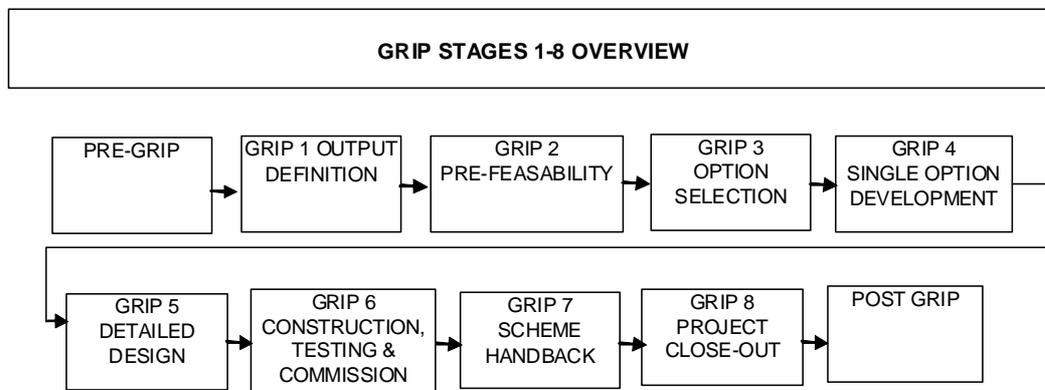
Enhancements expenditure in Scotland £ million 2011/12 prices	Control Period 5 expenditure forecast
Committed programme Edinburgh - Glasgow improvement programme: infrastructure and electrification	396
Proposed interventions See project summaries	490 – 542
Funds Includes Strategic Freight Network, level crossings, Scottish small projects fund, Scottish stations fund	157
Total	1,043 – 1,095

The industry recognises that the overall expenditure implied by these proposed interventions is significant and the industry must demonstrate the value for money and affordability of the individual interventions and the overall portfolio. Network Rail will continue to develop the definition and cost estimates for individual projects and programmes, prioritising those that are most likely to be supported by funders and train operators.

Network Rail has set itself the ambition to deliver a major output change on the network without the need for significant infrastructure investment. It is examining opportunities to do this through improved utilisation of the infrastructure, involving the potential re-planning of the timetable on key routes. The train operators are very supportive of this ambition. Examination of such opportunities is intended to reduce the funding sought in CP5. Specific examples of where such an opportunity presents itself will be included in the Strategic Business Plan (SBP).

Project development

Our projects are developed through the GRIP framework. The constituent projects are at varying stages of development within this framework. The final specification for each project and the construction plan are not confirmed until completion of GRIP stage 4.



Ongoing engagement with stakeholders

The key interface within Network Rail for the ongoing development of the overall plan for each route is with the Planning team and, in particular, the Principal Network Planners. The Network Planning team fulfil the role of client for any given intervention. A key element of this role is to remit sponsors to develop the necessary infrastructure schemes to support the operational plans. The industry is engaged in a number of ways on the development and delivery of the projects.

Individual project costs

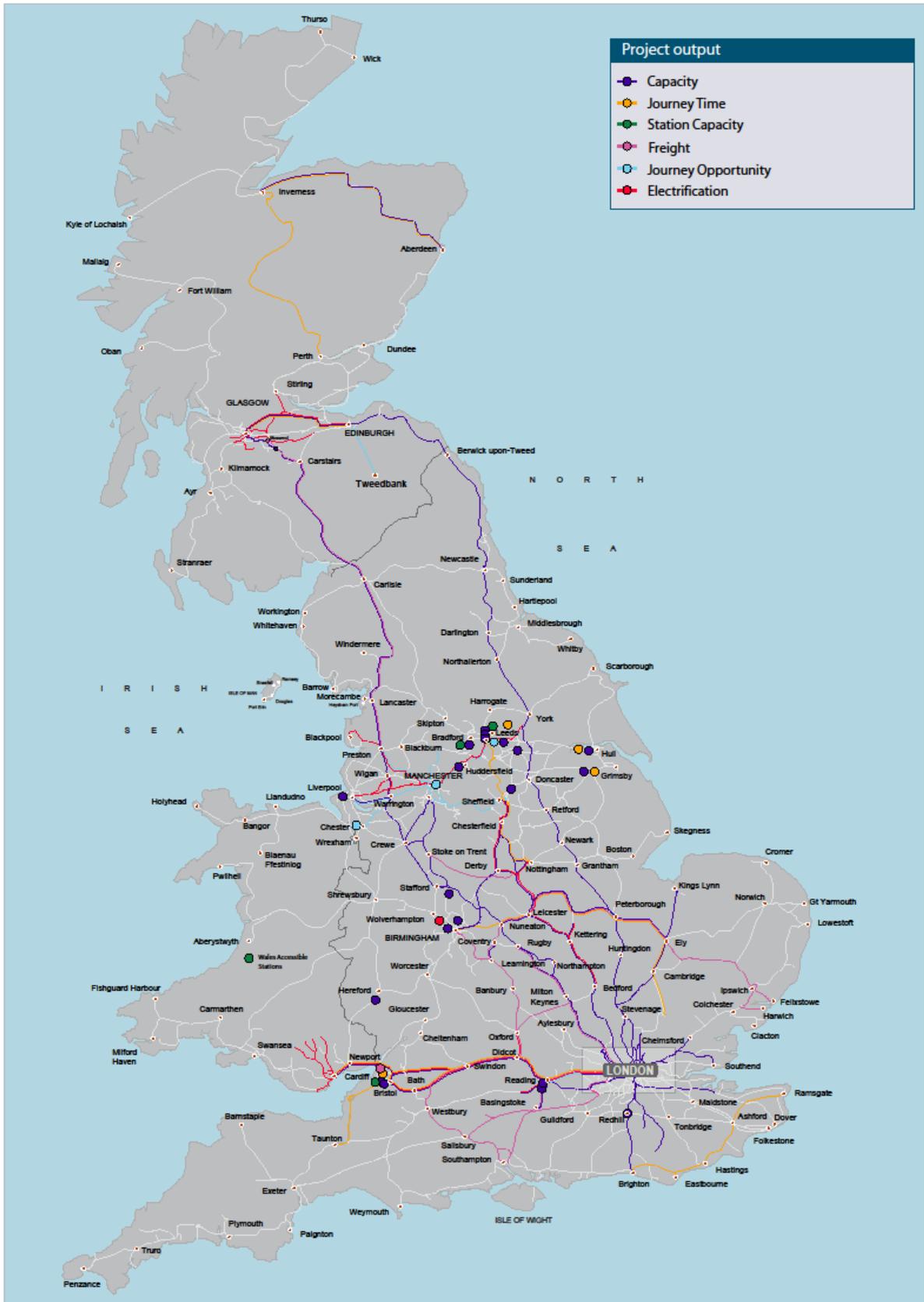
Tables showing the CP5 expenditure for individual projects and funds can be seen at the front of each section:

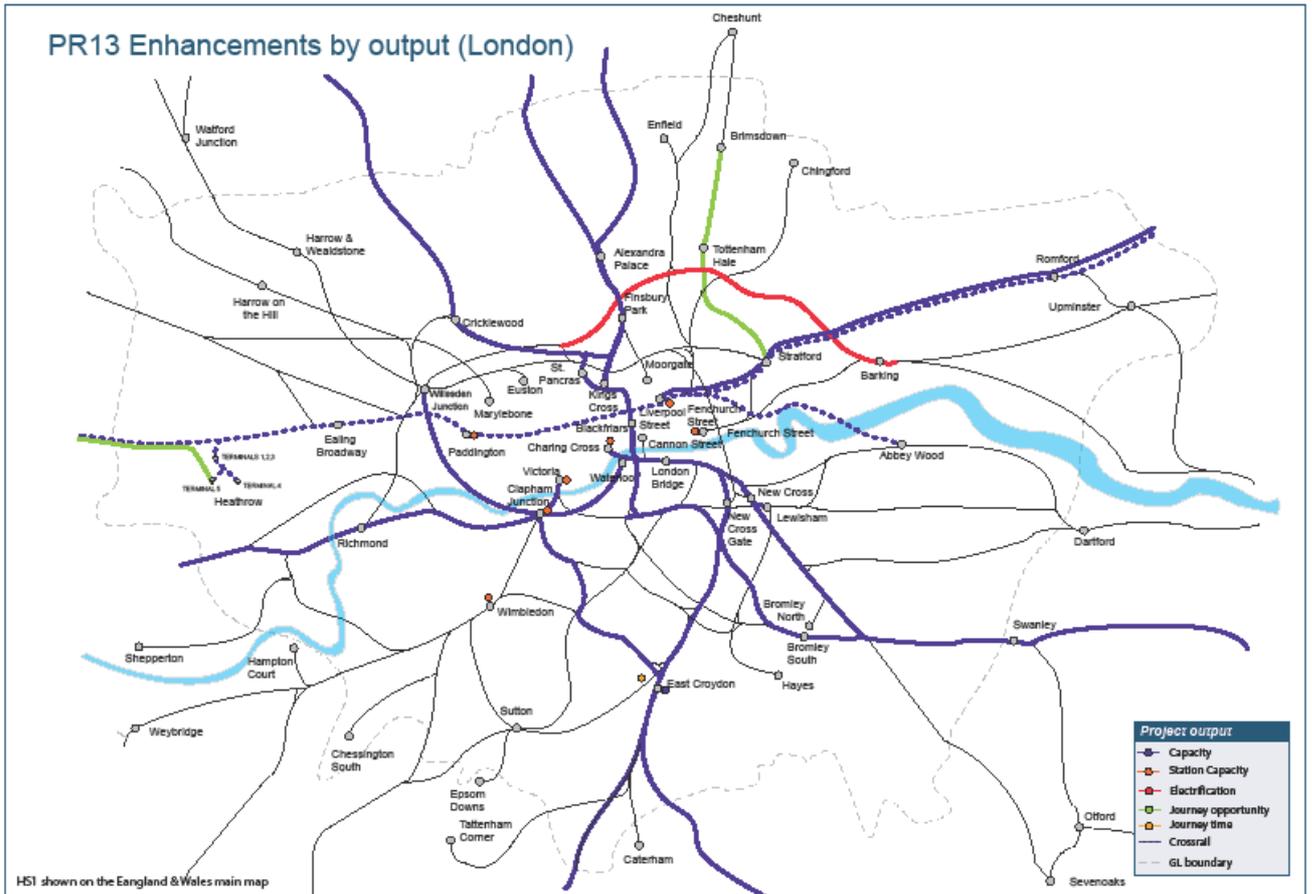
- England & Wales;
 - committed projects;
 - proposed funds;
 - proposed projects – London & South East
 - proposed projects – long distance;
 - proposed projects – regional;
- Scotland
 - committed projects;
 - proposed funds; and
 - proposed projects.

It should be noted that, for proposed new schemes, the sum of the individual project estimates is greater than the range summarised at a portfolio level in the previous tables. This is because the portfolio total reflects Network Rail's view of the possible range of benefits that could be realised from delivering the portfolio as a complete programme, including the benefits of managing risk across the portfolio, the possible efficiencies from synergies and economies of scale.

England & Wales - proposed enhancements programme

PR13 Enhancements by output (Scotland, England & Wales)





England & Wales – committed projects

Project Name	CP5 expenditure (£m) (2011/12 prices)
Thameslink programme	1,566
Crossrail programme	1,426
Reading station area redevelopment	161
Great Western electrification	548
North West electrification	155
West Coast power supply upgrade	228
Stafford area improvement project	153
Intercity Express Programme	258

Thameslink programme

Operating route: England & Wales.

Output: capacity.

CP5 output driver

A regulatory protocol has been established for the Thameslink programme. Our obligation under the protocol is to deliver the scope of works described below.

Scope of works

The Thameslink Programme has phased delivery over three key outputs. Key output 0 allows for a consistent train service at present levels to run throughout the Thameslink Programme construction periods. The work required to facilitate this was completed in March 2009. It allows for up to 15 trains per hour to run between St Pancras International (Low Level) and Blackfriars stations.

Key output 1, to be delivered in April 2012, provides an improved train service capacity of up to 16 train paths per hour between St Pancras International (Low Level) and Blackfriars stations and in advance of this allows 12-car train length operation between Bedford and Brighton by December 2011.

Key output 2 provides for the completed Thameslink service giving a further improved train service of up to 24 train paths per hour between St Pancras International (low level) and Blackfriars stations by December 2018.

Significant interfaces

The following major infrastructure programmes are scheduled to be undertaken concurrently with the Thameslink programme. These include;

- Crossrail programme;
- East London Line (phases 1 and 2);
- King's Cross station redevelopment;
- London Underground upgrades;
- 2012 Olympic and Paralympic games;
- DC power supply enhancement programme; and
- Alexandra Palace to Finsbury Park capacity improvements.

In addition, two major building developments are taking place;

- London Bridge Tower (Shard of Glass); and
- 25 London Bridge Place.

Key assumptions

- The Thameslink Rolling Stock project delivers rolling stock that is in compliance with the Train Infrastructure Interface Specification;
- the Thameslink programme has preceded any Crossrail works at Farringdon and Crossrail will be responsible for all further works at Farringdon required to deliver the Crossrail programme;
- the East London Line extension project will precede any works by the Thameslink Programme at New Cross Gate and in the Bermondsey and Peckham Rye areas;
- the Network Rail / London Underground Project Agreement for the Thameslink Programme will reflect London Underground's (LUL) acceptance of designs developed at the time of signing;
- any works being undertaken by LUL / Transport for London (TfL) before the start of or during the Thameslink programme will have no adverse impact on the proposed Thameslink works;
- the Thameslink programme and London Bridge Tower (Shard of Glass) construction works can either take place concurrently or a mutually acceptable programme will be developed and agreed; and
- the Thameslink programme and 25 London Bridge Place construction works can either take place concurrently or a mutually acceptable programme will be developed and agreed.

Crossrail programme

Operating route: England & Wales.

Output: capacity.

CP5 output driver

The Crossrail programme is to deliver infrastructure enhancements to enable the operation of 24 trains per hour through central London to destinations such as Heathrow Airport, West Drayton and Maidenhead in the west and Abbey Wood and Shenfield in the east.

The responsibility for the design and construction of the works outside of the central tunnel section – known as the ‘on network works’ (ONW) – was transferred to Network Rail when Royal Assent was granted to the Crossrail programme in July 2008.

The Protocol, which was established between Network Rail, Crossrail Limited (CRL) and the Department for Transport on 27 November 2009, details Network Rail’s obligation to deliver the ONW. It authorised the completion of design development for the ONW to the end of GRIP stage 4 and provided a process for agreeing Target Costs for GRIP stages 5 to 8 in individual delivery phases.

On 1st September 2010, Network Rail submitted its Key Date 1 (KD1) submission to CRL which contained the indicative Overall Target Price (OTP) for delivery of the ONW within budget.

Scope of works

The ONW that Network Rail is responsible for are listed below.

Track

- Layout changes and turnback capability at Maidenhead, Slough, West Drayton, West Ealing, Ilford, Chadwell Heath and Shenfield;
- two new tracks from Plumstead to Abbey Wood to support the Crossrail train service;
- remodelling at the interfaces between the Crossrail Central Tunnel section and the existing Network Rail infrastructure at Pudding Mill Lane, Plumstead, Royal Oak and on the approaches to Paddington; and
- remodelling at Old Oak Common depot to facilitate the Crossrail rolling stock depot and track lowering beneath a number of bridges between Stockley and Maidenhead.

Structures

- A major new elevated junction at Stockley and a new dive-under at Acton;
- reconstruction of a number of bridges between Stockley and Maidenhead; and
- new bay platforms at Maidenhead and Shenfield.

Signalling

- Resignalling of the Great Western main line between Paddington and Reading; and
- modification to the signalling of the Great Eastern main line between Stratford and Shenfield.

Electrification

- All four tracks of the Great Western main line will be electrified between Stockley and Maidenhead and new OLE structures will be fitted to the listed Maidenhead Railway Bridge.

Telecoms

- Station and lineside telecoms systems will be provided in order to meet Crossrail requirements.

Stations

- A new station will be constructed at Abbey Wood and Ealing Broadway, Ilford, Romford, Slough and Maidenhead stations will be refurbished;
- new modular station buildings at Acton Main Line, West Ealing and Southall; and
- platforms will be lengthened and step-free access will be provided at a number of stations.

Other works, which are not part of the ONW and are cash funded by CRL are:

- upgrade of the traction power supply system; and
- advanced works and asset protection works at the tunnel interfaces at Royal Oak, Plumstead and Pudding Mill Lane.

Significant interfaces

There are multiple interfaces within Network Rail with:

- other projects (Reading Station area redevelopment, Thameslink programme, Intercity Express programme, Great Western electrification, High Speed 2, ERTMS, FTN and GSM-R);
- routes (Western, East Anglia, Kent);
- enhancements (such as the Kent train lengthening programme);
- renewals (such as the Great Eastern rewiring);
- maintenance;
- tunnel spoil removal; and
- outside party works.

Key assumptions

- The systems installed by CRL in the Central Tunnel Section will be compatible with the surface railway infrastructure;
- the delivery and integration of the whole Crossrail system, management of interfaces and achievement of the required 95% PPM remains the responsibility of CRL; and
- interfacing projects are funded and delivered on time by other parties.

Reading station area redevelopment

Operating route: Western

Output: capacity.

CP5 output driver

Reading station area redevelopment is designed to deliver significant capacity and performance improvements throughout the area for GWML and cross country passenger and freight services.

Scope of works

The constituent parts of the project are:

- new Thames Valley signalling centre replacing the existing Reading signal box in December 2010;
- four new platforms on the north side of the station and a new transfer deck by May 2013;
- a new south side platform and platform extensions for Waterloo line services by May 2013;
- grade separation at the east end of the station via the former dive under from the Waterloo line to the north side of the station by May 2013;
- new train maintenance facility located to the west of Reading station including replacing the existing facilities, which will be demolished to enable the track layout reconfiguration, now enhanced to cater for additional capacity for HLOS + IEP trains and modern equivalent depot facilities by November 2013;
- grade separation by provision of elevated main lines to the west of the station facilitating improvements to Cow Lane bridge by December 2014;
- provision of a new grade separated eastern chord from Oxford Road Junction to the north side of the station by April 2015;
- grade separation of the western chord from Oxford Road Junction to Westbury Line junction by April 2015;
- extensive track layout reconfiguration and resignalling throughout the area; and
- passive provision for a possible future extension of Crossrail and the introduction of AirTrack.

Key interfaces

- Asset renewals programmes for signalling, telecoms and track;
- route (GWML);
- Crossrail programme; and
- IEP.

Key assumptions

- Current funding for the new train care facilities are based on a like for like replacement, and enhancements for additional trains including IEP and HLOS; and
- any additional requirements are made clear in sufficient time to enable delivery of the facilities without negative impact on the programme.

Great Western electrification

Operating route: Western.

Output: electrification.

CP5 output driver

On 23rd July 2009 the Department for Transport (DfT) published Britain's Transport Infrastructure: Rail Electrification, confirming government support for a programme of electrification. The projects supported, to be RAB funded, were the GWML (to Bristol, Oxford, Newbury and Swansea) and Liverpool – Manchester via the Chat Moss route.

On 26th October 2009 Network Rail published the Network RUS: Electrification Strategy, with a core strategy consisting of electrification of MML, GWML and two strategic infill schemes (Liverpool – Manchester and Gospel Oak – Barking).

On 1st March 2011 the Secretary of State for Transport confirmed the electrification of the Great Western Main Line between Cardiff, Bristol and Didcot (having previously announced electrification in November 2010 from London to Oxford, Didcot and Newbury).

Scope of works

The current client remit details the scope required for this project and includes the extension of electrification on the core route as follows:

- from Maidenhead (ELR: MLN 24m 19ch) to Wootton Bassett Junction (83m 07ch);
- Wootton Bassett Junction (ELR: SWB 83m 07ch) to Patchway (112m 68ch);
- Patchway (ELR: BSW 5m 61ch) to Severn Tunnel Junction (16m 24ch);
- Severn Tunnel Junction (ELR: SWM2 / SWA 148m 43ch) to Cardiff Central station;
- Reading (ELR: BHL 36m 75ch) to Newbury (53m 06ch);
- Didcot (ELR: DCL 52m 66ch) to Oxford (63m 41ch);
- Swindon (ELR: MLN1 83m 07ch) to Bristol Temple Meads (119m 22ch); and
- Stoke Gifford Junction (ELR: BSW / FEC 00m 00ch) to Bristol Temple Meads (5m 77ch).

The work will also include essential short connecting lines at junctions and depot access lines to facilitate maintenance and stabling of rolling stock. Private Siding connections will be costed separately and discussed with the funder and holder of the Private Siding Agreement.

Significant interfaces

- Crossrail programme - from 2018/19 the Crossrail programme will deliver an electrified passenger train service linking the west of London to the east and southeast via new dedicated infrastructure through central London. Crossrail services will interweave with national train operating company services on Network Rail infrastructure north-east and west of London. Crossrail will provide an intensive service for stations in the western suburban area – Paddington to Heathrow Airport and Maidenhead;
- the Intercity Express Programme (IEP) is planned to introduce a fleet of electric and bi-mode Super Express Trains capable of 125mph on key business routes on the GWML from 2016;

- Reading station area redevelopment will provide additional capacity and performance benefits for both the GWML and north-south routes with additional platforms, track layout reconfiguration and associated signalling alterations. The project is due to be completed in 2016;
- Western mainline signalling renewal. The existing signalling equipment along much of the route requires immunisation works. The proposed timescales for electrification will drive amendments to the existing signalling renewal plan for the route.

Key assumptions

- Electrification of the main and relief lines between Airport Junction and Maidenhead will be provided by the Crossrail programme. Electrification between Paddington Main Line station and Airport Junction already exists for Paddington to Heathrow services;
- changes to the existing electrification between Paddington and Airport Junction that may be required for Super Express Train operations will be met by the Intercity Express Programme;
- signalling renewal and immunisation work throughout the route will be undertaken in advance of electrification to provide electrification immune signalling;
- electrification of the IEP depots will be included within the “train service provision” (TSP) contract by the DfT to support the IEP introduction;
- delivery of electrification of the open routes between major junctions will be achieved by use of the application of modular techniques of construction and the deployment of rapid delivery systems, ie a factory train system. The techniques can be developed to enable electrification work to take place with the adjacent line open to traffic, with a six-hour productive shift;
- the Western Programme Integration Team was established on 1st April 2010 to coordinate the access, possessions and programme integration issues across all the major Western programmes. A key role will be to integrate the various programmes to deliver the key outputs, for example operation of electric services to Swansea from December 2017; and
- the electrification project will be able to obtain all relevant consents in a timely manner and without impacts on the project programme.

North West electrification

Operating route: London North Western.

Output: electrification.

CP5 output driver

On 23rd July 2009 the Department for Transport (DfT) published Britain's Transport Infrastructure: Rail Electrification, confirming government support for a programme of electrification. The projects supported, to be RAB funded, were the GWML (to Bristol, Oxford, Newbury and Swansea) and Liverpool – Manchester via the Chat Moss route.

On 26th October 2009 Network Rail published the Network RUS: Electrification Strategy, with a core strategy consisting of electrification of MML, GWML and two strategic infill schemes (Liverpool – Manchester and Gospel Oak – Barking).

A further DfT announcement on 14th December 2009 indicated support for electrification of the Lancashire Triangle, incorporating routes from Huyton – Wigan, Preston – Blackpool and Deal Street Junction to Euxton Junction. Taken together with the existing Liverpool - Manchester project, this now presents the opportunity for a rolling programme of electrification schemes in the North West.

Scope of works

A client remit details the scope required for this project. This includes AC overhead electrification and associated power supplies for the following routes, including all running lines and crossovers (except where indicated):

- Bootle Branch junction – Earlestown East junction (ELR: DSE);
- Earlestown West junction – Earlestown South junction (EEE);
- Newton-le-Willows junction – Deal Street junctions (DSE);
- Parkside junction – Lowton junction (PJL);
- Ordsall Lane junction – Castlefield junction (COL);
- Deal Street junctions – Manchester Victoria East junction (MVE1/MVM) including all six platforms at Manchester Victoria;
- Deal Street junctions – Euxton junction (MVE1/MVE2);
- Preston Fylde junction – Blackpool North including platforms 1 to 8 at the latter (PBN);
- Huyton junction – Springs Branch junction (SBH1/SBH2/SBH3/SBH4); and
- Ordsall Lane junction – Windsor Bridge South junction.

Private Siding connections will be costed separately and discussed with the funder and holder of the Private Siding Agreement.

Other works will include signalling immunisation, track lowering and bridge reconstructions on the above routes, together with provision of power supplies.

Significant interfaces

- Liverpool - Leeds – linespeed improvements;
- gauge enhancement to W10, Bootle Branch – WCML via Huyton;

- Salford Crescent station redevelopment;
- Route 20 platform lengthening;
- Route 20 stabling for Northern. Alterations to the depot at Blackpool may be required to provide additional stabling capacity. Electrification of the route to Blackpool may now require electrification within the depot;
- Stalybridge remodelling (as part of renewals scheme). Extension of electrification from Manchester Victoria to Stalybridge will be examined as a potential specific further option; and
- the Northern Hub proposes significant investment from 2014 in rail across Northern England, including some of the routes affected by the electrification project.

Key assumptions

- This project does not currently include the introduction of new rolling stock or route clearance for electric units. The introduction of electric rolling stock and any consequent infrastructure alterations or enhancement to these routes will be remitted and implemented by other projects; and
- this work will be capable of implementation within Network Rail's permitted development rights. If it is determined that additional powers require to be sought, for instance through an application to the Infrastructure Planning Commission, there would be an impact on the implementation programme.

West Coast power supply upgrade

Operating route: LNW.

Output: capacity.

CP5 output driver

To deliver an upgraded traction power supply system to support the operation of the 2018 Stafford design scenario timetable and 2030 freight service forecasts on the WCML. The project will provide improved capacity by removing the traction power supply as a constraint on line speed and capability on the route.

Scope of works

To renew and upgrade the remainder of the 25kV power supply equipment on the WCML between North Wembley and Whitmore (Phase 3A) with an upgraded Autotransformer (AT) traction power supply and distribution system. The power supply works required in the route sections from Whitmore and Great Strickland (Phase 3B), and Great Strickland to Carstairs (Phase 3C) is subject to further review in light of the future train service requirement.

The AT scope of works comprises the following work packages:

- modifications and alterations at various electricity supply industry (ESI) connection points on the route to support the increased electrical demand;
- provision of new 25kV AT distribution sites at approximately 10km intervals along the route;
- provision of telecoms and SCADA infrastructure for the new AT distribution sites;
- provision of additional 25kV conductors to form the AT Feeder (ATF) throughout the length of the route converted to AT;
- provision of a return screening conductor throughout the length of the route covered by the AT system;
- additional electrical cross bonding throughout the route;
- screening of signals or other structures where required to maintain electrical clearance to the ATF;
- clearance of lineside vegetation to maintain electrical clearance to the ATF;
- re-sectioning of the OLE to reflect the new feeding sections and subsections created by the AT system; and
- recoveries of redundant equipment.

Significant interfaces

- LNW route 25kV traction switchgear renewals and overhauls - the renewals will be integrated into the overall programme of works to maximise delivery efficiency;
- renewal of 25kV traction sole user assets at Rugby and Stafford. By better integration of the PSU program with LNW electrification renewals, renewal of 50 year old ESI connections can be avoided whilst delivering the enhancement required;
- Stafford remodelling;

England & Wales - committed projects

West Cost power supply upgrade

- DfT and Virgin Trains 'Pendolino' project that lengthens the current class 390 rolling stock formations from 9-car to 11-car during CP4;
- London Midland expansion of out-based stabling activity in the Bletchley area which may require infrastructure interventions;
- London Midland service interventions;
- Northern Hub proposals; and
- Network Route Utilisation Strategy: Electrification – published October 2009.

Key assumptions

Possession requirements are assumed to be covered by the Rules of the Route.

Stafford area improvement scheme

Operating route: LNW.

Output: capacity.

CP5 output driver

There are capacity and performance constraints in the Stafford area due to the number of conflicts that exist between the flows of traffic at various flat junctions. The project will deliver infrastructure to support DfT's indicative timetable specification to commence in December 2018. A fast line, standard off-peak hour timetable to deliver two additional fast line passenger paths per hour to / from London Euston, one additional Birmingham to Manchester axis path per hour and one additional freight path per hour in each direction via Stafford has been developed by Network Rail and agreed by DfT in August 2009.

This project will deliver additional capacity for the WCML long distance passenger market and freight market, along with increased line speed in the Stafford area for all services.

Scope of works

Current identified scope includes:

- grade separation of Norton Bridge Junction (including planning consent);
- slow line speed improvements – Doxey to Crewe;
- fast line speed improvements – Norton Bridge area;
- speed improvements – Trent Valley Junction;
- Stafford freight loop;
- Stafford area resignalling; and
- remitted track renewals in the Stafford Station area.

Significant interfaces

- West Coast power supply upgrade project (WCPSU); and
- Wolverhampton resignalling project.

Key assumptions

- West Coast power supply upgrade will have delivered the autotransformer system in the Stafford area prior to completion of the Stafford project; and
- planning consent can be achieved by the end of CP4.

Intercity Express programme - East Coast infrastructure capability

Operating route: LNE.

Output: capacity.

CP5 output driver

To provide infrastructure capability enhancements to enable the operation of the IEP train according to the deployment strategy defined by the DfT.

Scope of works:

- ECML gauging works;
- ECML OLE works;
- ECML platform works;
- additional projects to be confirmed e.g. stepping distances.

Significant interfaces

- Hertford North integration facility;
- ECML power supply upgrade;
- LNE, Scotland and Anglia traction power supply upgrades;
- Thameslink programme;
- CP4 ECML enhancements programme;
- IEP depot facilities – the IEP project team to work with the Train Service Provider (TSP) to develop the proposed IEP depot facilities across the LNE / Anglia / Scotland operational routes; and
- ECML interventions.

Key assumptions

- Any required capacity works for IEP are developed as separate CP5 schemes;
- the rolling stock procured by DfT will be compatible with the characteristics of the Network Rail infrastructure defined in the Train Infrastructure Interface Specification (TIIS) and will meet the requirements of the Train Technical Specification (TTS);
- platform lengthening work scope excludes locations where selective door opening operation has been proposed;
- any train alterations required to meet station operation requirements (e.g. SDO) will be progressed by the DfT with the TSP;
- all IEP depot and depot access works are excluded (part of TSP contract requirements);
- all IEP assembly plant and assembly plant access works are excluded (part of TSP contract requirements);
- no infrastructure work is required for structures capability (bridge resonance), or to address ballast displacement and aerodynamic effects. Feasibility work will confirm this;

- pantograph design for IEP will allow two pantograph operation without any modification to OLE infrastructure;
- pantographs can be raised at linespeed without any modification to OLE infrastructure. Feasibility work will confirm this; and
- existing signalling arrangements can support IEP splitting and joining requirements.

Intercity Express programme - Western capability

Operating route: Western.

Output: capacity.

CP5 output driver

To provide infrastructure capability enhancements to enable the operation of the IEP train according to the deployment strategy defined by the client (DfT). IEP is proposed to operate over the following:

- core routes:
 - London to Cardiff/Swansea;
 - London to Bristol/Weston Super Mare/Taunton;
 - London to Gloucester/Cheltenham;
 - London to Oxford/Worcester/Hereford; and
 - London to Newbury/Westbury/Exeter;
- diversionary routes:
 - Westbury to Bath Spa;
 - Gloucester to Severn Tunnel Junction;
 - Cardiff to Bridgend via Barry;
 - Castle Cary to Exeter via Yeovil; and
 - Reading to Waterloo.

Scope of works

The constituent parts of the infrastructure capability works are as follows:

- gauge clearance for the new IEP train on specific routes across GWML;
- a review of station operations at all stations where IEP trains are due to stop. This may result in the following changes:
 - platform extensions;
 - selective door opening;
 - revisions to permissive working (attaching / detaching / platform sharing) arrangements;
 - alterations to signal controls and signal locations to deal with changes to train operations;
- enhancements to overhead line equipment between Paddington and Heathrow Airport Junction; and
- further work is required to establish if expenditure relating to bridge resonance, ballast displacement and aerodynamic work is required, and this is related to train design and proposed solutions.

Some of the key deliverables are listed below (but not limited to):

- infrastructure gauge clearance for the IEP which will in turn require:

- completion of physical gauge clearance works;
- certificate of Gauging Engineer;
- completed and updated operational arrangements at stations including platform extensions;
- updated Sectional Appendix; and
- enhancements to OLE between Paddington and Stockley Bridge junction.

Deliverables related to capacity have to be finalised as they relate to the proposed train service specification which is still under development by the DfT.

Significant interfaces

- Reading Station area redevelopment - the Reading station project has been separately specified by the DfT to include provision for bi-mode and electric IEP formations, the majority of the works will be completed before IEP arrives on the Great Western Main Line;
- Crossrail programme - the IEP project has developed effective interfaces with the Network Rail Crossrail programme which will lead to an integrated programme of works being developed to enable both projects to deliver in line with current commitments;
- network electrification – the electric and bi-mode IEP trains will make use of electrification of the GWML between London, Oxford, Bristol and Cardiff;
- IEP depot facilities - the IEP project will work with the Train Service Provider to develop the proposed IEP depot facilities across the Western route;
- Western mainline signalling renewal – the existing signalling equipment along much of the route requires immunisation works. The proposed timescales for electrification will drive amendments to the existing signalling renewal plan for the route; and
- other CP4 and 5 enhancement schemes (for example Swindon – Kemble redoubling; Greater Bristol programme, SFN and Oxford corridor).

Key assumptions

- The rolling stock procured by DfT will be compatible with the characteristics of the Network Rail infrastructure defined in the Train Infrastructure Interface Specification (TIIS) and will meet the requirements of the Train Technical Specification (TTS);
- all IEP depot and depot access works are not part of this submission (part of Train Service Provider contract requirements);
- any train alterations required to meet station operation requirements (e.g. SDO) are not part of this submission (part of Train Service Provider contract requirements);
- Great Western mainline IEP works specifically exclude works covering traction power;
 - GWML electrification provides power and OLE between Maidenhead and Newbury, Oxford, Bristol and Cardiff;
 - the Crossrail programme provides OLE between Stockley Bridge Junction and Maidenhead;
 - Crossrail Ltd provide power between Paddington and Maidenhead;

England & Wales - committed projects

Intercity Express programme

- no infrastructure work is required for structures capability (bridge resonance), or to address ballast displacement and aerodynamic effects. Feasibility work will confirm this;
- pantograph design for IEP will allow two pantograph operation at 125mph without any modification to OLE infrastructure;
- pantographs can be raised and lowered at linespeed without any modification to OLE infrastructure. Feasibility work will confirm this; and
- existing signalling arrangements can support IEP splitting and joining requirements.

Intercity Express programme - ECML power supply upgrade

Operating route: LNE.

Output: capacity.

CP5 output driver

To provide infrastructure capability enhancements to enable the operation of the IEP train according to the deployment strategy defined by the DfT.

Scope of works

For the ECML mainline between Wood Green and Bawtry the scope of works is to upgrade from the existing classic arrangement to an autotransformer (AT) feeding system, this has two main elements:

- National Grid 400kV feeding supply transformers; and
- conversion of overhead line feeding from the existing “classic” arrangement to an AT feeding system.

The remainder of the ECML will remain on classic feeding. This includes the following upgrades:

- Doncaster - Leeds, for which feasibility is complete confirming the need for an additional transformer at Ardsley; and
- Hitchin and Cambridge/Kings Lynn, for which feasibility work is progressing.

Note - the upgrade of traction power supplies on the Hertford Loop is not required for either IEP or Thameslink KO2 services and is therefore not included in this scope of works. Feasibility work is, however, progressing for the CP5 growth scenario.

Significant interfaces

- Thameslink programme;
- CP5 ECML interventions;
- E&P asset renewals;
- CP4 ECML OLE performance project; and
- CP4 enhancement schemes and CP5 growth schemes.

Key assumptions

- Sufficient funding will be available from the Thameslink programme to deliver their requirements;
- AT upgrade is not required on the Hitchin to Cambridge / Kings Lynn;
- a power supply upgrade is not required between Bawtry and Edinburgh;
- National Grid meet the scope and timescale commitments in their feasibility study;
- works are delivered according to the a track access strategy based upon West Coast midweek and weekend access arrangements;
- only minimal replacement of OLE masts is required;

- only minimal replacement of the catenary (AWAC) is required to mitigate the effects of raising the fault level from 6kA to 12kA; and
- the rolling stock procured by DfT will be compatible with the traction power draw characteristics of the Network Rail infrastructure defined in the Train Infrastructure Interface Specification (TIIS) and will meet the requirements of the Train Technical Specification (TTS).

England & Wales – proposed funds

Fund	CP5 expenditure (£m) (2011/12 prices)
Network Rail discretionary fund	250
Innovation fund	150
CP6 development fund	100
Level crossing initiative	304
Journey time improvement fund	200
Performance fund	160
National stations improvement fund	150
Access for All (England)	150
Improved passenger information	200
ECML interventions	500
Strategic freight network	350

Network Rail Discretionary fund (NRDF)

Objective

The fund is a mechanism for funding minor schemes that can either be linked to renewals or stand-alone schemes and have a positive whole-industry business case. It is primarily aimed at schemes that will result in an increase in the capacity or capability of the network.

For a scheme to be eligible for this fund it must meet the following criteria:

- it provides a positive industry-wide business case in terms of the NPV; and
- the net cost of the scheme (i.e. the amount that will be drawn down from the NRDF) must not exceed £5 million, without the prior agreement of DfT.

Governance

The Network Rail Director of Network Planning is the fund holder for NRDF. Authorisation of draw down and spend is as set out in Network Rail's Investment Regulations but schemes are required to have been supported at the appropriate Route Strategy Planning Group (Network Rail's internal cross-functional group where local investment opportunities are reviewed) and will generally have been discussed at Route Investment Review Group (at which Network Rail shares its forward renewals plans with TOCs and FOCs and discusses opportunities for enhancements to the network). The use of funds and delivery of projects will still be driven through local engagement. This process involves consultation with the relevant train operators.

Schemes to be implemented in CP5

It is expected that most schemes will involve incremental enhancements linked to renewals as this is likely to provide the greatest value for money. However, stand-alone enhancement schemes are also possible, including those part-funded by third-parties.

The fund can be used for improvement initiatives that deliver:

- improvements in train service performance that will benefit more than one party. This does not include initiatives that deliver sufficient schedule 8 benefits within a five year period to cover the scheme costs, as Network Rail would be expected to fund these schemes;
- reduction in train journey times, possibly as a result of line speed improvements. Schemes that reduce walking journey times at stations are also eligible. The latter can result from new entrances and exits to the station, which will be used by rail passengers;
- station facilities improvements such as providing waiting rooms, shelters and customer information systems. The benefits are attributed to the passengers who board or interchange at the station;
- platform lengthening (when part of a larger capacity change scheme); and
- enlargement of freight capability in a specific area for which there is specific demand.

Innovation fund

Objective

The innovation fund is an industry-governed fund to address system wide innovation opportunities that address a specific industry need and have the potential to reduce cost and / or increase revenue. The objective of the innovation fund is to provide cross-industry funding to de-risk and / or align incentives for the implementation of innovation. The Rail Value for Money study estimates that investment in innovation generates whole industry benefit/cost ratios between 3:1 and 5:1.

Governance

Detailed governance proposals need developing but are likely to be similar to funds established in previous control periods, i.e. proposals will be for a defined purpose and funds will be justified and drawn down based upon specified criteria / business cases. Governance would be provided by the Technical Strategy Leadership Group.

Potential initiatives for CP5

- Futro – an intelligent traffic management system that regulates traffic to optimise performance of the system to deliver, for example, maximisation of the capacity of key assets, minimisation of the impacts of pinchpoints etc.;
- whole system reliability;
- develop technologies that make more efficient use of energy, reduce peak energy demand, improved diesel fleet efficiency etc.;
- differentiation – optimising the rail system to the particular needs of the railway in specific locations;
- future mobile communication;
- future positioning – work towards an affordable and upgradable Train Location Service; and
- testing and trialling facilities for innovative technology.

CP6 Development fund

Objective

The fund will be used to develop schemes which are considered likely to be required and funded for delivery during CP6 as part of the next periodic review.

Governance

The Network Rail Director of Network Planning would be the fund holder for the CP6 Development Fund. Authorisation of draw down and spend is as set out in Network Rail's Investment Regulations. Schemes will be prioritised by Network Rail following discussion with customers and funders at the appropriate industry planning forums including RIPG. Qualifying schemes will generally have been discussed with DfT as part of the HLOS(3) development process or will be in support of joint industry activity to plan for CP6. It is proposed to use RIPG to provide an oversight on the use of the CP6 Development fund.

Schemes to be developed in CP6

A list of schemes authorised to draw down from the fund will be developed as we progress through CP5.

Level Crossings initiative

Objective

The IIP proposes a fund for CP5 to improve safety at level crossings, recognising both the need to continually improve safety and stakeholder concerns with this type of risk in particular. The objective is to deliver the following by the end of CP5:

- a reduction in level crossing risk by a minimum of 50 percent;
- a reduced number of incidents and accidents;
- improved stakeholder confidence; and
- improved awareness of level crossing safety risk.

This will be achieved by adopting a more interventionist approach to reducing risk and improving safety, focussing on closures, enforcement and innovation. Network Rail also plans for a more collaborative approach between it and operators, including joint assessments and inspections, and sharing responsibilities where this best improves safety.

Programme development is currently in the early stages, so a fund approach is deemed the most appropriate means to deliver the outcomes.

Governance

Industry governance arrangements are to be developed for this fund.

Potential initiatives for CP5

The proposed interventions to reduce level crossing risk include:

- closure of user-worked crossings on high speed main lines;
- implementation of miniature warning lights;
- enforcement of safe usage of level crossings;
- closure of some user worked crossings;
- upgrading Automatic Open Crossings Locally Monitored (AOCL);
- technology to improve user behaviour;
- campaigns and education; and
- closure of footpath crossings on main lines.

Journey time improvement fund

Objective

It is proposed that a fund is provided to deliver well targeted improvements in rail journey times and connectivity in England and Wales during CP5. Programme development is still in the early stages, and a fund approach is deemed the most appropriate way to deliver the outcomes.

Governance

Industry governance arrangements are to be developed for this fund.

Potential initiatives for CP5

A range of solutions to deliver journey time improvements will be examined, including:

- rolling stock solutions;
- capacity studies;
- timetable studies;
- gauge studies;
- infrastructure interventions.

Potential infrastructure schemes which may be considered for funding include:

- MML phase 2, including the Market Harborough realignment scheme;
- Corby-Bedford slow line;
- Stafford – Crewe;
- North of Weaver Junction (to Carlisle), linked with S&C renewals;
- St Pancras / Victoria to Medway;
- Maidstone East line;
- Hastings line;
- North Kent coast;
- Arun Valley line;
- East Grinstead line;
- London to Norwich via Colchester and Ipswich
- Portsmouth line;
- West of England line;
- Weymouth line;
- North Cotswolds;
- South Cotswolds (includes Swindon - Kemble & Kemble - Standish); and
- Rugby to Tamworth slow line.

Performance fund

Objective

It is proposed that a fund is provided to deliver well targeted improvements in rail performance for England and Wales during Control Period 5. Whilst a selection of potential schemes could be described at this time, a key factor for such a fund is to be able to focus on change in performance both in how external factors affect the railway and in ensuring that performance remains at acceptable levels as the environment for delivery changes (e.g. through project work or change to operational arrangements). Whilst it is possible to forecast the high level impact on performance of any change, such forecasting is of relatively low statistical competence with the result being more impact than planned creating unacceptable overall delivery. For this reason a fund approach is considered the most appropriate way to deliver the outcomes; with exemplar projects being in how the CP4 Performance Fund has been used.

Governance

The fund holder will be the Network Rail Head of Operational Planning & Performance. Authorisation of draw down and spend is as set out in Network Rail's Investment Regulations. There are two key elements to the process for use of the funds:

- distribution of the fund to routes (plus a central fund) as budget holders in relation to initiatives on each route and on behalf of operators; and
- creation of business cases by measuring the value of trains that achieve the PPM and / or CaSL thresholds together with review of softer benefits such as sustainability.

National prioritisation is based on aligning funding availability and business case criteria towards key improvement areas, with route teams being responsible for management of the investment at local level, prioritising activity towards key areas and services and coordinating work for lead TOCs. A positive business case is likely to form only part of the investment criteria and not all schemes with positive business cases will be implemented.

Potential initiatives for CP5

Sample exemplar projects from the CP4 Performance Fund include activity in response to the recent difficult winter weather. As related elsewhere in this document, the impact of weather on rail performance is hugely variable with an annual range in impact on Network Rail caused delay. Beyond this, delay – and consequently PPM and CaSL - can increase disproportionately as the weather becomes more extreme; with consequent need for further increased resource to provide a good service. The CP4 settlement provided for “average” weather impact. Actual impact during the winters of 2009/10 and 2010/11 was significantly worse than that planned, resulting in general dissatisfaction in delivery and a need to provide more resilience in winter conditions. Availability of the performance fund enabled focussed investment designed to cost effectively mitigate the impact of severe winter conditions enabling much improved delivery. In overall terms, up to half of the CP4 performance fund has been used to invest in either mitigation of increased impact on performance from external impacts or to provide for delivery of improved service expectations.

National Stations Improvement fund

Objective in CP4

The core objective of the National Stations Improvement fund is to achieve a noticeable improvement to the passenger perception of stations by focusing on high footfall, low passenger satisfaction stations. During the current control period, the fund's objectives were further clarified as being focussed primarily on the top 500 stations by footfall.

The NSIP programme was also conceived to attract investment from third parties to deliver station improvements of additional scope or size.

A wider aim of the programme is to develop a more effective, coordinated approach for the planning and delivery of activities at stations by all stakeholders, thereby improving efficiency and value for money in station investments. This has been delivered through the establishment of Local Delivery Groups combining local Train Operator and Network Rail personnel to discuss and agree station priorities, funding opportunities and potential efficiencies through combining planned investments through the use of an Integrated Station Plan for each station.

Governance

The Network Rail Managing Director of Network Operations is the fund holder for this fund. Authorisation of draw down and spend will be as set out in Network Rail's Investment Regulations.

The programme is overseen by an Industry Board currently chaired alternatively by ATOC and Network Rail with representatives of Train Operators, ORR and the Department for Transport participating.

Initiatives for CP5

A list of schemes authorised to draw down from the fund will be developed as we progress through the control period. Given the investment in this current control period it is proposed that the objectives of the programme in CP5 provide for investment in a further range of stations including smaller stations which provide key gateways to the network in many smaller communities.

Access for All

Objective

The industry supports the continuation of the Access for All programme in CP5 with its objective of increasing the number of journey opportunities for people with disabilities. The industry believes that a target of providing step-free access to a further 5 percent of stations, similar to that being achieved in CP4, represents a sustainable move toward a more accessible and inclusive network overall. Such an investment builds upon the clear evidence within the research into Access for All commissioned by the DfT which indicates improved levels of satisfaction and more frequent use of rail services by both disabled and non-disabled users at stations which benefit from significant Access for All investment.

Governance

It is proposed to review the industry's governance arrangements with funders and ATOC following evolution of the Local Delivery Groups in the current Control Period and the emerging structure of the fund (in the current control period the Department for Transport provided for three separate investment portfolios from the fund whose management was differentiated).

The Network Rail Managing Director of Network Operations is the fund holder for this fund. Authorisation of draw down and spend will be as set out in Network Rail's Investment Regulations.

Access for All schemes are overseen through a programme specific series of delivery meetings and additionally communicated to the Local Delivery Groups (see NSIP description) through the Integrated Station Plans for each station.

Potential initiatives for CP5

A list of schemes authorised to draw down from the fund will be developed prior to the commencement of the control period and supplemented with a provision for investments during the control period.

It should be noted that schemes designed to improve accessibility to stations in England will be eligible for draw down from this fund as there is a separate project for accessible stations in Wales

Improved passenger information

Objective

A strategy is under development to improve the quality and availability of information to passengers, with an emphasis on information provision during times of disruption. The industry recognises that, particularly during service disruption, the timeliness and consistency of information provision can fail to meet this expectation. The industry's Customer Information Strategy will seek to address this through a series of investments and process changes at a national and local level.

Governance

Industry governance arrangements are to be developed for this fund as part of the Customer Information Strategy now under development by the industry.

Potential initiatives for CP5

Whilst the industry is developing the precise definition of the Customer Information Strategy the Initial Industry Plan describes the broad intent of the strategy. This fund will help to support a number of initiatives along the following lines:

- enhanced detection and prediction of train movements to allow for more accurate and timely information to be shared with customers;
- more information and of a better quality on trains through aligning their information sources with the industry's emerging "one consistent source of information";
- enhancing the industry's capabilities to communicate more information about the customer's journey to empower them to make decisions to fulfil their preferences for a better journey experience, e.g. provision of on-train services or the availability of seats on a train;
- equipping the industry employees with the right tools and processes to communicate better to each other and to customers; and
- developing and initiating the necessary cultural changes within the industry to provide greater empathy with customers that will drive effective communication across the multitude of channels that customers want to utilise.

East Coast main line interventions

Objective

Following the publication of the ECML 2016 Capacity Review, and the London and South East and Northern RUSs, Network Rail has developed a potential train service specification for December 2018 which includes all service groups covering long distance (including IEP introduction), freight and inner and outer suburban services including Thameslink proposals. An initial development timetable will identify what infrastructure changes are needed to support the level of services specified and avoid significant pathing time. Performance modelling will be undertaken, taking into account the infrastructure changes needed to support the timetable. Other systems integration issues will be examined during the appropriate stages of development including assessment of power supplies and level crossing risks.

As the timetable development work and performance modelling has yet to complete, a provisional sum of £500 million has been included in the IIP with potential projects being described below. In the context of the industry's intent to raise the level of performance on lower performing routes, Network Rail recognises the need to develop a strategy for the East Coast that will deliver sustainable improvements in performance in CP5. Part of the proposed £500 million fund may be targeted at schemes that are primarily focussed on performance improvement. The strategy for the route will be refined further through this development work and through discussions with train operators and reflected in the Strategic Business Plan.

Governance

Industry governance arrangements are to be developed for this fund.

Potential initiatives for CP5

The ongoing development work will determine the most cost effective programme of infrastructure works to robustly deliver an appropriate train service specification. However, as part of the optioneering process, Network Rail is currently examining the following schemes that have been identified through the RUS process, as it is anticipated that most will be identified as being required to provide the outputs:

- capacity relief Huntingdon North Junction – Fletton Junction which may entail 4-tracking for part or all of the distance;
- Peterborough station improvements;
- grade separated junction or other suitable means to allow freight trains from / to the March direction to access / egress the GN / GE joint line at Peterborough independently of the ECML up and down fast lines;
- replacement of the existing flat crossing at Newark of the ECML and the Nottingham – Lincoln lines with grade separation;
- Doncaster station area improvements;
- Darlington station improvements;
- Ferryhill – Newcastle capacity enhancement; and
- Doncaster – Wakefield Westgate additional capacity.

Strategic Freight Network (SFN)

Objective

A number of measures will be required to accommodate growth in rail freight: more effective use of the existing network, coupled with targeted investments which demonstrate a robust business case. In the light of this, the Strategic Freight Network Steering Group (SFNSG) has recommended that a fund be established for CP5 similar to that which has been available in CP4. In CP5, the fund may also be used for research and development up to £10million.

Governance

In CP4, the Network Rail Director of Network Planning is the fund holder for SFN. Authorisation of draw down and spend is as set out in Network Rail's Investment Regulations but schemes are required to have been supported by the Strategic Freight Network Steering Group (SFNSG). This cross-industry group oversees the development of the SFN and consists of representatives from Network Rail, DfT, the Welsh Government, Transport Scotland, Freightliner, DB Schenker, GB Railfreight, DRS, the Freight Transport Association, Rail Freight Group and ATOC. It is proposed that these arrangements will continue in CP5.

Potential Initiatives for CP5

Felixstowe to Nuneaton capacity enhancements

The CP4 output for the Felixstowe to Nuneaton capacity project is capacity for 24 trains per day (each direction) between Ipswich and Peterborough and 8 trains per day between Peterborough and Nuneaton. The 2030 scenarios anticipate demand outstripping the CP4 capacity at all locations along the route by a significant margin. Works are proposed in CP5 to meet the long term growth requirements and take advantage of the 'once-in-a-lifetime' opportunity presented by the recontrol & relocking of the signalling in the Leicester area.

This project will provide the network capability to accommodate anticipated growth in intermodal traffic from the port facilities at Felixstowe and Bathside Bay, to terminals in the Midlands, North West, North East and Scotland. In addition, it will enable freight that is currently routed via London to these destinations to use the cross-country route instead. This has the potential to offer journey time savings and release capacity both on the congested Great Eastern Main Line for other rail services and also in the London area in connection with the new London Gateway port (Thameshaven). It would be beneficial for the development of freight terminals, such as at Burnaston & Etwell Common, Castle Donington, Corby, and Markham Vale. There may also be spin-off benefits for passenger services, including better punctuality and reliability and opportunities to increase service frequencies. This scheme could prove especially attractive in light of the government's decision to suspend improvements to the A14 road. It should also be noted that the rail corridor is one of the priority projects of the EU's TEN-T initiative, which may be a potential source of additional funding.

Line speed improvements are to be identified to enable the Felixstowe – Nuneaton route journey times to be equivalent to the existing route via the Great Eastern Main Line, North London Line and West Coast Main Line to Nuneaton.

The scope of works under consideration is:

- doubling Haughley Junction;
- line speed improvements at Bury St. Edmunds;
- doubling Ely-Soham;
- remodelling Ely Dock Junction;

- Helpston-Syston resignalling / headway reduction;
- Syston-Wigston remodelling;
- Syston-Stoke infill gauge; and
- Syston – Stoke capacity.

The project would interface with CP5 signalling renewals and the Birmingham to Stansted Airport journey time improvements project.

The project currently excludes level crossing closures and infrastructure to support enhanced single line working and assumes the completion of CP4 projects.

Southampton to West Coast main line capacity enhancements

This project would provide an increase in freight capacity on the route from the Port of Southampton to Nuneaton via Eastleigh, Basingstoke, Reading, Oxford and Leamington Spa to meet the long term growth requirements and take advantage of the 'once-in-a-lifetime' opportunity presented by the re-control and relocking of the signalling in the Oxford and Banbury areas. The CP4 output for the equivalent project is capacity for 40 trains per day (each direction) between Southampton and the West Coast Main Line. The 2030 scenarios anticipate demand outstripping the CP4 capacity at all locations along the route by a significant margin.

The overall development of the Southampton to West Coast route is anticipated to provide increased capacity and diversionary potential; better regulation opportunities and an improved ability to respond to perturbation.

Scope that is being examined through GRIP stages 1 and 2 is:

- Eastleigh to Basingstoke enhancements to passing loops and signalling headways;
- Southampton and Basingstoke (via Andover) enhancements to signalling headways;
- Basingstoke freight loop – the provision of a new 775m loop along with changes to the signalling system;
- Oxford – possible enhancements on an existing resignalling scheme;
- Banbury – possible enhancements on an existing resignalling scheme;
- Leamington Spa to Coventry – potential new freight loops and bi-directional signalling;
- Leamington Spa to Small Heath – there is the potential for some interventions between these points;
- possible use of the East / West (Oxford / Bletchley) link to be used as a capacity/diversionary opportunity between Oxford – Leamington;
- Melksham – possible enhancements to an existing gauge clearance scheme; and
- W10 clearance for the Kew diversionary route.

The project would interface with a number of existing enhancements projects and assumes completion of the CP4 portfolio. It assumes that scope associated with level crossing closures and enhanced single line working is excluded.

West Coast Main Line (North of Preston) capacity enhancements

This scheme will provide the network capability to accommodate the anticipated growth in both freight and passenger traffic in CP5, over the largely two track section of the West Coast Main Line between Preston and Mossend. The 2019 freight forecasts indicate that up to 36 freight trains per day in each direction will operate on this route and by 2030 this figure will rise to 48.

The overall development over the route is anticipated to provide better regulation opportunities and improved ability to respond to perturbation as well as the ability to support more and longer freight trains whilst maintaining existing freight journey times over the route section.

Scope that is under development includes:

- new freight loops at Elmsfield (between Lancaster and Carnforth); and
- new freight loops on the approaches to Beattock Summit (between Lockerbie and Carstairs).

The project will interface with the Motherwell signalling renewal project and the proposed Carstairs journey time improvements project.

Great Western main line W12 gauge clearance

This scheme enhances the loading gauge to W12 on the Great Western Main Line between London and Bristol and Cardiff, including the connection to the West Coast Main Line at Acton, enabling the network to accommodate forecast growth in 9'6 containers on flows from the deep sea ports to the west. Gauge clearance also enables freight terminals to be developed at Colnbrook (near Heathrow Airport) and Avonmouth. An opportunity exists in CP5 to minimise disruption to rail users and deliver this scheme efficiently in conjunction with the electrification of the Great Western Main Line. The work is expected to consist of a variety of interventions including:

- track slue;
- track lower;
- bridge notching;
- reconstruction of overbridges; and
- modification of canopies.

The electrification of the GWML will provide W10 / W12 clearance at a number of structures. The study will liaise with the project team to evaluate the incremental works that will be required after the completion of electrification work by 2016.

Proposed projects - London and South East

Project Name	CP5 expenditure range (£m) (2011/12 prices)		
St Pancras to Ramsgate journey time improvements	10	-	11
Charing Cross Station capacity improvements	7.9	-	8.3
Ashford & East Coastway journey time improvements	12	-	14
East Kent signalling enhancements (phase 2)	16	-	17
East Croydon - signalling modifications to improve capacity	6.3	-	7.3
West Croydon remodelling	4.9	-	5.1
Uckfield line train lengthening	15	-	16
West London line train lengthening	16	-	17
Norwood Junction platform 6 & 7 turnback	6.5	-	6.9
Purley to East Croydon train lengthening	6.1	-	6.4
Redhill additional platform	18	-	19
London Victoria station capacity improvements	22	-	24
Clapham Junction congestion relief	15	-	16
Wimbledon station congestion relief	19	-	20
Virginia Water to Reading train lengthening	9.8	-	10.4
Fenchurch Street Station congestion relief	19	-	21
West Anglia main line capacity increase	17	-	21
Great Eastern main line infrastructure improvement	34	-	42
Gospel Oak - Barking electrification	69	-	80
Stevenage and Gordon Hill turnbacks	26	-	27

St Pancras to Ramsgate journey time improvements

Operating route: Kent.

Output: Journey time improvements.

CP5 output driver

The project seeks to assist with economic growth by reducing journey times between London and Thanet via HS1 through closure of the gap between the highest permitted speed of the class 375 / 395 trains and the line speed between Ashford International and Ramsgate via Canterbury West.

Scope of works

The full project seeks to reduce journey times between St Pancras and Ramsgate, however the focus of work is on the section Ashford to Ramsgate. Additionally there will be benefits to Charing Cross to Ramsgate services. The following areas have been examined to GRIP stage 2:

- SRTs with a target of raising the overall line speed from 70 to 85/90mph;
- signal sighting and braking distances;
- crossings;
- track quality, condition and curvature;
- structures;
- timetabling – particularly in relation to the working of Ashford station; and
- traction current supply.

Significant interfaces

There are no identified interfaces with any other CP5 project however it is known that a number of track renewal schemes are planned and it is intended to interface this project with them whenever the opportunity arises. In addition, the possibility of bringing forward a resignalling / re-control of the line between Ramsgate and Ashford has been identified and will be explored as an additional option in GRIP stage 3.

Key assumptions

- Traction current is adequate, this has been confirmed at GRIP stage 2 but not tested;
- there are no serious problems with any structures, this has been confirmed at GRIP stage 2 through a desk top study but further investigations will be made as part of GRIP stage 3;
- reduced SRTs will be utilised;
- there will be no increase in service frequency.

Charing Cross Station capacity improvements

Operating route: Kent.

Output: station capacity.

CP5 output driver

This project seeks to relieve current and future passenger congestion at Charing Cross Station.

Scope of works

- Confirm that a congestion problem exists through the use of pedestrian flow surveys/modelling;
- identify options for interventions which relieve the congestion highlighted and test those options against pedestrian flow surveys; and
- in particular seek scope for extending platform 4 toward the north end of the station to enable 12-car operations.

Significant interfaces

No significant interfaces with any other CP5 project have been identified. However it is known that there is an interest in a major re-development of the station and a close contact will be maintained with that scheme should it enter development.

Key assumptions

- Removal of retail (station trading) may be required and will be acceptable (subject to the effects on the business case); and
- there are no major structural issues with the station that would preclude any work.

Ashford & East Coastway journey time improvements

Operating route: Kent.

Output: journey time improvements.

CP5 output driver

To reduce journey times between Ashford International and Brighton / Keymer Junction.

Scope of works

The project seeks to improve journey times between Ashford International and Brighton / Keymer junction through increases in line speed, elimination and / or raising of permanent speed restrictions and modifications to crossings. The following scope of works has been developed to GRIP stage 2:

- SRT improvements, with a target of raising the overall line speed from 60 to 75mph between Ashford International and Hastings and overall to 90mph between Hastings and Brighton / Keymer junction;;
- signal sighting and braking distances;
- crossings;
- track quality, condition and curvature;
- structures;
- timetabling; and
- traction current supply (between Ore and Keymer Junction).

Significant interfaces:

- It is known that a number of track renewal schemes are planned and it is intended to interface this project with them whenever the opportunity arises; and
- at the western end of the route there is an interface with the East Coastway resignalling scheme.

Key assumptions

- Traction current is adequate (between Ore and Keymer Junction);
- there are no serious problems with any structures;
- the train company will take advantage of reduced SRTs; and
- it is possible to increase line speeds over existing crossings without major interventions (except at Winchelsea).

East Kent resignalling phase 2

Operating route: Kent.

Output: renewal led project.

CP5 output driver

The key driver for the enhancement is the provision of capability and capacity to facilitate a future time table (December 2018) through the Medway towns, operational cost reduction and improve integration of the railway with other public transport. The outputs to be delivered include:

- increase in capacity for at least 15tph;
- provision of 12-car platforms for class 465 stock;
- new Station at Rochester;
- headway improvement to 2 minute planning headway; and
- reduced maintenance / operation and schedule 4 / 8 costs.

Scope of works

- New infrastructure for bi-directional capability from Strood to Rochester;
- two additional signal sections to reduce headways between Rochester and Gillingham;
- platform extensions to accommodate 12-Car class 465s at the following stations:
 - Gillingham;
 - Strood;
- turnback facilities east of Gillingham station and associated station infrastructure requirements;
- new train operator warning systems (TOWS) or alternative safety systems where appropriate;
- provision of lighting, cameras, monitoring equipment and power for driver only operation (DOO) at Rochester, Chatham and Gillingham;
- improve track layout at Gillingham; and
- relocate Rochester station to Corporation Street, scope to include a new station building and new infrastructure including track and signals.

Significant interfaces

The enhancements will be delivered as part of the East Kent resignalling phase 2 renewal scope of works. The renewal is part of the CP5 signalling renewal workbank. The relocation of the Rochester Station is aligned with Medway Councils objectives and interfaces with their Rochester Renaissance Project.

Key assumptions

- The scope of works currently identified will be sufficient to deliver the required output, primarily the delivery of the December 2018 timetable and achieve the required business case benchmark;
- land can be procured for the new station at Rochester and at Rainham to support any additional turnback requirements east of Gillingham;
- the curvature of the track at Rochester will not prevent the relocation of the station to Corporation Street;
- the enhancements will be delivered as part of the renewals project and there will be funds available in CP4 to support the consequential cost profile; and
- there may be increased power supply requirements arising from the 12-car operation, reduced headways and increased frequency following the implementation of the proposed enhancements in this scheme. It is assumed that a separate power supply upgrade project will be addressing this issue.

England & Wales – proposed projects – London and South East

SE020: East Croydon signalling modifications to improve capacity

East Croydon signalling modifications to improve capacity

Operating route: Sussex.

Output: capacity.

CP5 output driver

This project is to increase network capacity and improve journey times by carrying out works as necessary to enable the removal of existing restrictions on T106 signal at East Croydon, without imposing additional restrictions elsewhere.

Scope of works

- The movement of one signal (T106); and
- extension to platform 4 at East Croydon.

Significant interfaces

None.

Key assumptions

It should be noted that a report from Parsons Brinckerhoff in 2008 concluded that a solution compliant to Network Rail and Group Standards could not be found. A GRIP stage 1 study will be carried out to establish whether a solution reliant upon derogations and authorised non-compliances with standards appears feasible.

West Croydon remodelling

Operating route: Sussex.

Output: capacity.

CP5 output driver

The project is to improve operational flexibility and performance at West Croydon by:

1. providing a compliant overlap on the Up Wallington line into platform 3 (removing the current approach control);
2. providing the ability to terminate down trains in platform 3; and
3. making platform 3 suitable for use as a through route in the Down direction.

Scope of works

Track:

- remove current non-standard S&C at London end of station and replace as single lead junction, nearer to London, using modular S&C; and
- remove Oakfield siding.

Signalling:

- two signals to be moved;
- adjustments to track circuiting arrangements to suit revised track work;
- alterations to interlocking to accommodate additional route(s); and
- alterations to Three Bridges ASC.

Significant interfaces

The project will interface with the Norwood Junction platform 7 turnback project.

Key assumptions

- A technical solution can be found that provides output 1 without requiring major alterations to signalling on the Down Wallington line and outputs 2 and 3 without requiring major reconstruction of the country end layout;
- the existing interlocking is suitable and has capacity for the required alterations;
- Three Bridges ASC can encompass any additional workload arising from these alterations within its current staff complement.

Uckfield line train lengthening

Operating route: Sussex.

Output: capacity.

CP5 output driver

The project will enable provision of extra capacity between East Croydon and London Bridge, and on the Oxted Line, by allowing longer trains to operate.

Scope of works

The project has developed scope of works through GRIP stage 2 to allow 10-car class 170/171 (23m) stock to serve the following locations:

- Edenbridge Town – extend two platform faces;
- Hever – extend two platform faces;
- Cowden - extend one platform face;
- Ashurst - extend two platform faces;
- Eridge - extend one platform face;
- Crowborough - extend two platform faces and move one signal;
- Buxted - extend one platform face and move one signal; and
- Uckfield Terminal - extend one platform face.

Significant interfaces

The scheme should make passive provision for future electrification of the route served by 12-car x 20m vehicles

Key assumptions

- That 10-car trains will be not longer than 236m (e.g. class 171 2x4-car and 1x2-car units), therefore platform length to be a minimum of 237m (single direction) or 238m (bi-directional) including 1m allowance from stop boards to top of ramps. Terminating platform to be 243m;
- options reliant upon use of Selective Door Opening (SDO) are unlikely to be feasible due to the fact that that class 170/171 fleet comprises 4-car and 2-car formations which could be assembled in any combination to make a 10-car train thereby limiting the scope for savings that this functionality would otherwise enable;
- the project's primary aim is to provide additional train capacity to be utilised further along the corridor towards London, it is therefore assumed the project will result in negligible increased passenger numbers using the Uckfield Line, therefore provision of additional passenger facilities at locations along the route can be ignored;
- land fenced into the railway at the London end of the Down platform at Hever can be transferred into Network Rail ownership and that works at all other locations can be contained within current property boundaries and ownership; and
- the works can be undertaken using Network Rail's permitted development rights.

West London train lengthening

Operating route: Sussex.

Output: capacity.

CP5 output driver

The main output is to enable longer trains to operate on the route (8-car rather than the existing 4-car) to meet future passenger growth as identified in the West Coast main line and London & South East RUSs. The West London line (WLL) has seen rapidly growing passenger numbers in recent years partly as a result of the new Westfield shopping centre and new stations at Shepherds Bush and Imperial Wharf.

Scope of works

Works at this stage will include further desk top studies, preliminary designs supported by site surveys to determine feasibility of each option identified during GRIP stage 2 to (a) verify the viability of these options and (b) identify a preferred option for each location to be taken forward. The stations being considered are:

- Clapham Junction - platforms 16 and 17 (including options identified at this location by Parsons Brinkerhoff);
- Imperial Wharf;
- West Brompton;
- Kensington Olympia;
- Shepherds Bush;
- use of the bay platform 10a at Watford Junction should be verified for 8-car capability – only minor works are anticipated;
- 8-car capability at all stations used by Southern services from Shepherds Bush to Watford Junction should be confirmed.

Achieving the platform extensions may require repositioning of signals in some locations and alterations and enhancement of station infrastructure.

The following platforms between Watford Junction and Milton Keynes have been confirmed as having 8-car capability:

- Hemel Hempstead;
- Berkhamstead;
- Tring;
- Leighton Buzzard;
- Bletchley; and Milton Keynes.

No further work is required at these locations apart from consideration of the feasibility, including timetable constraints, of turning back 8-car trains from Milton Keynes using either platform 2 or platform 3.

Significant interfaces

The project will interface with the Clapham Junction congestion relief scheme

Key assumptions

- The existing sub-standard stepping distances on platforms 16 and 17 at Clapham Junction may be improved but will continue to be non-compliant with current standards if any scheme other than the “large land take option” is taken forward;
- where platform extensions are required these can be accommodated within existing Network Rail property boundaries with the exception of the “large and small land take” options at Clapham Junction;
- platform extension works at Wembley Central are being progressed via a different project; and
- London Overground services will remain as 4-car due to platform constraints on the North London Line.

Norwood Junction platform 6 & 7 turnback

Operating route: Sussex.

Output: capacity.

CP5 output driver

The project is to provide the ability to terminate and turn back an electric passenger train of up to 10-cars in length, from / to the Crystal Palace direction, at Norwood Junction without occupying the main running lines. Southern (TOC) have identified a potential saving of one 10-car train in the morning 'peak' if this scheme is completed. The current working assumption with the TOC is that this rolling stock will be utilised on the West London Line to relieve substantial overcrowding.

Scope of works

The track scope of works under development is to:

- relay circa 1m 25ch of single line, to be provided with third rail;
- install sliding buffer stop;
- install approximately two additional insulated block joints; and
- remove current S&C at Bromley South Junction and replace with a new single lead junction (three point ends).

The signalling scope of works under development is to provide:

- a new exit signal from platform 6 & 7;
- a new down direction signal protecting Bromley Down junction;
- alterations to two interlockings to accommodate additional signals and bi-directional working on the Down Crystal Palace spur; and
- alterations to Three Bridges ASC and London Bridge ASC.

The electrification and power scope of works under development includes:

- modelling traction current requirements to determine any requirements for traction supply reinforcement;
- providing traction supply to platform 7 at Norwood, with associated switchgear; and
- alterations to the SCADA system.

The scope of civils works under development covers:

- embankment works in the vicinity of Bromley Down junction to accommodate new S&C;
- refurbishment of the existing disused Norwood platform 7 face and extension to 10-car length; and
- a similar extension to platform 6.

Significant interfaces

This project would interface with the proposed West Croydon remodelling project.

Key assumptions

- The solution will involve bi-directionally signalling the Down Crystal Palace spur and remodelling Bromley Down junction, and that technical solutions can be found to deliver this;
- provision for 10-car working will be sufficient, although passive provision for 12-car working will be made;
- driver only operation will be the normal method of operation;
- the through road / goods road and associated sidings can be taken out of use permanently; and
- the existing complement of signallers at Three Bridges ASC will be sufficient to deal with the altered infrastructure.

Purley to East Croydon train lengthening

Operating route: Sussex.

Output: capacity.

CP5 output driver

The project is to enable provision of extra capacity between Purley and Victoria, and on the Caterham and Tattenham Corner lines, by allowing longer train portions to operate on the branches which split / join at Purley.

Scope of works

The scope of works is to provide infrastructure to allow 10-car trains to serve Purley station, including:

- the extension of platform 6 and carrying out minor alterations to platform 5;
- moving four signals; and
- abolishing one set of S&C and introducing two sets at locations yet to be determined to replicate functionality.

Significant interfaces

This project interfaces with the Thameslink KO2 timetable to be introduced in December 2018. It is anticipated that this will include peak Victoria services with portions from the branches splitting / joining in platforms 5 & 6 at Purley.

Key assumptions

- It will be possible to find suitable locations for installation of new S&C on both the Caterham and Tattenham branches to replicate the functionality of abolished 1656 points that are compatible with operation of the timetable;
- 10-car trains will be not longer than 202.6m (e.g. class 445 2x4-car plus class 456 1x2-car), therefore platform length to be a minimum of 206.6m including driver only operation / stopping and splitting / joining tolerances;
- selective door opening (SDO) functionality shall be utilised to enable longer trains to call at Purley Oaks and South Croydon;
- the project's primary aim is to provide additional train capacity to be utilised further along the corridor towards London, it is therefore assumed the project will result in negligible increased passenger numbers at locations south of East Croydon therefore provision of additional passenger facilities at these locations can be ignored;
- the works can be contained within the current property boundary and be undertaken using Network Rail's permitted development rights; and
- traction power system reinforcement requirements are to be addressed by a separate project reviewing capability of the 3rd rail network in the light of service changes proposed during CP5.

Redhill additional platform

Operating route: Sussex.

Output: capacity.

CP5 output driver

The project is to develop a number of complementary enhancements that together allow additional splitting / joining services at Redhill and provide additional operational resilience to facilitate operation of the proposed post Thameslink KO2 timetable (December 2018).

Scope of works

- Provision of an additional 12-car 270m platform scheme at Redhill sited on the footprint of the number 2 Up siding / Snowplough siding by converting the Redhill goods loop to passenger use making associated track layout and signalling changes;
- provision of platform accommodation including WCs, canopy, waiting shelter and stairs / lift connection to the existing subway and ticket hall; and
- evaluate and develop an option to allow parallel moves from the down slow into platform 2 at Redhill station while trains are leaving either platform 1 or the new platform 0 in the up direction.

Significant interfaces

- Redhill Station commercial development; and
- Thameslink KO2.

Key assumptions

- While the project will provide passenger handling facilities associated with the new platform it does not include any additional station staff accommodation, ticket office or gate line facilities;
- Redhill SSI and associated signalling is both suitable, and has capacity, for the required modifications;
- conversion of the Goods loop to a passenger running line (for platform 0) and introducing the platform 2 Down direction parallel moves is permissible whilst retaining existing overlap and signal protection arrangements;
- the works can be contained within the current property boundary and be undertaken using Network Rail's permitted development rights;
- traction power system reinforcement requirements are to be addressed by a separate project reviewing capability of the 3rd rail network in the light of service changes proposed during CP5; and
- affordable compensation can be agreed with DBS for severing connection to the Up Yard.

London Victoria station capacity improvements

Operating route: Sussex.

Output: station capacity.

CP5 output driver

To increase passenger capacity at London Victoria station.

Scope of works

- To confirm the extent of the congestion problem that exists, through the use of pedestrian flow surveys / modelling; and
- identify options for interventions which relieve the congestion highlighted and test those options against pedestrian flow surveys.

Options identified to date include:

- increasing the number and location of ticket gates across the station to support pedestrian flows;
- removing / relocating retail facilities including the left luggage office and amendments to the concourse retail island; and
- infilling space behind the buffer stops.

Development through GRIP stage 3 will determine the single option chosen.

Significant interfaces

- Potential property development on Rail Air Deck and at Hudson's Place; and
- no significant CP5 interfaces identified at present.

Key assumptions

- A technical solution can be found that delivers alleviation of pedestrian congestion at the station to allow for today's congestion problem and to factor in resolution of future demand; and
- options can be delivered within a Listed Building.

Clapham Junction congestion relief

Operating route: Wessex.

Output: station capacity.

CP5 output driver

ORR 2008/09 footfall statistics show station entry and exit figures at Clapham Junction of 17.5million, and interchange figures of 16.4million. Planned funded and potential future interventions, such as train lengthening, will generate more passengers on the concourse. As passenger numbers grow, it is envisaged that interventions at Clapham Junction Station will be required for implementation in CP5 to relieve station congestion. This vision is shared with TfL, Stagecoach South Western Trains and Southern Railway.

Scope of works

An initial study is required to inform the next steps by provision of the following:

- evaluation of present and future passenger flows;
- identification of possible options; and
- recommendations for valuable interventions.

The potential scope of the works is the introduction of an expanded and a new station entrance to replace the existing ones along with improvements to access and egress from a number of existing platforms.

Significant interfaces

- Clapham is not yet defined in terms of CP5 Buildings and Civils renewals; and
- West London line train lengthening.

Key assumptions

- We can acquire or purchase the land we require;
- the local authority and the TOC will be supportive of this option;
- the possession will be limited to rules of the route and sharing with other projects; and
- the existing structures can be adapted.

Wimbledon station congestion relief

Operating route: Wessex.

Output: station capacity.

CP5 output driver

To increase passenger capacity at Wimbledon station.

Scope of works

- Confirm the extent of the congestion problem that exists, through the use of pedestrian flow surveys / modelling; and
- identify options for interventions which relieve the congestion highlighted and test those options against pedestrian flow surveys.

Options identified at this stage include:

- an additional platform interchange bridge linked to the existing overbridge and London Underground concourse;
- amendments to platform accommodation and associated canopies; and
- additional gateline capacity at the Centre Court side entrance.

Further development through GRIP stage 3 will determine the single option chosen.

Significant interfaces

- South West trains retail development (CP4); and
- station forecourt remodelling (CP4).

Key assumptions

- A technical solution can be found that delivers alleviation of pedestrian congestion at the station to allow for today's congestion problem and to factor in resolution of future demand; and
- the solution will not impact the operational railway i.e. signal sighting.

Virginia Water to Reading train lengthening

Operating route: Wessex.

Output: capacity.

CP5 output driver

To enable the provision of extra capacity between Reading and Waterloo by allowing longer trains to operate.

Scope of works

To develop a scheme allowing 10-car trains to serve the following locations:

- Earley station - extend platforms 1 & 2;
- Winnersh Triangle station - extend platforms 1 & 2;
- Winnersh station - extend platforms 1 & 2 and move one signal;
- Wokingham station - extend platform 1;
- Bracknell station - extend platforms 1 & 2 and move one signal;
- Martin's Heron station - extend platforms 1 & 2;
- Ascot station - extend platforms 1, 2 & 3 and move four signals;
- Sunningdale station - extend platforms 1 & 2;
- Longcross station - extend platforms 1 & 2; and
- Virginia Water station - extend platforms 1 & 2.

Significant interfaces

- The project interfaces with the Reading Station area redevelopment project, the scope of which includes lengthening the 'Southern' platforms (4a & 4b); and
- the 10-car south west suburban train lengthening project which is being completed in CP4.

Key assumptions

- That 10-car trains will be no longer than 204m (e.g. class 458 strengthened with class 460 vehicles or similar), therefore platform lengths are to be a minimum of 205m including 1m allowance from stop board to top of ramp;
- the project's primary aim is to provide additional train capacity to be utilised further along the corridor towards London, it is therefore assumed the project will result in negligible increased passenger numbers at these locations and provision of additional passenger facilities can therefore be ignored;
- turnback facilities are to be maintained at Wokingham (platform 1) and Ascot (platforms 1,2 & 3), but that no additional allowance for splitting and joining is required;
- existing substandard signal standbacks are not to be addressed unless the signal is moved and that the deficiency can be rectified for an affordable cost;

SE002: Virginia Water to Reading train lengthening

- at Ascot a derogation / Network Change can be obtained for substandard signal standbacks following three signal moves on platforms 1, 2 & 3 where full compliance is not achievable within the constraints of the existing track and signalling layout;
- widths of 2.5m (2.15m at Sunningdale platform1) for extended platform portions will be acceptable;
- it is possible to move traction cable oil coolers to allow extended platforms at Virginia Water and Sunningdale;
- traction power system reinforcement requirements are to be addressed by a separate project reviewing capability of the 3rd rail network in the light of service changes proposed during CP5; and
- the works can be contained within the current property boundary and be undertaken using Network Rail's permitted development rights.

Fenchurch Street Station congestion relief

Operating route: Anglia.

Output: station capacity.

CP5 output driver

The major benefit of the project will be to increase passenger capacity at Fenchurch Street Station.

Scope of works

- Confirm the extent of the congestion problem that exists, through the use of pedestrian flow surveys/modelling; and
- identify options for interventions which relieve the congestion highlighted and test those options against pedestrian flow surveys.

Options identified to date include:

- improvements to the capacity of the existing Coopers Row subway;
- an additional entrance at the country end of the platforms; and
- improvements to the Fenchurch Place entrance.

Further structural assessments during GRIP stage 3 will determine the single option chosen at this confined site.

Significant interfaces

No significant CP5 interfaces have been identified at present.

Key assumptions

- A technical solution can be found that delivers alleviation of pedestrian congestion in the subway to allow for today's congestion problem and to factor in resolution of future demand; and
- options are structurally viable due to the complex nature of the station's structure.

West Anglia main line capacity increase

Operating route: Anglia.

Output: capacity.

CP5 output driver

To relieve overcrowding and absorb additional forecast growth on the West Anglia main line. The project shall aim to implement recommendation C2a included within the July 2011 London and South East RUS. The project is to develop a scheme which increases frequencies of Lea Valley line services to Stratford terminating in platform 11 to 4 tph in the peak (currently 2tph).

Scope of works

- Undertake timetabling, rolling stock utilisation and performance study to validate the preliminary assessment that two additional morning peak services from Brimsdown can be timed with acceptable PPM and a calling pattern assuming minimum additional infrastructure provided at Brimsdown;
- assessment of overnight berthing requirements for additional units; and
- provide an additional turnback facility at Brimsdown (recommendation C2a). Works to include a new platform face and trackwork and associated signalling and OLE modifications.

Significant interfaces

None identified.

Key assumptions

- Agreement can be reached with key stakeholders that the timetable performance and calling pattern emerging from the modelling study is acceptable;
- completion of the Lee Valley on Network works;
- power modelling is being undertaken under a separate CP5 traction power scheme to make sure that supplies are sufficient;
- no additional stabling facilities will be required for the rolling stock strategy to operate the scheme; and
- works can be accommodated within the current operational rail boundary and be undertaken using Network Rail's permitted development rights.

Great Eastern main line infrastructure improvement

Operating route: Anglia.

Output: capacity.

CP5 output driver

The project is to develop a scheme which makes optimum use of capacity released on the electric lines into Liverpool Street Station following diversion of most peak suburban services through the Crossrail tunnel (due to open in 2018) with the aim of reducing overcrowding on the Chelmsford and Southend Victoria routes. The project shall aim to implement recommendation D2 included within the July 2011 London and South East RUS to increase main line services up to 28 trains in the busiest hour (from an assumed 24 tph following implementation of earlier RUS recommendations).

Scope of works

- Undertake a timetabling, rolling stock utilisation and performance study to validate the preliminary assessment that three additional morning peak services from Chelmsford and one additional service from Wickford can be timed without additional rolling stock and with acceptable PPM. To also identify inter-peak stabling requirements;
- recovery of three crossovers at the existing Bow Junction and provision of three new crossovers in locations and with speeds to optimise the layout allowing more up direction trains to access the Up electric line on the London side of the new Crossrail tunnel portal. Works to include associated signalling and OLE modifications;
- provision of turnback facilities in the Chelmsford and Wickford areas; and
- provision of stabling facilities for up to seven 12-car trains (to be confirmed by the timetable study), a number of sites along the Lea Bridge corridor have been proposed which will require further investigation to confirm feasibility and develop infrastructure requirements.

Significant interfaces

- The Crossrail programme.

Key assumptions

- No additional traction power reinforcement will be required west of Shenfield. This will be confirmed by a power modelling exercise undertaken by the Crossrail programme. Additional power modelling is being undertaken under a separate CP5 Traction Power scheme to make sure that supplies are sufficient east of Shenfield;
- a site for stabling can be confirmed along the Lea Bridge corridor or that the timetable can accommodate more remote / operational alternatives;
- planning permission can be obtained for the selected stabling site; and
- other than stabling, works can be accommodated within the current operational rail boundary and be undertaken using Network Rail's permitted development rights.

Gospel Oak to Barking Electrification

Operating route: Anglia.

Output: electrification.

CP5 output driver

The key output will be the ability to run electric trains between Gospel Oak and Woodgrange Park Junction. This will facilitate the current 4 trains per hour passenger service being converted from diesel to electric traction. Electrification would provide an alternative route for electrically hauled freight to and from the Thameside area, avoiding crossing the Great Eastern main line 'on the flat'. To encourage transfer of freight haulage to electric, the project will consider electrification of the connection to the Midland Main Line and the Thameshaven Branch.

Scope of works

- The bay platforms at Gospel Oak and Barking are included in the core scope, as is the connection to the East Coast main line at Harringay;
- localised track lowering in several locations is expected; this may require localised track renewal;
- some signalling immunisation may be required on the Gospel Oak to Woodgrange Park section;
- circa 35 single track kilometres of new OLE, together with associated switchgear etc. A new power supply may be required; this will be determined during development; and
- modification or reconstruction of overbridges on the route; quantity not yet determined.

Significant interfaces

- Midland main line electrification; and
- Crossrail programme.

Key assumptions

- That a business case for the scheme can be made; several previous studies have indicated that the project will have a high capital cost; and
- any rolling stock or platform alterations (e.g. lengthening) necessary to convert the Gospel Oak to Barking passenger service to electric traction will be provided outside of this project.

Stevenage and Gordon Hill turnbacks

Operating route: LNE.

Output: capacity.

CP5 output driver

Provide efficient resourcing for peak capacity on inner suburban services.

Scope of works

- Potential for additional crossovers and turn-back at Stevenage (which may include an intervention at Langley Junction); and
- potential for an island platform / turn back facility at Gordon Hill (Hertford loop).

Significant interfaces

- Hertford North integration facility;
- ECML PSU (121945 and 121948) (CP4 and CP5);
- Alexandra Palace to Finsbury Park (CP4);
- traction power supplies study; and
- Thameslink programme (CP4 and CP5).

Key assumptions

- 2018 Thameslink Key Output (KO2) timetable will be implemented as per current understanding (Version DTT 2010);
- the 2018 Thameslink KO2 timetable identifies 12 trains per hour (tph) in the high peak into Moorgate (10 tph from the Hertford Loop and 2 tph from Welwyn Garden City) which is the same total of trains that operates from December 2010. Should this number of trains within the 2018 Thameslink KO2 timetable change, the assumptions and scope of work will need to be reviewed;
- ERTMS will be installed on the Hertford Loop – Moorgate corridor by 2018/19;
- all planned works (e.g. between Alexandra Palace and Finsbury Park) will be completed in CP4;
- refresh of scope, cost, milestones or assumptions on the completion of GRIP2;
- rolling stock will be of a specific type and available (the rolling stock will be made available if the additional paths can be created as part of this project);
- stations will be able to accommodate additional passenger flows without the need for infrastructure interventions;
- the bay platform at Stevenage with new line and connection to Langley Junction is based on Option 3 of the Stevenage Station turnback options report (06/03/2009);
- the current proposal for the island platform turnback facility at Gordon Hill (Hertford loop) is based on Option 1 taken from early development work, further development work is considering three new options with stakeholders;

NE004: Stevenage and Gordon Hill turnbacks

- sufficient room is available within the existing relay room at Langley Junction to accommodate three geographical signalling sets needed for the new facility at Stevenage station;
- no cost included for any land purchase;
- the project will secure necessary disruptive track access requirements;
- that innovative technical solution or construction approach (e.g. modular) will not be required;
- derogations to standards will not be required;
- standard regulatory consents (Network Change and Station Change) and planning permissions will be required and not any particular consents (e.g. TWA / IPC);
- some works will be delivered by others (e.g. traction power scope);
- delivery of outputs is also dependant on completion of other (specified) projects; and
- this project is linked to the ECML interventions package (system integration and timetable).

Proposed projects - long distance

Project Name	CP5 expenditure range (£m) (2011/12 prices)
Paddington station passenger capacity	7.9 - 9.4
Bristol – Bridgwater journey time improvements	31 - 33
Bristol Temple Meads passenger capacity	7.7 - 9.0
Dr Days to Filton Abbey Wood capacity improvements	54 - 57
Intercity Express Programme – specific GWML capacity schemes	20 - 23
Leamington to Coventry capacity	34 - 37
Oxford corridor capacity enhancement	35 - 37
Midland Main Line electrification	216 - 257
Midland Main Line long distance high speed services train lengthening	33 - 35
Derby station area remodelling	61 - 66

Paddington station passenger capacity

Operating route: Western.

Output: station capacity.

CP5 output driver

To reduce the passenger congestion at Paddington station through the construction of an enhanced overbridge at the country end of the station to improve passenger flows to / from the mainline station, taxi rank , Crossrail station and London Underground.

Scope of works

An enhancement to the passenger footbridges at the country end of Paddington station to improve the flows and reduce congestion to / from the Underground, Crossrail, Taxi deck and mainline station.

Significant interfaces

- Crossrail programme developments at Paddington station;
- Intercity Express programme (IEP);
- GWML electrification; and
- other 3rd party works funded by LUL.

Key assumptions

Passenger growth on GWML driven by the electrification of the GWML and the introduction of an enhanced IEP service in December 2017 and the new Crossrail service in December 2019 will result in an increasing number of passengers circulating on the footbridges on the country end of the platform.

England & Wales – proposed projects – long distance

WW011: Bristol to Bridgwater journey time improvements

Bristol to Bridgwater journey time improvements

Operating route: Western.

Output: journey time improvements.

CP5 output driver

To enhance line speeds between Bristol Temple Meads and Bridgwater, and potentially up to Plymouth, with a remit to reduce end-end journey times. The output is to achieve a line speed of 125 mph where feasible.

Scope of works

The scope of this work is to propose where line speeds can be increased to up to 125 mph between Bristol Temple Meads, Bridgwater and Plymouth. If 125 mph is not achieved the works will identify and recommend what speed can be achieved.

This work will consider what the impact of the higher line speeds will be on network infrastructure, which includes:

- bridge structures along line of route;
- signal structures and spacing;
- level crossings and other crossings;
- track and track bed investigation to understand impact and potential risk of sluing the rail; and
- work required to supporting or adjacent earthworks.

Significant interfaces

None identified.

Key assumptions

- Bristol area resignalling will proceed on programme in starting in 2015. This phase of the Greater Bristol programme is programmed for completion in 2017/18 given it is not directly linked with the planned electrification of the GWML – it is assumed this position will not change; and
- IEP bi-mode has a maximum speed of 110 mph.

England & Wales – proposed projects – long distance

WW024: Bristol Temple Meads passenger capacity

Bristol Temple Meads passenger capacity

Operating route: Western.

Output: station capacity.

CP5 output driver

Provision of sufficient passenger capacity within Bristol Temple Meads station to accommodate anticipated rail passenger growth as predicted in the Great Western Route Utilisation Strategy.

Scope of works

- Pedestrian flow modelling will be undertaken to identify capacity interventions required to improve passenger circulation and accommodate the predicted level of growth; and
- there will be a review of operational requirements for platform 1 in line with IEP services.

Significant interfaces

- Bristol resignalling programme 2015 – 2018;
- the project is driven by passenger growth forecasts as predicted by the Great Western RUS and the enhanced service frequency proposed by IEP; and
- redevelopment of the wider Bristol Temple Meads area with commercial and residential developments and the Local Enterprise Partnerships Enterprise Zone at Temple Quarter.

Key assumptions

Wider developments for the area will need to be reviewed with external stakeholders and developed through an area master plan.

England & Wales – proposed projects – long distance

WW009: Dr Days to Filton Abbey Wood capacity improvements

Dr Days to Filton Abbey Wood capacity improvements

Operating route: Western.

Output: capacity.

CP5 output driver

To provide sufficient capacity in order to accommodate the predicted growth in services with the enhanced service frequency to be introduced with the Intercity Express programme, additional local services as proposed by the Great Western RUS and the freight growth predicted by the Strategic Freight Network. The additional capacity will also facilitate improved journey times (through linespeed increases and the ability to segregate mixed traffic flows), whilst also enabling an operational railway to be available when engineering works are undertaken.

Scope of works

This will include provision of a three or four track railway and associated infrastructure as required to accommodate the specified outputs.

Significant interfaces

- Planned resignalling of Bristol area programmed to commission in May 2015. It should be noted that the planned resignalling programme cannot be compromised due to the requirement to complete resignalling in advance of the electrification of the route (December 2016);
- introduction of IEP and associated capacity interventions around Bristol that may be required; and
- the proposed electrification of the GWML.

Key assumptions

- This scheme will align with the resignalling works at Bristol to achieve the maximum synergy and efficiencies.

England & Wales – proposed projects – long distance

WW028: Intercity Express Programme – specific GWML capacity schemes

Intercity Express programme - specific GWML capacity schemes

Operating route: Western.

Output: journey opportunity.

CP5 output driver

These schemes are necessary to deliver the enhanced December 2017 timetable as referenced in the updated remit and scope of works from DfT to Network Rail dated May 2011 and titled "IOS 3". Other capacity schemes may be necessary to deliver the December 2017 timetable but where these have a number of beneficiaries they have been developed as separate CP5 schemes.

Scope of works

- Paddington - an enhancement to the infrastructure in the station throat area and on a number of platform faces to improve the flow of trains into and out of the station in the peak hours;
- Bristol Parkway - construction of an additional Down line platform and passenger circulating area to enable two additional fast trains per hour to operate between Paddington and Bristol TM calling at Bristol Parkway only; and
- line speed increases - study into line speed increases on the South Wales main line and on both the North and South Cotswolds lines. The benefits will result in reduced journey times and increase revenue opportunities.

Significant interfaces

- Great Western electrification;
- Crossrail programme;
- Reading station area redevelopment;
- Western mainline signalling renewals;
- Cardiff area signalling renewals;
- CP5 Western enhancements - Bristol area, Oxford, Filton Bank, Hereford and freight gauge clearances;
- Swindon to Kemble;
- IEP GWML capability works across Western and Wales routes;
- IEP depot facilities – the IEP project team will work with the Train Service Provider to develop the proposed IEP depot facilities across the GWML; and
- LUL new Hammersmith & City line station at Paddington.

England & Wales – proposed projects – long distance

WW028: Intercity Express Programme – specific GWML capacity schemes

Key assumptions

- The introduction of an enhanced timetable from December 2017 onwards will result in an increasing number of passengers. This increase in passenger numbers will result in specific IEP funded capacity enhancements at a number of stations. At the present time works are required at Paddington and Bristol Parkway (as outlined in the station RUS);
- other specific infrastructure capacity enhancements may be required across the route but these will not be fully identified until timetable modelling is updated in 2011. The proposed December 2017 timetable specification is still being developed jointly with DfT and FGW; and
- Specific IEP capacity enhancements may be required in the Paddington to Old Oak Common area. This is suggested by an expert assessment of the emerging timetable.

Leamington to Coventry capacity

Operating route: LNW.

Output: journey opportunity and passenger & freight capacity

CP5 output driver

The West Midlands and Chilterns Route Utilisation Strategy (RUS) has identified that there is a capacity gap on the line between Leamington Spa and Coventry in the peak hours and on-train crowding on services on that line. Furthermore, there is a lack of direct connectivity for passengers wishing to travel from Derbyshire, Yorkshire and the North East to Coventry and Birmingham International, suppressing rail demand.

Scope of works

- Increase the capacity of the section of track between Milverton Junction and Kenilworth North Junction including the Kenilworth Loop by installing 7km of second track including structural works to embankments and cuttings to support the doubled section of route;
- realignment of the existing single track to enable the second track to be installed on the adjacent formation;
- a new S&C unit will be installed at Kenilworth;
- a new bridge span is required over the A46 Trunk Road for the second track;
- existing bridges will need strengthening, although this is subject to further detailed assessment during development, and parapet barrier improvements; and
- signalling and power supplies will be installed on the new double track railway.

Significant interfaces

- CP5 Southampton - WCML (Didcot / Leamington / Coventry) capacity project for the Strategic Freight Network;
- a major new structure could be required to bridge the A46. In 1974, in connection with the construction of the A46 truck road, the then Department of the Environment provided to British Rail, a letter proposing to “defray additional expenses” in connection with widening or altering of the railway on lands now invested in them. This interface has yet to be discussed with the Highways Agency; and
- there is a third party proposal to build a new station at Kenilworth where the line is currently single track. This proposal is currently only part funded and timescales are unknown.

Key assumptions

- The diversion of the Reading to Newcastle hourly service via Coventry, is to be accommodated on the Leamington to Coventry corridor in addition to the December 2010 timetable and 2019 and 2030 SFN growth forecasts which are:
 - 2019 SFN forecast growth is one class 4 train per hour in each direction; and
 - 2030 SFN forecast growth which is two class 4 trains per hour in each direction;

- existing infrastructure has the capacity for the SFN growth forecasts. The loss of the facility to recess freight at Kenilworth may adversely affect the pathing freight from the Coventry direction. A wider timetable study is being undertaken at GRIP stage 3 covering routes affected by proposal;
- for modelling purposes it is assumed that outputs of GRIP stage 3 development will be consistent with the Southampton to West Midlands train lengthening project:
 - northbound class 66 +1400 tonnes trailing weight (640 metres total length), 75mph; and
 - southbound class 66 +1200 tonnes trailing weight (640 metres total length), 75mph;
- the timetable specification assumed that the current point-to-point timings at Birmingham New Street and Leamington will be maintained. It is assumed that the additional stops at Birmingham International and Coventry will not cause the diverted service to lose existing train paths South of Leamington or North of Birmingham;
- identification of, and mitigating against, performance impacts of the diverted services will be undertaken in GRIP stage 3;
- capacity has been released by the termination of the Wrexham, Shropshire & Marylebone railway services which is assumed to no longer operate or paths reserved for a replacement service;
- track redoubling works along the section between Milverton Junction and Kenilworth South Junction would fall within permitted development rights;
- bridge works to accommodate two tracks over the A46 would require planning permission or a development consent order; and
- planning permission and funding for the second platform and footbridge would be obtained by the third party developing Kenilworth new station. There is no funding allowance for any scope relating to a new station included in the Leamington – Coventry capacity project cost estimate.

Oxford corridor capacity improvements

Operating route: Western.

Output: renewal led.

CP5 output driver

The objective of the scheme is to improve capacity and capability on the “Oxford Corridor” to meet the Initial Industry Plan objectives for capacity enhancement and reduction in end-to-end journey time. The project aspiration is to allow up to three additional train paths an hour in each direction to accommodate the future capacity requirements forecast in the Great Western RUS (established March 2010) and the SFN forecast up to 2030.

Scope of works

- Implementation of an Oxford Up side south-facing bay. This element has been developed previously to GRIP stage 4 (for the platform only). The proposed location of the new platform necessarily uses part of the existing station car park (approx. 200 spaces). The project will consider how these spaces can be replicated and consider proposals for linking this new platform with the existing station (access deck);
- provision of bi-directional (bi-di) signalling between Didcot North (Appleford), Hinksey North, Oxford North Junction, Wolvercot Junction., Tackley, and Aynho Junction.
- reduction in headway between Wolvercot and Aynho using 3-aspect signalling to align with Oxford area resignalling scheme and Banbury South resignalling;
- developing options for Down and Up passenger loops either at Hinksey or north of the station with higher speed entrance connections to facilitate passenger trains passing freight at increased length;
- increasing linespeeds in support of reduction in end-to-end journey times; and
- a double junction at Oxford North to facilitate increased capacity of connection to the Bicester line (subject to the progression of East West railway).

Significant interfaces

Planned resignalling of the Oxford area programmed to commission in May 2015.

Key assumptions

- This scheme will align with the resignalling works at Oxford to achieve the maximum synergy and cost benefit to this project;
- the resignalling team will be in a position to undertake the enhanced works; and
- the Strategic Freight Network upgrade programme is conducting a feasibility study into the provision of a 775m loop on the Down-side of the layout Nth of Oxford. This loop would carry passenger trains while freight trains were detained on the main running lines. If this proceeds then the Down loop elements of this project are not required.

Midland Main Line electrification

Operating route: East Midlands.

Output: electrification.

CP5 output driver

As set out in the Network RUS: Electrification Strategy, this scheme will enable the more efficient operation of passenger services on the route, replacing diesel traction with electric. It may also enable freight operators to use electric traction (typically class 92s) on some flows using the route.

Scope of works

The core scheme will involve provision of OLE at 25kV AC for the following sections of route (costs are included for these route sections only):

- Bedford to Sheffield via Derby;
- Kettering to Corby; and
- Trent Junction to Nottingham.

Separate costs for the following additional route options are being developed as potential increments to the core scheme:

- Trent Junction to Clay Cross South Junction (Erewash valley line);
- Matlock branch;
- Etches Park depot;
- Sheffield to Doncaster;
- Sheffield to Leeds; and
- Up and Down Hendon lines from Silkstream Junction to Watling Street Junction.

Additionally, the Great Western main line electrification project is remitted to assess the costs of electrifying the Dudding Hill line.

It is expected that the ruling linespeed on the route will increase from 110mph to 125mph following works committed in CP4. The electrification equipment will therefore be designed to cater for the following speeds:

- passenger services – 125mph;
- freight trains up to RA8 – 75mph; and
- freight trains of RA9 or RA10 – 60mph.

Power supplies are being developed against a train service specification in three parts. This is based on the services that would convert to electric traction in the following scenarios:

- electrification of the core routes (the core scheme);
- further electrification of the specified additional route options.

Significant interfaces

- Nottingham station area resignalling / remodelling (CP4 project);
- line speed increases between London and Sheffield (CP4 project);
- Derby station area resignalling / remodelling (CP5 project);
- Felixstowe to Nuneaton capacity enhancements (phase 2) - Leicester area (CP5 scheme);
- gauge capability project;
- Midland main line long distance high speed services train lengthening;
- Sheffield station area remodelling;
- Gospel Oak to Barking electrification;
- North Trans Pennine electrification (National Grid power supply requirements north of Sheffield); and
- ERTMS introduction on MML South (CP6 proposal).

Key assumptions

- Unlike GWML electrification and North West electrification this proposal is not driven by the DfT-led rolling stock strategy. Appraisal for the Electrification RUS indicated that this scheme could be financially positive, based largely on lower rolling stock costs. A key assumption is that a strategy is developed to enable provision of electric rolling stock for MML to the same timescales as provision of OLE electrification. An initial review has been held with DfT in respect of rolling stock strategy. As a result of the continued DfT review of the IEP programme, it is not possible at this stage to be definitive about the rolling stock to be used. For the purposes of power supply design, assumptions have been made regarding the types and lengths of electric rolling stock, based on the use of IEP, class 323 and class 319 units. Electrically-hauled freight services have been assumed based on use of class 92 locomotives. Rolling stock assumptions are set out in the train service specification;
- delivery is based on substantial deployment of new high output plant which will be procured for initial use on GWML electrification and will have sufficient residual life to deliver the route wiring (foundations, masts, wiring etc) for MML. It is assumed that delivery of high output plant will be funded by a separate project, (although MML electrification would require provision of High Output Operational Bases (HOOBs);
- resignalling / remodelling of Derby and Felixstowe to Nuneaton capacity enhancements (stage 2) works in the Leicester area will be undertaken in CP5 and will be delivered before OLE energisation is required;
- sufficient capacity and outage opportunities exist to enable provision of grid supply points for MML electrification in CP5 / early CP6;
- no further enhancement of power supplies between St Pancras and Bedford will be required to support the new electric services as set out in the train service specification. However, some upgrade works to power supplies may be required between Borehamwood and Bedford;
- this project is delivered as part of a wider rolling programme of electrification; and
- an electrical control facility will be provided and funded by the national SCADA project.

England & Wales – proposed projects – long distance

NE009: Midland Main Line long distance high speed services train lengthening

Midland Main Line long distance high speed services train lengthening

Operating route: East Midlands.

Output: capacity.

CP5 output driver

To improve infrastructure capability to enable the introduction of 11 x 23m vehicles on the MML on selected services in order to accommodate forecast levels of passenger growth (in 2019) and reduce crowding on MML LDHS between London St. Pancras and Corby, Nottingham, Derby and Sheffield.

Scope of works

- Operation control measures at platforms;
- platform extensions;
- new foot bridges;
- minor signalling changes;
- possibility of minor alterations to depots; and
- possibility of minor alterations to stabling facilities.

Specifically this is to be achieved through infrastructure alterations or operational control measures (or combination of the two) that will:

- accommodate the proposed increased train lengths up to a maximum of 11 x 23m vehicles at all stations for services operating on Midland Main Line Long Distance High Speed (LDHS) services between London St. Pancras and Corby, Nottingham, Derby and Sheffield;
- accommodate the proposed increased train lengths up to a maximum of 11 x 23m vehicles at all depots and stabling locations for services operating on Midland Main Line Long Distance High Speed (LDHS) services between London St. Pancras and Corby, Nottingham, Derby and Sheffield; and
- identify the incremental costs of providing platform capability to allow operation of 10-car IEPs.

Significant interfaces

- MML electrification;
- station renewal works;
- planned maintenance works;
- NSIP programme of works;
- East Midlands signalling renewals at Nottingham and Leicester;
- St Pancras to Sheffield linespeed improvements; and
- Derby remodelling.

Key assumptions:

- This project shall deliver infrastructure capability only and does not address capacity of infrastructure, namely station capacity and depot capacity (other than the accommodation of the lengthened vehicles);
- in deciding to implement train lengthening, the client has considered the impact upon station capacity and facilities therein (e.g. bridges, pedflow, evacuation);
- current capacity of the infrastructure shall not be reduced by the options proposed;
- maximum train length is constrained by the layout at London St. Pancras, which would be unable to accommodate trains longer than 11 x 23 metre vehicles without significant rebuilding. It should be noted that the infrastructure alterations required accommodate 11-car 222s at St Pancras has yet to be determined;
- the currently declared infrastructure capability regarding rolling stock gauge shall be maintained;
- rolling-stock configurations will be as defined with the current operating plan (2010);
- existing station facilities out with platforms and associated assets (e.g. CCTV and customer information systems) are assumed to be sufficient for the lengthened services / growth;
- pedestrian flow modelling at stations affected will not need to be undertaken;
- rolling-stock shall be assumed to be 11 x 23m vehicles and sufficient numbers of vehicles will be available to TOC;
- no major structural strengthening or alteration will be required;
- no major junction remodelling or resignalling will be required;
- most works can be undertaken within Rules of the Route, but that disruptive track access will be secured;
- that require IPC or planning consents will not be required;
- that innovative technical solutions or derogations to standards will not be required; and
- assuming the required internal and external resources will be available in GRIP stages 3-8.

Derby station area remodelling

Operating route: East Midlands

Output: journey time improvements and capacity.

CP5 output driver

To provide a remodelled layout at Derby, as a once in life time opportunity aligned to planned signalling and track renewals in the area. Specifically, to provide a layout that reduces the interaction between services approaching Derby from the North and the services approaching from the south by segregating the routes through Derby station that will:

- reduce journey times;
- improve performance;
- improve operational flexibility; and
- maintain declared infrastructure capability regarding rolling stock gauge.

Scope of works

- Signalling renewal and remodelling in the station area and beyond (see boundaries of scheme listed in assumptions);
- track renewal and remodelling in the station area and beyond (see boundaries of scheme listed in assumptions);
- incremental enhancement to track and signalling layout to segregate flows;
- possibility of minor alterations to station platforms in order to facilitate track layout; and
- provision of a new platform and associated access for all provision.

Significant interfaces

- MML electrification;
- station renewal works;
- planned maintenance works;
- NSIP programme of works;
- East Midlands signalling renewals at Nottingham and Leicester
- St Pancras to Sheffield linespeed improvements; and
- MML long distance high speed train lengthening.

Key assumptions

- The estimate is based upon Option 2 'medium cost' layout;
- the hybrid option developed at VM2 will provide improved benefits and reduced costs compared with Option 2;
- that there is a business case for the enhancements;
- the current capacity of the infrastructure shall not be reduced by the options proposed;

- the boundaries of the scheme are LNW junction towards Birmingham, Spondon towards Trent and Little Eaton junction towards Sheffield. Planned signalling and track renewals could be completed for the renewals funding identified, and that capacity could be maintained within such a scheme;
- Option 2 (and therefore Hybrid option post VM2) assumes that the existing track infrastructure condition will be sufficient to enable line speed increases and changes from freight to passenger with only minor works rather than wholesale relaying. Currently declared infrastructure capability regarding rolling stock gauge shall be maintained;
- rolling-stock configurations will be as defined with the current operating plan (December 2010);
- pedestrian flow modelling at stations affected will not need to be undertaken unless significant alterations to platform lengths or station facilities are proposed;
- rolling-stock shall be assumed to be as per current vehicle deployment as at December 2010, namely class 220/221/222 and HSTs/158/156/153/170;
- the introduction of IEP has not been considered;
- scope is subject to further time table modelling and assessment for the Hybrid solution;
- it has been assumed that the required disruptive possessions would be obtained;
- that IPC or planning consents are not required; and
- that innovative technical solutions or derogations to standards are not required.

Proposed projects - regional

Project Name	CP5 expenditure range (£m) (2011/12 prices)
Wales improved accessibility programme	48 - 52
Cardiff Valleys electrification	146 - 179
Hereford station area junction enhancements	4.7 - 4.9
Western access to London Heathrow Airport	tbc - tbc
Water Orton capacity enhancements	19 - 20
Birmingham to Stansted Airport journey time improvements	18 - 20
Northern Hub	459 - 493
North Trans Pennine electrification	7.3 - 9.1
Liverpool Lime Street capacity enhancement	27 - 32
Liverpool stations passenger capacity	11 - 13
North West train lengthening	17 - 20
Bradford Mill Lane capacity	2.7 - 3.1
Ferriby to- Gilberdyke journey time, performance and capacity improvements	17 - 20
Halifax station capacity	9.2 - 10.6
Horbury Junction to Wakefield journey time improvements	16 - 19
Huddersfield station capacity improvement	13 - 15
Leeds platform 0	25 - 29
Leeds platform 17 lengthening	12 - 14
Leeds station capacity	12 - 14
Micklefield turnback	23 - 28
Neville Hill depot access improvements	5.7 - 6.0
Sheffield Station	19 - 21
South Humberside Main Line capacity & journey time improvements	68 - 72
South Yorkshire train lengthening	13 - 15
West Yorkshire train lengthening	25 - 29

Wales improved accessibility programme

Operating route: Wales.

Output: station accessibility.

CP5 output driver

It has been recognised by the rail industry and Welsh Government (WG) that improved accessibility for railway stations in Wales will greatly assist in rail growth. Increased patronage is one of the highest priorities for Wales in the National Transport Plan with the key aim of “improving the provision of, and access to, rail services including improvements for disabled and vulnerable people”.

Scope of works

The study will review opportunities to improve accessibility at stations across Wales to provide easier access and more attractive and comfortable rail journey opportunities. Further investigation of the top 25 stations reviews the options at each station that have been identified to resolve accessibility issues. Looking in detail at each location, the options will be ranked against criteria that will include passenger benefit, value for money, ease of construction, ongoing maintenance and operations compatibility.

Significant interfaces

- Cardiff Valleys electrification; and
- CP5 renewals workbank for buildings and civils.

Key assumptions

- The property assumption is that none of the land has been subject to recent sale by British Railways Board (Residuary) (this will be verified in GRIP stage 3);
- the works will provide fully accessible stations; and
- the works will be delivered by Network Rail’s Buildings and Civils team.

Cardiff Valleys electrification

Operating route: Wales.

Output: electrification.

CP5 output driver

We are working with the Welsh Government to develop the business case associated with this project. It is thought that the scheme will enable the more efficient operation of passenger services on the route, replacing diesel traction with electric. Power supplies are being developed against a train service specification based on the existing level of train service, together with the following train service frequency increases:

- an additional 2tph between Caerphilly and Cardiff Central;
- an additional 2tph between Pontypridd and Cardiff Queen Street via Ninian Park (the City Line); and
- it is also likely that a second tph will run to Rhymney by extending a Bargoed terminating service.

Scope of works

- The core scheme will involve provision of OLE at 25kV AC for the following sections of route:
 - Cardiff Queen Street to Rhymney;
 - Cardiff Queen Street to Coryton;
 - Cardiff Queen Street to Merthyr Tydfil;
 - Cardiff Queen Street to Aberdare;
 - Cardiff Queen Street to Treherbert;
 - Cardiff Queen Street to Radyr via the City Line;
 - Cardiff Queen Street to Penarth; and
 - Cardiff Queen Street to Barry Island;
- discussions are ongoing with the Welsh Government and DfT regarding extending the scope to include the Ebbw Vale branch, the Maesteg branch and Cardiff – Bridgend via the main line. These will now be considered as increments against the original remit;
- platform lengthening work to allow 6-car EMUs to call at all platforms on the routes except the City Line which will allow for 3-car EMUs;
- as part of the Cardiff area signalling renewals scheme (CASR) and other planned enhancements, the following additional infrastructure will be provided and will be included in the cost estimates for electrification:
 - one through and one south facing bay at Cardiff Queen Street, giving a total of four through, and one bay, platform;
 - a new platform 8 at Cardiff Central;
 - a south-facing bay platform at Caerphilly;
 - a south-facing bay platform at Pontypridd;
 - a north-facing bay platform at Barry;

- doubling of the Treforest East Curve (Radyr Branch Junction to Penarth Curve North Junction); and
- as a result of the pre-GRIP work, the scope of the project has been estimated at 415 single track kilometres (stk).

Significant interfaces

- The GWML electrification project.

Key assumptions

- The pre-GRIP estimate includes the following key assumptions / exclusions:
 - no provision is included for Schedule 4 costs;
 - no provision is made for provision of OLE in Cardiff Canton depot, including the access roads;
 - a reduced cost OLE can be provided on lines with a line speed of up to and including 45mph;
 - Imperial Park grid supply point has sufficient capacity to support electrification of both Cardiff Valleys and the South Wales Main Line to Swansea;
 - the full cost of Imperial Park grid supply point is allocated to GWML electrification;
 - electrification work is delivered using permitted development rights and no inclusion is made for a Transport and Works Act submission;
 - provision has been made for platform lengthening works;
- it is assumed that CASR will be complete before Cardiff Valleys electrification, with no further changes to the signalling and operational telecoms equipment required to provide AC immune signalling, and telecoms and all signal structures constructed with full electrification clearance. Signalling and telecoms equipment within the area excluded by CASR will have to be replaced by this project;
- unlike GWML electrification and North West electrification this proposal is not driven by the DfT led rolling stock strategy. A key assumption therefore is that a strategy is developed to enable provision of electric rolling stock for Cardiff Valleys to the same timescales as provision of OLE electrification. It is not possible at this stage to be definitive about the rolling stock to be used. For the purposes of power supply design, rolling stock is assumed to be 6-car class 313;
- delivery is assumed to follow on from completion of GWML and North West electrification, although disruptive possessions, especially for structures clearance, would begin in advance of this. At present it is assumed that delivery will be based on traditional methodology and plant, made available from completion of North West electrification in 2016. However, there is a potential option to use high output plant for the Valleys after completion of GWML (in 2017 to Cardiff or 2016 to Bristol) if not required to transfer to Midland Main Line;
- Cardiff Valleys is delivered as part of a wider rolling programme of electrification and not as a stand alone project; and
- an electrical control facility is provided and funded by the national SCADA project.

Hereford station area junction enhancements

Operating route: Western.

Output: capacity and operational flexibility.

CP5 output driver

To provide increased capacity around Hereford station in line with the West Midlands and Chilterns Route Utilisation Strategy (WM&C RUS) which suggests that demand for rail services on the Hereford and Worcester corridor is expected to increase up to 2019. In line with Local Transport Strategies for Hereford and Worcester, it is identified that there is the need for improved rail access, in the context of population changes, housing developments and to support sustainable economic growth. As part of the RUS process, the Stakeholder Management Group proposed that a turnback facility at the station would be beneficial to meet the outputs identified. The turnback facility would not only allow the station to operate more efficiently, it could also reduce the performance risk in times of perturbation and deliver potential resource savings.

Scope of works

Options have been identified that provide turnback facilities allowing reversing moves on platforms 1 or 1 & 2. This enables trains arriving from the north to be more efficiently operated when reversing towards the north avoiding a time consuming shunt move via the south end of the station, thus freeing up capacity on the main lines.

Significant interfaces

- Network Rail is working with key stakeholders on potential interim measures in the Worcester area. This is due to there being limited renewal opportunities to enhance the network in the short to medium term;
- there are currently no plans to resignal Hereford station area, with mechanical life extension work planned for 2014;
- IEP programme;
- enhanced ATW North – South Wales services; and
- freight growth 2019 and 2030.

Key assumptions

- A turnback facility is required to enable additional trains from the north to reverse, providing operational flexibility and the possibility of resource savings through quicker turnarounds; and
- it is assumed that IEP services will be operational when this intervention is delivered.

Western access to London Heathrow Airport

Operating route: Western.

Output: airport accessibility.

CP5 output driver

Following the decision not to proceed with the proposed “Airtrack” project to link Heathrow Airport with Staines and South West London, the British Airports Authority, Department for Transport and the rail industry have jointly agreed to examine the alternative of a western link from the airport to the Great Western main line (GWML). This would improve accessibility to the airport from the West of England, South Wales and the West Midlands through connections at Reading, as well as providing a loop line, creating the option to route Reading to Paddington suburban services via Heathrow.

Scope of works

The study will review options for constructing the link, including:

- extension from the Terminal 5 station in a tunnel under the western boundary of the airport, connecting to the Colnbrook branch to a new junction West of West Drayton on the GWML; and
- extension from Terminal 5 in a tunnel to Richings Park, Iver, with a new junction between Iver and Langley stations on the GWML.

Further options may be identified by the design consultant. No decisions have been taken about service provision over the loop, but options include a completely new service, re-routing Crossrail services and extending Heathrow Express and / or Heathrow Connect services to Reading.

Significant interfaces

- The Crossrail programme;
- Thames Valley resignalling;
- Slough international freight exchange (SIFE); and
- High Speed 2 (HS2) – potential extension to Heathrow Airport.

Key assumptions

- The Crossrail programme is completed;
- Thames Valley resignalling is completed; and
- SIFE is potentially completed, and designed to accommodate the Heathrow Western link.

Water Orton capacity enhancements

Operating route: LNW.

Output: capacity.

CP5 output driver

The Derby to Birmingham corridor is currently operating at, or close to, maximum capacity especially around Water Orton. This is due to the complex variation in stopping patterns, the different rolling stock types and the mix of traffic, along with significant freight flows to and from local terminals and marshalling yards. Further capacity is required on this route to meet passenger and freight growth on the corridor in CP5 as per the West Midlands and Chilterns Route Utilisation Strategy.

Scope of works

The following infrastructure interventions have been identified to deliver the required outputs:

- 4 aspect signalling between Water Orton west junction and Wichnor junction (“Option B signalling”);
- direct Northern access to the Kingsbury Branch; and
- Tamworth turnback siding.

Significant interfaces

- Water Orton resignalling - the Water Orton resignalling project is assumed to have completed prior to the CP5 project being implemented as it commissions in April 2012;
- HS2 - the current HS2 proposals affect the Water Orton corridor between Water Orton West Junction and Birmingham, which is outside of the area of this scheme. However, as HS2 and this project progress, the implications will need to be explored;
- Derby PSB re-control to East Midlands Control Centre - this is planned for December 2016. Therefore, the proposal to re-signal from Tamworth to Wichnor junction set out above will need to be considered. A delivery strategy will need to be agreed between the two projects during GRIP stage 3;
- DB Schenker lease - there is an opportunity to re-configure the lease and reception arrangements within the Kingsbury branch to further improve access / egress to the branch. This will be developed in conjunction with the Route Freight Manager during GRIP stage 3; and
- the opportunity to explore changes to line speed profiles and the timetable (in particular stopping patterns) will be possible following Nottingham resignalling in 2013. This possibility of a future timetable recast will be taken account of (where possible) in the GRIP stage 3 timetable / performance modelling.

Key assumptions

- Water Orton resignalling will commission in April 2012 and is therefore the base case for the purposes of this project;
- the assumed option is Scenario E which involves the package of three interventions listed in the scope of works;
- the “core option” for signalling i.e. where passive provision exists, will not deliver the required capacity and has therefore been discounted;
- all of the infrastructure interventions are required in CP5 in line with the RUS;
- 2019 SFN freight growth assumes 3tph from the north and 2 from the south in each direction and 2030 SFN freight growth assumes 3tph in each direction. It is trains from the north that drive the requirement for the interventions therefore the interventions are required to cater for CP5 growth; and
- performance and journey times will not be affected detrimentally.

Birmingham to Stansted Airport journey time improvements

Operating route: East Midlands.

Output: journey time improvements.

CP5 output driver

To provide journey time improvements between Birmingham and Stansted Airport as set out in the East Midlands and West Midlands & Chilterns RUS's. Specifically, the additional infrastructure, created by Ipswich to Nuneaton capacity improvements and by signalling and S&C renewals along this corridor in CP5, will create opportunities to allow journey times to be improved for passenger trains between Birmingham and Stansted.

Scope of works

- Infrastructure alterations leading to line speed increases, including track, S&C, signalling and level crossing;
- Locations for potential line speed improvements identified at GRIP stage 2 for further development are:
 - Peterborough to Stanford;
 - Stanford to Oakham;
 - Oakham to Melton Mowbray;
 - Melton Mowbray to Syston;
 - Wigston to Nuneaton; and
 - Nuneaton to Coleshill;
- possibility of minor alterations to timetable clock face; and
- possibility of minor alterations to pathing time.

Significant interfaces

- MML electrification;
- station renewal works;
- planned maintenance works;
- NSIP programme of works;
- East Midlands signalling renewals at Nottingham and Leicester;
- St Pancras to Sheffield linespeed improvements;
- Derby remodelling;
- MML long distance high speed train lengthening;
- Felixstowe to Nuneaton capacity enhancements (phase 2); and
- Peak Forest to London freight capacity.

Key assumptions

- The study has looked at opportunities to improve journey times between Birmingham and Glen Parva Junction and Syston East Junction and Helpston Junction;
- the study has excluded the section between Wigston North Junction and Syston South Junction as this is included with Felixstowe to Nuneaton capacity enhancements (phase 2) project area;
- the Wigston – Syston base-case has been assumed to be the preferred option as developed by Felixstowe to Nuneaton capacity enhancements (phase 2), as available at December 2010 and is likely to include:
 - four tracking between Syston Junction and Leicester station;
 - three tracks between Leicester station and Wigston Junction; and
 - improved layout at Syston Junction and relocation of Syston station;
- if the Felixstowe to Nuneaton capacity enhancements (phase 2) enhancements between Wigston and Syston are not undertaken in CP5 then journey time reduction opportunities could be investigated;
- all modelling of journey times shall be based on class 170 CrossCountry trains timings as shown in December 2010 timetable;
- the aspirational speed for freight services is 75mph (up to RA8) and 60mph (above RA8);
- currently declared infrastructure capability regarding rolling stock gauge shall be maintained;
- rolling-stock configurations will be as defined within the current operating plan (2010);
- no major structural strengthening or alterations are required;
- no major junction remodelling or resignalling are required;
- any level crossing changes required will be supported and approved;
- existing asset condition of S&C is suitable for higher line speed and will not require renewal as full depth switches;
- cant deficiency derogations approved for St Pancras – Sheffield linespeed improvements are applicable;
- most works can be undertaken within Rules of the Route, but that disruptive track access will be secured;
- IPC or planning consents will not be required; and
- innovative technical solutions or derogations to standards will not be required.

Northern Hub

Operating route: LNW.

Output: journey opportunity.

CP5 output driver

The key output from the Northern Hub is to facilitate the economic growth of the North of England through value for money improvements to rail services. The key rail service improvements that facilitate this economic growth are identified in the Northern Way Conditional Output Statement (April 2009) with Network Rail's strategy for delivering these improvements published in the Manchester Hub Rail Study Report (January 2010). This report identified a series of improvements that delivered a BCR including wider economic benefits of 4.7, and later work by GMPTE identified an annual contribution to the Northern economy of £2 billion gross value added.

The specific outputs to deliver the service improvements that facilitate the economic growth across the North are to enhance the capability of the network across the Northern Hub beyond that delivered in Control Period 4 to provide affordable and value for money interventions that provide;

- capacity for forecast passenger growth;
- faster and more frequent inter-regional services with increased direct links between Northern cities;
- improved services on key commuter corridors to support the sustainable development of the cities;
- direct journeys from a wider range of towns / cities to Manchester Airport; and
- the freight capacity required to 2030.

Phase one of the Northern Hub was confirmed as funded in the March 2011 Budget.

Scope of works

- The Northern Hub is based on a series of interventions, none of which by themselves unlock the capacity and capability required to meet the challenge of facilitating economic growth;
- Phase One involves the provision of the Ordsall Chord, initial capacity works at Manchester Victoria and the Stalybridge to Victoria journey time improvements. This will be delivered for the service changes associated with the December 2016 timetable change; and
- Phase Two, including all the other interventions and remainder of the Manchester Victoria capacity intervention, is being planned to be available for the December 2018 timetable change.

For further details on Northern Hub, please see www.northernhub.co.uk and the Northern Rail Utilisation Strategy (June 2011).

Significant interfaces

- Northern urban centres;
- Strategic Freight Network;
- North West electrification schemes;
 - Liverpool to Manchester via Newton-le-Willows;
 - Huyton to Wigan;
 - Manchester – Blackpool via Preston;
- North Trans Pennine electrification;
- CP5 capacity improvements at Leeds station;
- Northern Route Utilisation Strategy;
- CP5 renewals plans including Liverpool Lime Street and Sheffield station; and
- HS2.

Key assumptions

- Funds to develop the programme to the completion of GRIP stage 4 will be made available in CP4;
- schemes outlined in the CP4 Delivery Plan form the baseline for the Northern Hub infrastructure;
- the scope and associated costs of Central Manchester performance are based in the GRIP stage 1 report;
- significant assumptions have been made about the condition of structures, in particular in central Manchester;
- it is currently assumed that the timeline for obtaining consents allows delivery in CP5. This strategy includes obtaining the powers to purchase the required land;
- sufficient traction power is provided by the North West electrification programme;
- rolling stock assumptions are based on current traction and unless new platforms are being constructed the Northern Hub service proposition does not drive train lengthening;
- sufficient rolling stock is available to support the proposed service pattern; and
- the study area has not to date included Leeds, Liverpool Lime Street and Sheffield stations.

North Trans Pennine electrification

Operating route: LNE.

Output: electrification.

CP5 output driver

Electrification of the North Trans-Pennine route is being considered as a means of increasing capacity in order to deliver the robust operation of the proposed Northern Hub timetable between Manchester and Leeds via Huddersfield. The benefits of electrification (using modern electric traction for local services) may lead to shorter journey times and a reduction in the average speed differential between local and express services which may create additional route capacity, compared to the continued use of diesel services.

Electrification may also bring wider benefits through the conversion of inter-urban, long distance and freight services to electric traction in the longer term.

Scope of works

- The core scheme will involve provision of OLE at 25kV AC for the following sections of route (costs are included for these route sections only):
 - Guide Bridge West Junction to Copley Hill East Junction via Huddersfield; and
 - Neville West Junction to Colton Junction;
- electrification between Manchester Victoria and Stalybridge is included in the remit and is being developed by the North West electrification programme; and
- a number of additional routes in Yorkshire and Greater Manchester are being considered as possible increments to the core scheme and these are not being proposed for delivery in CP5.

Network Rail are currently examining the scope for this project. There are a number of options – electrification of the core route, the addition of a key link to the East Coast main line to allow operational flexibility and diversionary routes. The headline cost is an early estimate of the costs for the core route.

Significant interfaces

There are a number of interfacing projects. These include:

- North West electrification;
- Stalybridge remodelling/resignalling;
- Northern Hub;
- Trans-Pennine Express journey time improvement;
- Northern Urban Centres;
- Strategic Freight Network; and
- Electrification – High Output Plant;

Key assumptions

- A strategy is developed to enable provision of electric rolling stock for this route to the same timescales as provision of OLE electrification;
- it is not possible at this stage to be definitive about the rolling stock to be used. For the purposes of power supply design, assumptions have been made regarding the types and lengths of electric rolling stock, based on the use of class 319 and class 380 units. Electrically-hauled freight services have been assumed based on use of class 92 locomotives hauling 2600 tonnes;
- it is assumed that suitable high output plant would be available for the delivery of the OLE system;
- other key assumptions include:
 - sufficient capacity and outage opportunities exist to enable provision of grid supply points for electrification in CP5;
 - the provision of one additional traction power supply point at Stalybridge will be sufficient to cover the route between Guide Bridge West Junction and Copley Hill East Junction, assuming the route is also fed from the Leeds direction, and no additional feeder stations are required east of Leeds;
 - North Trans Pennine electrification is delivered as part of a wider rolling programme of electrification and not as a stand alone project;
 - an overarching application for development consent will be obtained; and
 - an electrical control facility will be provided and funded by the national SCADA project.

Liverpool Lime Street capacity enhancement.

Operating route: LNW.

Output: capacity.

CP5 output driver

- Liverpool Lime Street is constrained by number and length of trains, their associated layovers, the capacity of the station throat, and congestion on its approaches;
- platforms are relatively short and there are currently multiple trains on platforms by virtue of the existing services being relatively short. However, once the local and regional services are lengthened in CP4 and CP5 in line with passenger growth forecasts and for electrification, platforms 1-6 will not be able to handle multiple trains in the same platform;
- the introduction of longer Long Distance High Speed services (class 390 train sets increasing to 11-car sets) will restrict platforms 7-9; and
- the station layout and throat should be considered for remodelling to create more platform faces, better parallel moves and a more efficient approach.

Scope of works

- Remodel Liverpool Lime Street station layout and its approaches to meet anticipated passenger growth, improve route and station capability in terms of capacity, performance, operational flexibility and the ability to maintain the infrastructure;
- low numbered platforms 1-6 should cater for a maximum train length equivalent to two separate 4 x 24m trains;
- high numbered platforms 7-9 should cater for a maximum train length of 11-car class 390 Pendolinos;
- potential construction of new platforms;
- potential alterations to concourse and barrier line building to create scope for longer platforms; and
- potential remodelling of the station throat layout.

Significant interfaces

- Northern Hub; and
- signalling & track renewals planned in CP5.

Key assumptions

- Options will be developed during GRIP stage 2 which will further define the scope of works;
- DfT support additional local services between Manchester & Huddersfield and between Huddersfield & Leeds to meet passenger growth (as recommended in the Northern RUS);
- disruptive track access will be available;

England & Wales – proposed projects – regional

WW026: Liverpool Lime Street capacity enhancement

- scope is subject to further modelling;
- the station will be able to accommodate additional passenger flows;
- for project development, it is unlikely that additional land purchase will be required, but Station Change or Network Change and internal property clearance will be needed; and
- no requirement to introduce longer trains / lengthen platforms other than specified in the Train Service Specification.

Liverpool stations passenger capacity

Operating route: LNW.

Output: station capacity.

CP5 output driver

The main output is additional peak on-train and station capacity on the third rail network in Merseyside that is required to accommodate an increasing number of employment-based and other economically productive trips to and from central Liverpool. Secondary outputs include the prevention of a worsening of train performance due to platform overcrowding at Liverpool Central station, and an improved waiting environment for passengers at this station.

The outputs for CP5 comprise part of 30 year draft strategy for growth which has been developed in partnership with Merseytravel and Merseyrail.

Scope of works

- Construction of a turnback facility at Liverpool South Parkway to allow an increase in the frequency of Northern Line services that run through Liverpool Central to eight trains per hour during both the peak and off peak; and
- 3rd party procurement of a replacement rolling stock fleet, with at least 30 more vehicles than currently available and appropriate deployment of these additional vehicles through train lengthening.

Significant interfaces

Merseytravel and Merseyrail fleet replacement strategy – it is assumed that the existing fleet will be replaced in CP5 with around 30 more vehicles than currently, and that provision for stabling and maintaining these vehicles will be made as part of this.

Key assumptions

The additional rolling stock is procured as an increment to the fleet replacement in CP5, and is funded publically via a 3rd party.

North West train lengthening

Operating route: LNW.

Output: capacity.

CP5 output driver

To accommodate continued passenger growth on routes into Manchester and Liverpool by:

- accommodating additional services; and
- accommodating longer trains.

Scope of works

- Platform lengthening on various lines of route into Manchester; and
- Hadfield - Dinting – Glossop – Manchester rail capacity.

Significant interfaces

- Northern Hub;
- Liverpool Lime Street S&C and resignalling;
- North West station renewals and maintenance programme;
- North West electrification;
- W10 gauge clearance Liverpool – Manchester via Earlestown; and
- new freight terminals (Port Salford & Parkside).

Key assumptions

- That the DfT support additional / longer local services in the Manchester area to accommodate passenger growth and as recommended in the Northern RUS;
- disruptive track access will be available;
- scope is subject to further development;
- for project development, it is unlikely that additional land purchase will be required, but Station Change or Network Change and internal property clearance will be needed;
- rolling stock will be available (the rolling stock will be made available if the additional paths can be created as part of this project) for longer trains (platform extensions); and
- stations will be able to accommodate additional passenger flows.

Bradford Mill Lane capacity

Operating route: LNE.

Output: capacity.

CP5 output driver

- To provide capacity, performance and journey time improvements between Halifax, Bradford and Leeds to meet RUS and Northern Hub outputs and to meet passenger growth;
- there are currently four services (in each direction) between Bradford Interchange and Halifax, and Bradford Interchange and Leeds; that is proposed to be increased to five services off-peak and six services in the peak;
- the Yorkshire & Humber RUS (option CV1) identified the need for an additional hourly passenger shuttle service between Halifax and Leeds to cope with future passenger growth forecasts; and
- the Northern RUS proposes a further 2tph in the high peak hour and recognises that infrastructure remodelling at Bradford and capacity improvements in the Halifax area (as part of the Halifax station capacity scheme) maybe required to support such a service.

Scope of works

- To identify the infrastructure enhancements required to facilitate parallel moves in and out of Bradford Interchange to / from Leeds and Halifax at the same time, avoiding conflicting moves to accommodate peak and off peak growth as identified in the Yorkshire & Humber & Northern Route Utilisation Strategies (RUS);
- the Yorkshire & Humber RUS recommends an additional crossover between platforms 1 & 2 at Bradford Interchange, this would offer capacity to address peak crowding on the Calder Valley line. The Northern RUS still supports this with further infrastructure intervention to relocate the existing Bowling Junction crossover close to Mill Lane Junction together with bi-directional signalling to accommodate the extra route; and
- this scheme will complete the revised layout originally started in CP3 (as part of the Bradford Mill Lane Junction remodelling scheme), which can only be completed when the area is resignalled and signalling interlocking capacity is increased. The signalling at Bradford Mill Lane and Halifax is due to be reconrolled from York IECC in CP5 and a key driver of this project is to deliver efficiently by aligning with the planned renewal.

Significant interfaces

- the Northern Hub programme;
- the Halifax Station capacity scheme; and
- resignalling of the Bradford and Halifax area in CP5.

Key assumptions

This scheme has a dependency on the planned resignalling scheme to recontrol Bradford and Halifax areas in CP5, and therefore it is a key assumption that the resignalling scheme will go ahead.

England & Wales – proposed projects – regional

NE014: Ferriby to Gilberdyke journey time, performance and capacity improvements

Ferriby to Gilberdyke journey time, performance and capacity improvements

Operating route: LNE.

Output: renewal led.

CP5 output driver

This scheme aims to take advantage of the opportunity to undertake enhancements in conjunction with planned signalling renewals between Ferriby and Gilberdyke in CP5. The project aims to provide journey time reductions and improve capacity for passenger and freight services to and from Hull, including:

- improved signalling infrastructure to enable increased linespeeds and reduced headways;
- an enhanced regulating facility in the Ferriby area in place of the existing Up slow line;
- possible increased turnout speeds at Gilberdyke Junction for services to / from the Goole direction; and
- longer hours of operation enabled through a reduction in the number of signal boxes and manned crossings.

Scope of works

- Enhancement of signalling between Ferriby and Gilberdyke, including conversion from Absolute Block to Track Circuit Block;
- rationalisation of signal boxes and manned crossings;
- potential remodelling of Gilberdyke Junction for higher speeds; and
- potential remodelling of the track layout in the Ferriby area.

Significant interfaces

- Planned signalling renewals between Ferriby and Gilberdyke in CP5; and
- journey time improvements between Leeds and Hull in CP4.

Key assumptions

- Level crossing requirements associated with the enhancement works will not prevent the achievement of project outputs or delay the project;
- the pattern of train service will continue in broadly similar form to now (with a possible increase in the level of train service between Leeds and Hull from one to two tph);
- there will be no change to traction and rolling stock used on the route;
- there will be no requirement for platform extensions at stations on the route;
- signalling renewals will take place in CP5 as planned, and will not be descoped;
- sufficient possession opportunities will be available to undertake the work;
- any required Listed Building Consents will be obtained; and
- the scope may be subject to further modelling / assessment.

Halifax station capacity

Operating route: LNE.

Output: capacity.

CP5 output driver

- The output driver of this scheme is to provide a turnback facility at Halifax, facing Leeds, which will improve capacity, performance and journey times between Halifax, Bradford and Leeds to meet RUS and Northern Hub outputs and to meet passenger growth forecasts;
- there are currently four services (in each direction) between Bradford Interchange and Halifax which are proposed to be increased to five services off-peak and six services in the peak. The turnback facility will enable a planned shuttle service to operate between Halifax and Leeds via Bradford Interchange;
- the Yorkshire & Humber RUS (option CV1) identified the need for an additional hourly passenger shuttle service between Halifax and Leeds to cope with future passenger growth forecasts; and
- the Northern RUS proposes a further 2 tph in the high peak hour and recognises that infrastructure remodelling at Bradford and capacity improvements in the Halifax area (as part of the Halifax station capacity scheme) maybe required to support such a service.

Scope of works

- To identify the infrastructure enhancements required to provide a turnback facility layout to accommodate the existing services and the additional services proposed by the Northern Hub and the Yorkshire & Humber RUS between Halifax and Leeds without having an adverse effect on functionality and performance; and
- the signalling at Bradford Mill Lane and Halifax is due to be recontrolled from York IECC as part of a CP5 planned resignalling scheme and a key driver of this Halifax Station Capacity scheme is to save time and cost by aligning this scheme with the planned signalling recontrol in CP5.

Significant interfaces

- The Northern Hub programme;
- the Bradford Mill Lane capacity scheme; and
- resignalling of the Bradford and Halifax area in CP5.

Key assumptions

This scheme has a dependency on the planned resignalling scheme to recontrol Bradford and Halifax areas in CP5, and therefore it is a key assumption that the resignalling scheme will go ahead.

Horbury Junction to Wakefield journey time improvements

Operating route: LNE.

Output: journey time improvements.

CP5 output driver

This scheme seeks to take advantage of the opportunity to undertake enhancements in conjunction with planned track and signalling renewals at Turners Lane Junction, Wakefield Kirkgate, Horbury Junction and Woolley Coal Siding in CP5. The scheme aims to provide journey time reductions and improve capacity for passenger and freight services on the route through Horbury Junction and Turners Lane Junction, including:

- improved operational flexibility and higher junction speeds; and
- reduced journey times between Wakefield Kirkgate and Barnsley.

Scope of works

- Remodelled track layout at Horbury Junction, with possible relocation of the junction functionality to the west end of Wakefield Kirkgate station with two pairs of parallel double lines diverging at the site of the existing Horbury Junction;
- remodelled layout at Wakefield Kirkgate with greater flexibility of platform utilisation;
- increased linespeed between Wakefield Kirkgate and Barnsley Station Junction up to a maximum of 80 mph; and
- increased operational length of platform 3 at Wakefield Kirkgate to accommodate trains up to 115 metres in length.

Significant interfaces

- Planned track and signalling renewals at Turners Lane Junction, Wakefield Kirkgate, Horbury Junction and Woolley Coal Siding in CP5; and
- this scheme also needs to take into account the outputs of a previous GRIP stage 3 study of the route between Sheffield and Leeds via Barnsley.

Key assumptions

- The pattern of train service will remain broadly in its current form;
- existing types of traction and rolling stock will continue to operate on the route;
- track and signalling renewals will progress in CP5 as planned;
- listed building consent will be obtained for any proposed alterations to Wakefield Kirkgate station.

Huddersfield station capacity improvement

Operating route: LNE.

Output: capacity.

CP5 output driver

Increase the capacity at Huddersfield Station for 4x23m vehicle services to / from Leeds and Manchester to meet passenger growth on the Manchester-Huddersfield-Leeds-York / Selby corridor.

Scope of works

- Potential construction of new through platform (number 9);
- potential extension of platform 1 eastwards to provide a longer Penistone bay (platform 2) to accommodate peak hour train lengthening on the Sheffield – Penistone route;
- potential extension of platform 4; and
- potential remodelling of the east end station layout to give longer platforms 5, 6 and 8 and access to the stabling sidings.

Significant interfaces

- Northern Hub;
- track renewals of platform 1, 4 and 8 planned in CP5;
- civils renewal of train shed roof in early CP5; and
- platform extension at Huddersfield platform 5.

Key assumptions

- Further options will be developed during GRIP stage 2 which could alter the scope of works detailed above;
- that the DfT support additional local services between Manchester and Huddersfield and between Huddersfield and Leeds to meet passenger growth; and
- disruptive track access will be available.

Leeds platform 0

Operating route: LNE.

Output: capacity.

CP5 output driver

To accommodate continued passenger growth in the Yorkshire area by enabling the operation of additional services and longer trains on the Skipton, Ilkley and Harrogate routes.

Scope of works

Provision of an additional platform adjacent to the existing platforms 1 to 5 in Leeds station.

Significant interfaces

- Other capacity improvement schemes in Leeds station;
- platform extensions in West Yorkshire;
- Neville Hill depot access improvements; and
- Northern Hub.

Key assumptions

- DfT support additional / longer local services in the Leeds and Sheffield areas to meet passenger growth and as recommended in the Northern RUS;
- disruptive track access will be available;
- scope is subject to further development;
- for project development, it is unlikely that additional land purchase will be required, but Station Change or Network Change and internal property clearance will be needed; and
- rolling stock will be available for longer trains and additional services, and an operational plan will be agreed between TOCs and DfT.

Leeds platform 17 lengthening

Operating route: LNE.

Output: capacity.

CP5 output driver

To accommodate continued passenger growth in the Yorkshire area by enabling the operation of longer trains on services to Castleford, Knottingley and Sheffield via Barnsley.

Scope of works

Lengthening of the existing platform 17 at Leeds to accommodate longer trains.

Significant interfaces

- Other capacity improvement schemes in Leeds station;
- platform extensions in West and South Yorkshire;
- Neville Hill depot access improvements;
- Nottingham to Leeds journey time improvements including Horbury / Wakefield remodelling; and
- Northern Hub.

Key assumptions

- DfT support additional / longer local services in the Leeds and Sheffield areas to meet passenger growth and as recommended in the Northern RUS;
- disruptive track access will be available;
- scope is subject to further development;
- provision of land for the stabling and servicing facilities will only have a moderate cost and any consents required will be gained within reasonable timescales;
- for project development, it is unlikely that additional land purchase will be required, but Station Change or Network Change and internal property clearance will be needed; and
- rolling stock will be available (the rolling stock will be made available if the additional platform capacity can be created as part of this project) for longer trains, and an operational plan will be agreed between TOCs and DfT.

Leeds station capacity

Operating route: LNE.

Output: station capacity.

CP5 output driver

To accommodate continued passenger growth in the Yorkshire area by enabling the operation of additional services and longer trains on local and inter-regional services.

Scope of works

Additional / longer platforms at Leeds station, which may include creating an additional through platform from existing bay platforms 13 and 14.

Significant interfaces

- Other capacity improvement schemes in Leeds station;
- platform extensions in West and South Yorkshire;
- Neville Hill depot access improvements;
- Nottingham to Leeds journey time improvements including Horbury / Wakefield remodelling; and
- Northern Hub.

Key assumptions

- DfT support additional / longer inter-regional and local services in the Leeds and Sheffield areas to meet passenger growth and as recommended in the Northern RUS;
- disruptive track access will be available;
- scope is subject to further development; and
- additional rolling stock will be available for the operation of longer trains and additional services, and an operational plan will be agreed between TOCs and DfT.

Micklefield turnback

Operating route: LNE.

Output: capacity.

CP5 output driver

Turnback facility east of Leeds in the Micklefield area.

Scope of works

Turnback facility east of Leeds in the Micklefield area.

Significant interfaces

- Huddersfield station capacity;
- Neville Hill depot access improvements;
- Nottingham to Leeds journey time improvements including Horbury / Wakefield remodelling; and
- Northern Hub.

Key assumptions

- DfT support additional / longer local services in the Leeds and Sheffield areas to meet passenger growth and as recommended in the Northern RUS;
- disruptive track access will be available;
- scope is subject to further development;
- for project development, it is unlikely that additional land purchase will be required, but Station Change or Network Change and internal property clearance will be needed;
- additional rolling stock will be available for the operation of longer trains and additional services, and an operational plan will be agreed between TOCs and DfT;
- S&C renewals are planned at Neville Hill in early CP5; and
- signalling renewals are planned at Horbury, Wakefield and Sheffield in CP5.

Neville Hill depot access improvements

Operating route: LNE.

Output: capacity.

CP5 output driver

To provide enhanced access arrangements for trains entering and leaving Neville Hill depot, including:

- a more flexible track and signalling layout to reduce vulnerability to operational disruption;
- improved ability to regulate and reorder train movements from Leeds station onto Neville Hill depot; and
- improved maintenance access to the infrastructure in the Marsh Lane / Neville Hill area.

Scope of works

- remodelling of S&C in the Marsh Lane / Neville Hill area and associated signalling and overhead line alterations; and
- provision of additional bi-directional signalling between Quarry Hill Junction and Neville Hill West Junction.

Significant interfaces

- This scheme aims to take advantage of the opportunity to undertake enhancements in conjunction with planned S&C renewals and refurbishment at Neville Hill West Junction; and
- schemes are also being developed for capacity improvements in Leeds station and journey time improvements between Leeds and Hull in CP4 and CP5.

Key assumptions

- The number of train movements on and off Neville Hill Depot will remain broadly similar to now; and
- the number of train services on the route between Leeds and Micklefield will increase in line with the Yorkshire and Humber RUS.

Sheffield station

Operating route: LNE.

Output: capacity.

CP5 output driver

In conjunction with planned signalling renewals the key outputs are:

- to remodel Sheffield station layout and its approaches to meet anticipated passenger and freight growth, improve route and station capability in terms of capacity, performance, operational flexibility, make best use of station capacity and the ability to maintain the infrastructure;
- ease crowding on local, regional and long distance services by allowing longer trains to operate to / from Sheffield making best use of track capacity;
- provide the ability for 4-car local and regional services from the south to reverse at Sheffield;
- allow terminating trains from the north to be lengthened to 4-car class 158;
- provision for through platforms to take 5 or 10-car x 26m long distance high speed services and also the ability to terminate these trains from the south;
- provision for Charter trains up to 300m in length with call on facilities for attaching locos; and
- retain pathing opportunities through the station.

Scope of works

- Potential of up new through platform faces with platform 2, 5 and / or 6 built out onto the existing sidings / loops / centre lines in order to provide a new platform through face and four car turnback facing north / south;
- potential for bi-directional signalling operation through all platforms from Nunnery Junction to Sheffield and Dore Station Junction; and
- potential of additional turnback facilities.

Significant interfaces

- Signalling interlocking renewals in CP5 and signal equipment renewals in CP6;
- Northern Hub including Hope Valley journey time improvements;
- Hope Valley signalling renewals;
- Dore and Totley signalling renewals, Dore Station Junction doubling and Dore South Curve extension (SFN scheme);
- Nottingham to Leeds journey time improvements;
- possible MML electrification and further journey time improvements;
- ongoing station renewal and maintenance activities in CP5;
- ongoing track maintenance and S&C renewals in the Sheffield station area; and
- CP5 HLOS South Yorkshire metrics including additional stabling.

Key assumptions

- Further options will be developed during GRIP stage 2 which could alter the scope of works detailed above;
- disruptive track access will be available; and
- scope is subject to further modelling.

England & Wales – proposed projects – regional

NE006: South Humberside main line capacity and journey time improvements

South Humberside main line capacity and journey time improvements

Operating route: LNE.

Output: renewal led.

CP5 output driver

This project aims to capitalise upon “once in a life time” enhancement opportunities on the back of planned asset condition driven signalling renewals to increase capacity and improve journey times on the South Humberside main line.

Scope of works

- Four minute planning headway between Humber Road Junction and Scunthorpe Foreign Ore Junction.

Significant interfaces

- Signalling renewals between Humber Road Junction and Scunthorpe Foreign Ore Junction.

Key assumptions

- Signalling renewals are to be estimated and funded separately;
- the planned renewals will take place in the same time frame as CP5;
- sufficient disruptive possessions will be available;
- no product acceptance or derogations will be required;
- there will be no requirement for statutory consents such as IPC;
- the scope of works is subject to further modelling / assessment;
- freight trains will be loaded to 70% in the down direction & 40% in the up direction;
- passenger services will remain as today;
- Keadby canal bridge is open to rail traffic at all times;
- no change in the requirements of the Northern RUS from DfT and Network Rail borne from the assumption that the Government energy policy will not change;
- the Northern RUS forecasted freight growth between the Humber ports & the Aire Valley power stations will be realised.

South Yorkshire train lengthening

Operating route: LNE.

Output: capacity.

CP5 output driver

To enable longer trains to operate on local services in South Yorkshire in order to accommodate continued passenger growth.

Scope of works

A programme of platform extensions to allow longer trains to operate on a number of rail corridors South Yorkshire.

Significant interfaces

- West Yorkshire train lengthening;
- Leeds station capacity improvements;
- Huddersfield station capacity;
- Nottingham to Leeds journey time improvements including Horbury / Wakefield remodelling; and
- Northern Hub.

Key assumptions

- DfT support additional / longer local services in the Leeds and Sheffield areas to meet passenger growth and as recommended in the Northern RUS;
- disruptive track access will be available;
- scope is subject to further development;
- for project development, it is unlikely that additional land purchase will be required, but Station Change or Network Change and internal property clearance will be needed;
- rolling stock will be available for longer trains for which operational plans will be agreed between TOCs and DfT; and
- stations will be able to accommodate additional passenger flows.

West Yorkshire train lengthening

Operating route: LNE.

Output: capacity.

CP5 output driver

To enable longer trains to operate on local services in West Yorkshire in order to accommodate continued passenger growth in the Yorkshire area.

Scope of works

A programme of platform extensions to allow longer trains to operate on a number of rail corridors in West Yorkshire.

Significant interfaces

- Capacity improvement schemes in Leeds station;
- South Yorkshire train lengthening;
- Huddersfield station capacity;
- Neville Hill depot access improvements;
- Nottingham to Leeds journey time improvements including Horbury / Wakefield remodelling; and
- Northern Hub.

Key assumptions

- DfT support additional / longer local services in the Leeds and Sheffield areas to meet passenger growth and as recommended in the Northern RUS;
- disruptive track access will be available;
- scope is subject to further development;
- for project development, it is unlikely that additional land purchase will be required, but Station Change or Network Change and internal property clearance will be needed;
- rolling stock will be available for longer trains for which operational plans will be agreed between TOCs and DfT; and
- stations will be able to accommodate additional passenger flows.

Proposed projects - power supply upgrade

Project Name	CP5 expenditure range (£m) (2011/12 prices)
LNE routes traction power upgrade	47 - 57
Anglia traction power upgrade	91 - 110
Kent traction power upgrade	19 - 22
South London HV traction power upgrade	31 - 37
Sussex traction power upgrade	70 - 84
Wessex traction power upgrade	68 - 82

LNE routes traction power upgrade

Operating route: LNE.

Output: capacity.

CP5 output driver

The main output driver for this scheme is the operational support of the train service on the LNE routes in the future. The driver for this scheme will be developed as the balancing requirement of service enhancements outside of the major current railway and growth schemes on the LNE routes. These include :

- CP5 renewals / policy adherence on the LNE routes;
- IEP driven traction power schemes;
- Thameslink KO2 AC schemes;
- Northern Hub schemes (where applicable); and
- Anglia traction power schemes.

Scope of works

The scope of work required to support this train service is being developed as part of the Route Asset Strategy process. At present the identified works are in the following packages:

- Newcastle to Berwick (traction reinforcement); and
- Hertford loop (traction reinforcement).

Significant interfaces

- The DfT's procurement programme for new and cascaded rolling stock;
- project NE004: Gordon Hill and Stevenage turnback;
- CP5 renewals / policy adherence on LNE routes;
- IEP driven traction power schemes;
- Thameslink key output AC schemes;
- Northern Hub scheme; and
- Anglia traction power schemes (CP4).

Key assumptions

- Train lengthening programmes will absorb all other costs associated with track / signalling / structures / stations etc.;
- power upgrades between Wood Green and Bawtry and at Ardsley are completed under the IEP programme (ECML); and
- Gospel Oak / Barking electrification is a “stand alone” scheme.

Anglia traction power upgrade

Operating route: Anglia.

Output: capacity.

CP5 output driver

The main output driver for this scheme is the operational support of the train service on the Anglia routes as per the client remit dated January 2011. This will enable operation of the full post-Thameslink Key Output 2 timetable and Crossrail running 12tph (high peak), 8tph (shoulder peak) and 6tph (off peak and weekends). It is to be assumed that all trains are running at maximum length.

Scope of works

- Upgrade of existing grid points on the West Anglia route;
- upgrade of grid points on the Great Eastern route;
- provision of new 400kV bulk supply point at Springfield and AT feeding Shenfield to Colchester (for CP5/6 service growth post Crossrail).

Significant interfaces

- Crossrail programme;
- Inter City Express train introduction (services to Cambridge / Kings Lynn);
- Thameslink (services to Cambridge); and
- West Anglia main line capacity increase.

Key assumptions

- Train lengthening programmes absorb all other costs associated with track / signalling / structures / stations etc.;
- Thameslink and Crossrail programmes progress according to their December 2010 timelines and provide the identified capability for any additional cascaded rolling stock;
- the Crossrail programmes provide full AT capability between Pudding Mill Lane and Shenfield;
- no infrastructure interventions have been identified to support the two extra West Anglia trains per peak hour into Stratford. This requirement will be covered by the more major scheme to provide additional facilities on the West Anglia routes;
- Gospel Oak to Barking electrification is progressed as a “Stand Alone” scheme;
- Barking grid cable reinforcement works are carried out under the Asset Management workscope; and
- requirements for Great Eastern route works are occasioned by the introduction of new rolling stock between Liverpool Street and Norwich.

CP5 Kent traction power upgrade

Operating route: Kent.

Output: capacity.

CP5 output driver

The main output driver for this scheme is the operational support of the train service on the Kent routes to enable operation of the full post-Thameslink Key Output 2 timetable, with all trains running at maximum length. This increases train lengths on most routes in Kent, either:

- directly by new Thameslink KO2 stock for Thameslink services; or
- indirectly through cascaded stock for non-Thameslink services.

KO2 will involve a complete timetable rewrite across a wide area. However in terms of power supply implications the key changes are likely to be as follows:

- Tonbridge main line: the peak only fast services to Cannon Street (4tph) will be replaced by trains to Thameslink (via London Bridge), utilising new KO2 stock. These will be 12-car fixed formations.
- Thameslink to Catford Loop: new KO2 stock will be used on all services (6tph). These will be 8-car fixed formations;
- Suburban lines: the KO2 stock used for the above two points will free up numerous existing units which will then be able to be cascaded onto the Greenwich, Bexleyheath, Sidcup and Hayes routes. Whilst the full timing of train lengthening is not yet known, it is anticipated that there will be extensive 12-car class 465 suburban operations by CP5 end, extending beyond Dartford to Gillingham. This lengthening programme is likely to continue into CP6;
- Hastings line: North of Tunbridge Wells all peak trains will be 12-car length. Trains to Hastings will continue to be restricted to a maximum 8-car length once south of Tunbridge Wells. More trains than today to / from Charing Cross will be formed by attachments / detachments of fast and slow portions running separately to / from Hastings, meaning more carriages in operation than today at certain times south of Tunbridge Wells. Also of relevance to power supply is that there are also strong drivers for reducing overall journey times to Hastings for the fast portion of this train.

Scope of works

The scope of work required to support this train service is being developed as part of the Route Asst Strategy process. At present the identified works are in the following packages:

- Grove Hill substation (conversion to 33KV); and
- traction power upgrade (Gravesend to Gillingham).

Significant interfaces

- The DfT's procurement programme for new and cascaded rolling stock;
- the completed CP4 platform lengthening programme;
- Thameslink Key Output 2 infrastructure;
- development work on the December 2018 timetable; and

- the journey time reduction programme.

Key assumptions

- Train lengthening programmes absorb all other costs associated with track / signalling / structures / stations etc.;
- the Thameslink scheme will progress according to their December 2010 timelines and provide the identified capability for any additional cascaded rolling stock;
- the CP4 delivery plan interventions to cater for the 12-car class 465 operation on all three routes to Dartford are completed. This includes the extension to Gravesend;
- this scheme will also cover works required for this operation on the Hayes branch and on the route to Chislehurst;
- the Gravesend to Gillingham upgrade works have been included on the assumption that no case is made in CP4 to allow 12-car class 465's to operate at power draw level equivalent to a 10-car class 465 (as currently operate on the Kent routes);
- the Canterbury FSC works will be carried by Asset Management;
- this scope does not provide any capability to allow the operation of 12-car beyond Tunbridge Wells to Hastings.

South London HV traction power upgrade

Operating route: Kent, Sussex and Wessex.

Output: capacity.

CP5 output driver

The main output driver for this scheme is the High Voltage network support of the train services on the Kent, Sussex and Wessex routes.

The key aim is to enable the traction power support for the operation of the following key service patterns alterations in the South London area:

- operation of the full post-Thameslink Key Output 2 timetable, with all trains running at maximum length on the Kent and Sussex routes;
- additional service alterations on the Sussex route;
- train service alterations and train lengthening on the Wessex routes into Waterloo; and
- future CP6 train service interventions.

Scope of works

The scope of work required to support this train service is being developed as part of the South London HV strategy (8th October 2010) and the Route Asset Strategy process. At present the identified works are in the following packages:

- Wimbledon grid point upgrade; and
- HV feeder upgrades in South London.

Significant interfaces

- The DfT's procurement programme for new and cascaded rolling stock;
- the completed CP4 platform lengthening programme;
- Thameslink Key Output 2 infrastructure;
- development work on the December 2016 timetables;
- the journey time reduction programme;
- other growth enhancement projects in the South London area; and
- New Cross Grid upgrade (CP4 delivery plan for completion in CP5).

Key assumptions

- Train lengthening programmes absorb all other costs associated with track / signalling / structures / stations etc.;
- the Thameslink programme and other schemes will progress according to their December 2010 timelines and provide the identified capability for any additional cascaded rolling stock;
- New Cross grid and feeder alteration will be complete by December 2015;
- the Staines grid point works do not take place in CP4;

England & Wales – proposed projects – power supply upgrade

DP021: South London HV traction power upgrade

- the Reading Grid point upgrade has not been included. This was a requirement of the Airtrack scheme; and
- Byfleet grid point will be developed in late CP5 (subject to service interventions noted for CP6 delivery). This has not been included in the funding request.

Sussex traction power upgrade

Operating route: Sussex.

Output: capacity.

CP5 output driver

The operational support of the identified “CP5 growth” train service on the Sussex routes as per the service pattern outlines received in October 2010.

Scope of works

The scope of work required to support this train service is being developed as part of the Route Asset Strategy process. At present the identified works are in the following packages:

- traction reinforcement: Gatwick to Brighton;
- traction reinforcement: West Coastway including feeder 3370;
- traction reinforcement: Streatham / Epsom Downs;
- traction reinforcement: Purley Area branches (Caterham / Tattenham Corner); and
- traction reinforcement: East Croydon to Victoria and suburban area.

Significant interfaces

- The DfT’s procurement programme for new and cascaded rolling stock;
- the completed CP4 platform lengthening programme;
- the CP4 traction power upgrade;
- Thameslink Key Output 2 infrastructure;
- development work on the December 2018 timetable; and
- the journey time reduction programme.

Key assumptions

- Train lengthening programmes will absorb all other costs associated with track / signalling / structures / stations etc.;
- the Thameslink programme will progress according to its December 2010 timelines and provide the identified capability for any additional cascaded rolling stock;
- the East Grinstead scope of work is completed in December 2011; and
- requirements due to Redhill additional platform works are not yet included.

Wessex traction power upgrade

Operating route: Wessex.

Output: capacity.

CP5 output driver

This scheme aims to provide operational support of future train service on the Wessex routes as per the client remit dated August 2010. The key aims are described as:

- operating 10-car trains between London Waterloo and Reading, at this stage assuming class 450 rolling stock and a stopping pattern consistent with current services.

Scope of works

The scope of work required to support this train service is being developed as part of the Route Asset Strategy process. At present the identified works are in the following packages:

- HV Feeders Aldershot area;
- Wessex TSU (Virginia water to Reading); and
- Isleworth / Bedford upgrade works.

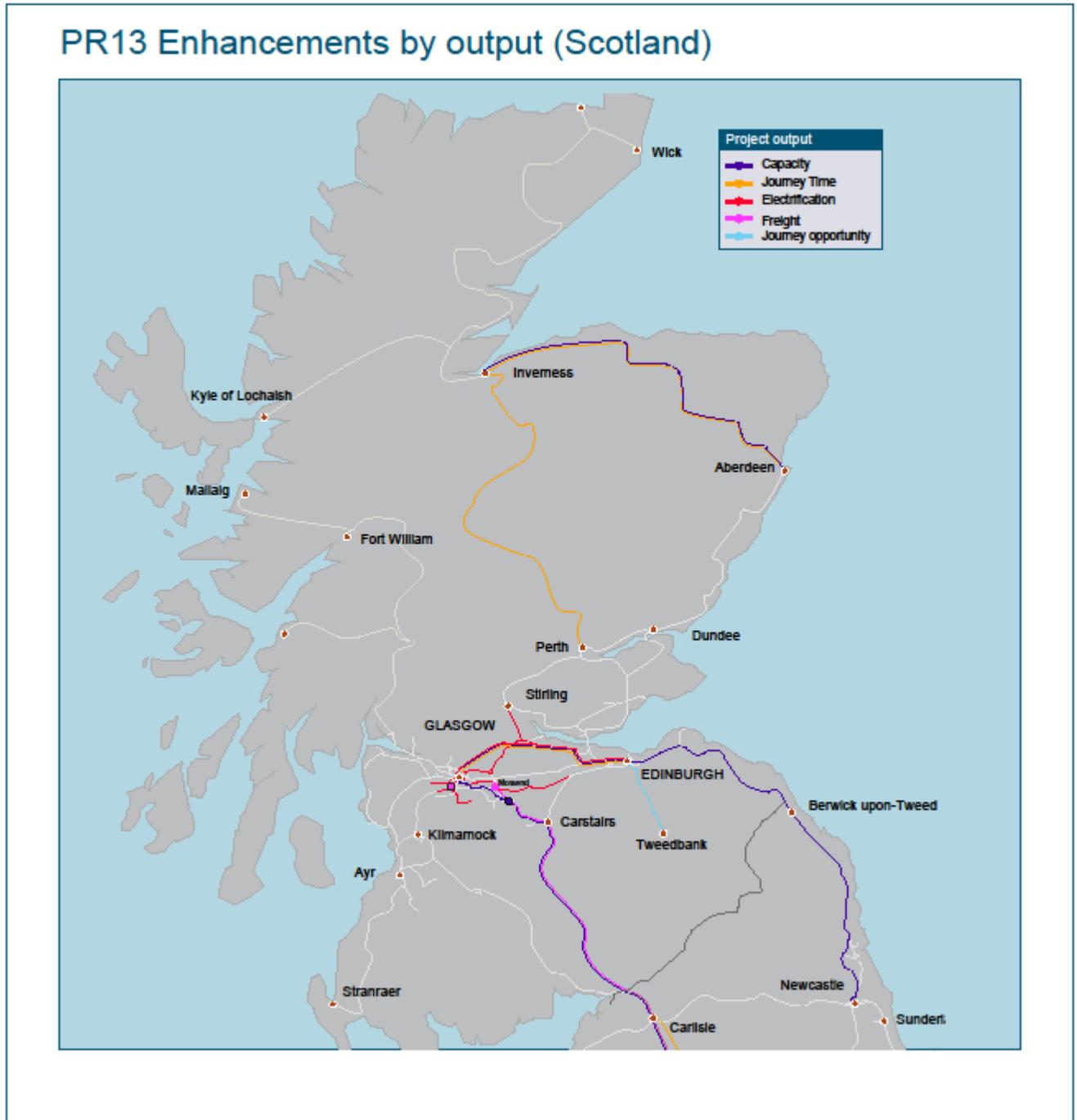
Significant interfaces

- The DfT's procurement programme for new and cascaded rolling stock;
- the completed CP4 platform lengthening programme;
- CP5 project: Virginia Water to Reading train lengthening;
- Reading station area redevelopment;
- the journey time reduction programme; and
- GWML electrification programme (Reading area).

Key assumptions

- Train lengthening programmes absorb all other costs associated with track / signalling / structures / stations etc.;
- Reading station area redevelopment and Great Western electrification schemes will progress according to their December 2010 timelines and provide the identified capability for any additional cascaded rolling stock;
- traction power on the West London Line is developed as a separate project;
- the development of the Basingstoke / Bournemouth re-electrification will be carried out by the Asset Management team in CP5; and
- the "Airtrack" proposals have not been included in this scheme.

Scotland



Scotland - committed projects

Project Name	CP5 expenditure (£m) (2011/12 prices)
Edinburgh – Glasgow improvements programme – infrastructure works	242
Edinburgh – Glasgow improvements programme – electrification	154

Edinburgh to Glasgow Improvements Programme (EGIP) infrastructure works

Output: capacity and journey time improvements.

CP5 output driver

The provision of more frequent and faster rail services between Scotland's two principal cities forms a key part of the Scottish Government's future transport strategy. This element of EGIP delivers the additional network capacity required to operate these enhanced services.

These will support an increase in service levels across all routes between Edinburgh and Glasgow from the six or seven services per hour, with a fastest journey time of around 50 minutes operating in 2007, to 13 services per hour with a fastest journey time of around 35 minutes by 2016.

Scope of works

- The following infrastructure projects are being developed to the end of GRIP stage 4:
- Glasgow Queen Street high level station capacity - extended platforms, station throat re-modelling and signalling headway improvements;
- Croy Station turnback;
- Greenhill Upper Junction enhancement - grade separation;
- Winchburgh Junction enhancement - upgrading of existing route to provide 100mph linespeed;
- Almond Chord - new chord linking the Winchburgh Junction to Dalmeny Junction route to the Edinburgh to Fife line;
- Haymarket to Inverkeithing signalling headways - signalling improvements to deliver 3 minute headways;
- Edinburgh Waverley station capacity - additional switch and crossing in the Mound Tunnel and station throat, signalling headway improvements and an east of Edinburgh turnback facility;
- Stirling area stabling facilities - new EMU stabling and cleaning facility in the Stirling area;
- Springburn turnaround improvement - additional S&C and cross-over to enable faster turnaround of Cumbernauld services to / from Queen Street low level station – to minimise the increase to journey times;
- Hyndland turnback; and
- Newton to Rutherglen enhancement - doubling of existing single lead north connecting line.

Significant interfaces

The following Scotland CP5 projects (confirmed as part of asset renewals workbanks) have been identified as relevant to EGIP, and works have been phased to combine scope and possession opportunities or de-conflict where scope or work-types are incompatible:

- Motherwell North signalling renewals (commissioning January 2015);
- Carstairs Junction re-modelling (2017/18); and

Scotland – committed projects

SC009: Edinburgh – Glasgow improvements programme – infrastructure works

- Motherwell phase 2 signalling renewals (commissioning January 2018).

Key assumptions

The key assumptions relate to the project requirements under the new Transport & Works Act Scotland (TAWs) process. This forms the basis of the project being granted the necessary statutory consents to enable the construction works to be progressed in line with the current programme. In broad terms it is anticipated that projects not requiring TAWs will be implemented during 2013 and 2014 and other projects will be implemented during 2015 and 2016.

Scotland – committed projects

SC001: Edinburgh – Glasgow improvements programme – electrification

Edinburgh to Glasgow Improvements Programme (EGIP) electrification

Output: electrification.

CP5 output driver

The provision of more frequent and faster rail services between Scotland's two principal cities forms a key part of the Scottish Government's future transport strategy. This element of EGIP delivers electrification of the E&G and its diversionary routes, as well as lines to Dunblane, Alloa and Grangemouth.

These will support an increase in service levels across all routes between Edinburgh and Glasgow from the six or seven services per hour, with a fastest journey time of around 50 minutes operating in 2007, to 13 services per hour with a fastest journey time of around 35 minutes by 2016.

Scope of works

The project comprises the electrification of the following routes within the Central Belt of Scotland:

- Newbridge Junction to Glasgow Queen Street high level via Falkirk High;
- Cowlares West / Cowlares South Junctions to Cumbernauld (including Eastfield LMD);
- Gartcosh Junction to Gartsherrie South Junction;
- Garnqueen North Junction to Gartsherrie South Junction;
- Cumbernauld to Falkirk Grahamston and Polmont;
- Grangemouth Junction to Fouldubs Junction; and
- Carmuir West / Carmuir East Junctions to Larbert, Stirling, Alloa and Dunblane.

The extent of the above works equates to 342stk's (single track kilometres) of new electrification, including provision of a new feeder station at Greenhill, clearance works for circa 62 foul structures and, immunisation of existing telecoms and S&T equipment.

Significant interfaces

The following Scotland CP5 projects (confirmed as part of asset renewals workbanks) have been identified as relevant to EGIP, and works have been phased to combine scope and possession opportunities or de-conflict where scope or work-types are incompatible:

- Stirling Middle S&C renewal (autumn 2013);
- Motherwell North signalling renewals (commissioning January 2015);
- Carstairs Junction re-modelling (2017/18); and
- Motherwell phase 2 signalling renewals (commissioning January 2018).

Key assumptions

OLE equipment will be new Network Rail OLE Design Series 2 – suitable for 100mph running, though dispensation is being sought for 110mph running without further modification. It is assumed that the project will deliver in 2016.

Scotland - proposed funds

Fund	CP5 expenditure (£m) (2011/12 prices)
Scottish small projects fund	30
Scottish stations fund	25
CP6 development fund (Scotland)	10
Level crossing initiative (Scotland)	42
Strategic freight network (Scotland)	50

Scottish small projects fund

Objective

The fund is a mechanism for funding minor schemes which can either be linked to renewals or stand-alone schemes, which have a positive whole-industry business case. It is primarily aimed at schemes that will result in an increase in the capacity or capability of the network.

For a scheme to be eligible for this fund it must meet the following criteria:

- it must satisfy the appraisal criteria based on a value for money assessment (using a methodology agreed with ORR and Transport Scotland) and consider the financial impact on each affected industry partner and the socio-economic benefits to society; and
- the net cost of the scheme (i.e. the amount that will be drawn down from the SPF) must not exceed £5 million, without the prior agreement of Transport Scotland.

Governance

The fund in CP4 is administered by the Network Rail Planning & Development Manager (Scotland) and it is proposed that this arrangement continue in CP5. Authorisation of draw down and spend is as set out in Network Rail's Investment Regulations but schemes are required to have been supported at the Scotland Route Strategy Planning Group and will generally have been discussed at Scotland Route Investment Review Group involving Transport Scotland and train operators.

Schemes to be implemented in CP5

It is expected that most schemes will involve incremental enhancements linked to renewals as this is likely to provide the greatest value for money. However, stand-alone enhancement schemes are also possible, including those part-funded by third-parties.

The fund can be used for improvement initiatives that deliver:

- improvements in train service performance that will benefit more than one party. This does not include initiatives that deliver sufficient schedule 8 benefits within a five year period to cover the scheme costs;
- reduction in train journey times, possibly as a result of line speed improvements; and
- platform lengthening.

The above list is not intended to be exhaustive.

Scottish stations fund

Objective

This fund is a mechanism for funding schemes to improve stations in Scotland. The purpose of the fund would be to achieve improvement to the passenger perception of stations and the accessibility at stations.

Governance

Industry governance arrangements are to be developed for CP5.

Potential initiatives for CP5

It is expected that the fund be used for improvement initiatives that deliver:

- reduced walking journey times at stations for instance by providing new entrances and exits to stations;
- station facilities improvements such as waiting rooms, shelters and customer information systems; and
- improved accessibility at stations.

CP6 Development fund (Scotland)

Objective

The fund would be primarily aimed at initial development for future schemes that would enhance the network in Scotland. Schemes would be developed to a point where a decision about next steps can be made with expected implementation of the schemes in CP6.

Governance

The fund would be administered by the Network Rail Planning & Development Manager (Scotland). Authorisation of draw down and spend is in accordance with Network Rail internal regulations by schemes would be required to have been agreed with Transport Scotland, supported at the Scotland Route Strategy Planning Group and been discussed at Scotland Route Investment Review Group.

Schemes to be developed in CP6

A list of schemes authorised to draw down from the fund will be developed as we progress through CP5.

Level Crossing initiative (Scotland)

Objective

The IIP proposes a fund for CP5 to improve safety at level crossings, recognising both the need to continually improve safety, and stakeholder concerns over this type of risk in particular. The objective is to deliver the following by the end of CP5:

- a reduction in level crossing risk by a minimum of 50 percent;
- a reduced number of incidents and accidents;
- improved stakeholder confidence; and
- improved awareness of level crossing safety risk.

This will be achieved by adopting a more interventionist approach to reducing risk and improving safety, focussing on closures, enforcement and innovation. Network Rail also plans for a more collaborative approach between it and operators, including joint assessments and inspections, and sharing responsibilities where this best improves safety.

Programme development is currently in the early stages, so a fund approach is deemed the most appropriate means to deliver the outcomes.

Governance

Industry governance arrangements are to be developed for this fund.

Potential initiatives for CP5

The proposed interventions to reduce level crossing risk include:

- closure of user-worked crossings on high speed main lines;
- implementation of miniature warning lights;
- enforcement of safe usage of level crossings;
- closure of some user worked crossings;
- upgrading Automatic Open Crossings Locally Monitored (AOCL);
- technology to improve user behaviour;
- campaigns and education; and
- closure of footpath crossings on main lines.

Strategic Freight Network (Scotland)

Objective

A number of measures will be required to accommodate growth in rail freight: more effective use of the existing network, coupled with targeted investments which demonstrate a robust business case. In the light of this, the Strategic Freight Network Steering Group (SFNSG) has recommended that a Scottish fund be established for CP5 similar to that which has been available in England & Wales in CP4.

Governance

In CP4, the Network Rail Director of Network Planning is the fund holder for SFN. Authorisation of draw down and spend is as set out in Network Rail's Investment Regulations but schemes are required to have been supported by the Strategic Freight Network Steering Group (SFNSG). This cross-industry group oversees the development of the SFN and consists of representatives from DfT, the Welsh Assembly Government, Transport Scotland, Freightliner, DB Schenker, GB Railfreight, DRS, the Freight Transport Association, Rail Freight Group and ATOC. It is proposed that these arrangements will continue in CP5.

Potential initiatives for CP5

Mossend capacity improvements

The recommendations of the Strategic Transport Projects Review were published on 10 December 2009. This project relates to Recommendation 27 – enhancements to rail freight between Glasgow and the border via West Coast Main Line. This recommendation seeks to improve capacity for rail freight between Scotland and England by providing enhanced facilities on the West Coast Main Line. This would include measures such as lengthening of loops, removal of speed restrictions below 75mph for freight trains, increasing loading gauge on the route and increasing freight terminal capacity. This project will increase capacity and improve the facilities of the freight terminal at Mossend.

The project is in an early stage of development. The following scope items are being considered, but the precise scope of works will be determined at the end of GRIP stage 3:

- extending the lengths of the loops adjacent to the main lines to 1000m (or minimum of 775m);
- improving the capability of the other loops at Mossend;
- provision of additional loops in the Carnbroe area between Mossend and Whifflet South Junction;
- installation of bi-directional signalling on parts of the network at Mossend and between Mossend and Whifflet South Junction;
- improving arrival and departure speeds from 5mph to 15mph;
- improving access to / from the Euro Terminal;
- segregating the PD Stirling terminal from DBS infrastructure; and
- ensuring that there is sufficient and fit for purpose capacity for NDS requirements.

It is assumed that the project will not provide new electrification or European GB gauges. It is also assumed that infrastructure will not be provided outside the Network Rail control boundary and that the current Euro Terminal access is fit for purpose.

Proposed projects

Project Name	CP5 expenditure range (£m) (2011/12 prices)		
Aberdeen to Inverness journey time improvements & other enhancements	189	-	198
Carstairs journey time improvements	45	-	54
Highland main line journey time improvements (phase 2)	31	-	37
Motherwell North resignalling enhancements	15	-	17
Motherwell area stabling	8.4	-	9.9
Portobello Junction capacity enhancements	16	-	19
Scotland traction power scheme	23	-	28
Scotland electrification (phase 2)	168	-	284

Scotland – proposed projects

SC002: Aberdeen to Inverness journey time improvements and other enhancements

Aberdeen to Inverness journey time improvements and other enhancements

Output: journey time improvements and capacity.

CP5 output driver

The principal driver for the project is the output of the Scottish Government's Strategic Transport Projects Review (STPR). The STPR defines the most appropriate strategic investments in Scotland's national transport network from 2012 to support the Scottish Government's purpose of promoting sustainable economic growth by planning the next 20 years of transport investment for Scotland's rail and trunk road networks.

This project aims to improve capacity and journey times by:

- providing an hourly service between Aberdeen and Inverness;
- enabling a journey time improvement of approximately 20 minutes;
- providing 2 trains per hour between Inverness and Nairn / Elgin also stopping at the new station to be provided at Dalcross and potentially Kintore; and
- retaining freight capacity.

Scope of works

The main elements of scope in development are:

- Dalcross Station: new station close to Inverness Airport;
- Kintore Station: new station to the West of Aberdeen;
- Forres layout: improve the track layout and signalling through Forres Station to combine dwell time at the platform with the crossing of trains;
- Keith layout: improve the track layout and signalling through Keith Station to combine dwell time at the platform with the crossing of trains;
- dynamic loops: consideration is to be given to the provision of dynamic passing loops at various locations;
- Inveramsay Bridge: consideration to be given to the replacement of this structure to improve the road layout and eliminate the operational impact associated with the current frequency of bridge strikes;
- Kittybrewster ground frame: automation of the ground frame at Kittybrewster to control the turnouts at Kittybrewster Yard leading to the Waterloo branch;
- timetable: development of timetable options required to support the objectives of journey time and service frequency; and
- linespeed increases: examination of existing infrastructure with a view to increases in linespeed to meet the journey time objectives.

Significant interfaces

The project does not interface with any other planned enhancement projects, however it will interface with the following renewals works:

- S&C renewal at Keith (2011/12) – incorporating planned linespeed improvement enhancement element;

Scotland – proposed projects

SC002: Aberdeen to Inverness journey time improvements and other enhancements

- Don Viaduct strengthening and repairs (2013/14); and
- track renewals at 40 locations (2011/12 to CP5) principally comprising rerail, resleeper (steel) – potentially 20miles of track renewals required that will facilitate project linespeed improvements.

Key assumptions

- Rolling stock to be used on the route will be class 158 and 170 Diesel Multiple Units (DMU's);
- class 170's are assumed to give marginally poorer performance and are therefore used to model the timetable in GRIP stage 2 to illustrate the worst base case;
- all trains travelling between Inverness and Nairn will call at Dalcross;
- timetable modelling assumes all trains stopping at Kintore to future proof the evaluation of crossing locations and infrastructure considerations;
- the location proposed within previous studies for Dalcross station will not alter significantly;
- the location proposed within previous studies for Kintore station will not alter significantly;
- reasonable provision of freight capacity will be required but not during peak periods;
- seasonal charter trains will continue to operate over the route;
- no requirement to introduce longer trains/lengthen platforms other than specified;
- trains will call at all existing stations; and
- the project is currently assumed to deliver by end 2016/17.

Carstairs journey time improvements

Output: renewal led.

CP5 output driver

The track and signalling at Carstairs Junction is due for renewal in late CP5. This project will examine the junction as a whole with a view to improving the layout at all three junctions around Carstairs to reduce journey times for both passenger and freight operators and increase capability on the route. In addition, the project aims to simplify the junction layout reducing the amount of infrastructure requiring maintenance in future years.

Scope of works

The GRIP stage 1 development work is currently examining the following scope:

- re-model the junctions at Carstairs by simplifying the layout to retain current functionality and at the same time deliver speed improvements over the junction including the removal of the current 15 mph restriction at the Station Junction;
- increase the speed over the Station Junction to 30 mph or to a higher speed;
- double track all legs of the junction to increase capacity; and
- improve the layout at Ravenstruther Coal Terminal between Carstairs and Lanark Junction to avoid the current requirement for wrong direction movements to and from the terminal.

Significant interfaces

- Track and signalling renewals planned in CP5 at Carstairs; and
- Haymarket to Carstairs journey time improvement project.

Key assumptions

- The project will not consider any options to move the existing station at Carstairs and the current two platform face island platform arrangement will be retained;
- the project has a dependency on the S&C and signalling renewals remaining in the CP5 workbank. Any deferral of these renewals may compromise the business case for the enhancement;
- agreements and consents will be required before the project enters GRIP stage 6; and
- it is likely that this project will deliver towards the end of CP5.

Scotland – proposed projects

SC011: Highland main line journey time improvements (phase 2)

Highland main line journey time improvements (phase 2)

Output: journey time improvements.

CP5 output driver

To provide enhanced infrastructure to facilitate further journey time improvements between Perth and Inverness.

Scope of works

The project will principally be a track project although strengthening works to structures and minor signalling system changes will also be required. The principal works are expected to be:

- re-alignment of track;
- renewal of jointed track with continuous welded rail;
- track formation treatment;
- bridge strengthening; and
- signalling system alterations.

Significant interfaces

The project will interface with the following planned renewals:

- steelwork repairs and repainting - UB 290/265 Findhorn Viaduct;
- structural infill - UB 290/346 Nairn Road; and
- re-rail, re-sleeper (steel) - HGL 1.

Key assumptions

The scope and costing for phase 2 are based on information in a previous GRIP stage 3 report. This is being re-worked and it is assumed that the scope described above is still accurate.

Motherwell North resignalling enhancements

Output: renewal led.

CP5 output driver

Potential enhancements elements of this project are driven by:

- a RUS identified requirement to enhance the network in the Motherwell North area, specifically the suburban commuter routes which are approaching capacity as a passenger growth area; and
- there are route aspirations for capacity enhancements further in the future, including electrification of commuter lines and increases in commuter service frequency; the desirability of considering opportunities for synergy in delivering potential enhancement initiatives alongside this project.

Scope of works

The scope of the renewals element of the project consists of:

- full renewal of all signalling equipment in life-expired route relay interlocking areas;
- re-control of interlocking areas from existing SSI to latest approved technology in line with signalling asset policy; and
- signalling control will be transferred to the West of Scotland Signalling Centre (WSSC).

The scope of the enhancements works is currently under development but could include improved capability at one or more of the following locations:

- turnback signal at Wishaw Station;
- turnback signal at Holytown Station;
- Rutherglen – Newton capacity improvements;
- R&C freight differentials and 3-aspect signalling;
- upgrade of Whifflet / Sunnyside goods line to passenger standard;
- Shotts 3-aspect signalling; and
- abolition of Garriongill crossover and provision of bi-directional signalling on the Up Main from Shieldmuir South Junction to Garriongill Junction.

Significant interfaces

The project will interface with the following CP5 enhancement projects:

- Mossend capacity enhancement;
- Motherwell area stabling;
- Carstairs journey time improvements; and
- Scotland electrification (phase 2) projects.

Key assumptions

- The existing GEC Geographical Interlockings at Carmyle, Fauldhouse, Hamilton, Holytown, Uddingston, Whifflet and Wishaw shall be renewed with Westlock Interlockings, which ensures continuity with the current systems at WSSC when control is transferred from MSC;
- the existing SSI controlled areas at Gartsherrie, Haughhead, Mossend (Burnhouse / South / Yard), Motherwell (North / South) and Newton (A/B) shall be re-controlled from WSSC via new Westlock Interlocking;
- GETS Modular Control System (MCS) shall be used as the control system, which is in line with the current technology in use at WSSC;
- VDU in the form of TFT screens shall be provided as the indication system and operations will be controlled by tracker balls, or approved "Mouse", and keyboards;
- it is preferred that all complex signals (heads and structures), within the interlocking areas that are proposed for renewal, shall be renewed in their entirety;
- no changes to the existing electrification system are anticipated as part of this project;
- no changes are envisaged to the current configuration of existing rolling stock within the area of the project, however this should be confirmed through consultation with the TOC/FOC representative; and
- it is intended that the majority of implementation will be from the start to the middle of CP5.

Motherwell area stabling

Output: capacity.

CP5 output driver

As per the work carried out in the early part of 2010 by Transport Scotland, this project will consider consolidation of all stabling and cleaning facilities at a single location (the former Motherwell TMD site) with a view to releasing some or all of the existing sites in current use for other purposes especially following the introduction of the class 380 trains. This is because the current stabling and cleaning of EMU and DMU fleets at Motherwell and the facility at each of these stabling locations is very basic, and not commensurate with the expected Service Quality regime. In addition, there is currently insufficient stabling capacity in the Motherwell area, and this requires daily ECS moves between York and Motherwell.

Scope of works

Scope under consideration is:

- direct access from Motherwell station (without the need to shunt to Braidhurst viaduct and reverse on the main line), including use of the sidings to the West of the depot as a proposed location;
- EMU and DMU stabling facilities;
- carriage cleaning facilities including door level walkways and water and power;
- CET facilities, possibly by use of a mobile plant that can access all sidings;
- carriage washing plant;
- maintaining road access to the depot;
- staff and store facilities (using Bathgate depot specification as guide); and
- passive provision for a four car road shed with basic maintenance facilities.

Significant interfaces

- Motherwell North signalling renewal project currently being developed for delivery in CP5; and
- the planned freight enhancement at nearby Mossend.

Key assumptions

It is assumed that the project can be delivered within the existing footprint of Motherwell TMD, recently acquired from DB Schenker.

Portobello Junction capacity enhancements

Output: capacity.

CP5 output driver

Portobello Junction was identified in the first Scotland RUS as a key constraint on this part of the Network, which could impact on future growth on the East Coast Mainline (ECML). Capacity from Portobello Junction towards Niddrie South Junction is currently restricted due to the single lead junction and the single line section from the ECML. Also, the approach control at EP610 signal is very slow and can impact on performance when trains are running out of course on the ECML to and from Edinburgh. In addition, the mainline crossover through Portobello Junction is restricted to a slow speed of 15mph.

Scope of works

Scope under consideration includes:

- the possibility of delivering an at grade junction through Portobello Junction;
- optimising diverging speed to a minimum of 40mph to enable the removal of the approach control on the mainline Portobello Junction;
- providing an additional platform at Brunstane capable of accommodating 6 x 24m vehicles on the route to enable the class 380 EMU stock to operate to Newcraighall;
- providing a crossover from the Niddrie South Junction line to the suburban route to allow improved access to the proposed new platform at Brunstane station;
- providing a crossover from the Niddrie South Junction line to the suburban route at the south end of Brunstane Station to allow traffic from the Millerhill direction to access the new platform, Leith South Yard, the East Depot Line at Portobello Junction and the ECML to Edinburgh;
- retaining bi-directional working over the suburban and Millerhill routes; and
- electrifying the suburban route clear of Niddrie West Junction to Portobello Junction with consideration of electrifying the Newcraighall turnback.

Significant interfaces

There are no specific interfaces with other CP5 enhancement projects. However synergies with other renewals and enhancements need to be monitored. In particular the Edinburgh – Glasgow Improvements Project (EGIP) for delivery by 2016 has proposals for a stabling facility in the Portobello or Millerhill area.

Key assumptions

- Leith South will continue as a bulk freight terminal and that there will be some commodity growth with routes required to: ECML south, Millerhill Yard and the suburban line;
- the Depot Facility Owner at Craigentenny LMD will require routes from the East Depot Line to: Niddrie South Junction / Millerhill and to the suburban line;
- Network Rail and the relevant operating companies will continue to require diversionary routes at Portobello Junction via Niddrie South Junction / Millerhill Yard and via the suburban line;

- the passenger service for the Borders Rail project will be formed by an extension of the existing Newcraighall terminating services and that the frequency will remain at 30 minutes with the morning and evening peaks;
- the current understanding is that the ScotRail franchise holder will stable DMU's overnight at Tweedbank station to avoid lengthy Empty Coaching Stock (ECS) mileages being accrued at the start and finish of each working day;
- the suburban line will remain as a strategic freight route with the capability to handle diversionary passenger services to and from Edinburgh Waverley station and the west via the Suburban Line as well as the ECML via Millerhill Yard; and
- it is anticipated that the majority of implementation will be from the middle to the end of CP5.

Scotland traction power scheme

Output: capacity.

CP5 output driver

The scheme aims to provide the operational support of train services on the Scotland routes in the future, including enabling the operation of the following in CP5:

- the introduction of IEP on the ECML between Berwick and the Edinburgh area to replace the existing class 91/Mk4 stock which operates 1/2 trains per hour.

Scope of works

The scope of work required to support this train service is being developed as part of the Route Asst Strategy process. At present the identified work is:

- Berwick to Edinburgh (traction reinforcement).

Significant interfaces

- The DfT's procurement programme for new and cascaded rolling stock;
- CP5 renewals / policy adherence on Scotland routes;
- the IEP driven ECML traction power upgrade;
- the renewals led WCPSU traction power upgrade;
- North West electrification;
- EGIP projects including electrification phase 1;
- Strategic Transport Projects Review Phase 2 electrification of the Glasgow South suburban network;
- Motherwell North resignalling;
- Motherwell South resignalling;
- Carstairs journey time improvements in conjunction with resignalling and S&C renewals;
- enhancements being developed within the above schemes through the Tier 3 development fund; and
- the journey time reduction programme.

Key assumptions

- Train lengthening programmes will absorb all other costs associated with track / signalling / structures / stations etc;
- the development and delivery of the ECML Traction Power scheme (IEP) enables continuous implementation of the works beyond Newcastle to Edinburgh;
- the alterations to the Saltcoats supply point are covered by the Kilmarnock scheme;
- the Shotts / Kilmarnock / Paisley / Rutherglen "infill" schemes are "stand alone" with respect to their traction power requirements.

Scotland electrification (phase 2)

Output: electrification.

CP5 output driver

The principal driver for the project is the output of the Scottish Government's Strategic Transport Projects Review (STPR). The STPR defines the most appropriate strategic investments in Scotland's national transport network from 2012 to support the Scottish Government's purpose of promoting sustainable economic growth by planning the next 20 years of transport investment for Scotland's rail and trunk road networks.

The further electrification of the rail network in Scotland is one of the interventions targeted by the Scottish Government. Specific objectives identified in further electrification include:

- reduction in carbon emissions;
- reduction in energy consumption of up to 20%;
- improved accessibility by providing opportunities for new routes and through services; and
- more efficient use of rolling stock.

Scope of works

The project is considering the infrastructure changes that would be necessary to install 25kV electrification on the following route sections:

- Holytown Junction - Shotts – Midcalder Junction;
- Rutherglen East Junction – Langloan Junction – Coatbridge Junction – Whifflet North Junction (R&C route);
- Corkehill Depot Junction – Crookston – Paisley Canal;
- Muirhouse Central Junction – Larkfield Junction – Busby Junction – East Kilbride, Busby Junction – Barrhead; and
- High Street Junction to Shields Junction (City Union Line).

Significant interfaces

Paisley Canal Line

- LLPA renewals at: Dumbreck, Corkehill, Mosspark, Crookston, Hawkhead and Paisley Canal stations. There will be synergies with the requirement to immunise the telecoms cabling along the route.

Shotts Line

- UB285/201 Cleland Viaduct: strengthening, masonry repairs and waterproofing (2014/15);
- Motherwell area resignalling phase 1 (2014/15);
- Kirknewton level crossing (2014/15);
- Carstairs Junction journey time improvements, to coincide with S&C renewals at Carstairs;
- Motherwell area resignalling phase 2 (2017/18); and

- restoration / enhancement of freight gauge.

GBK

- Kennishead platform renewal (both platforms);
- telephone concentrator renewals (2019/20); and
- renewal of lineside mains power cubicles.

If some or all of the sub-route sections included in Phase 2 are taken forward to implementation then it will be a requirement to interface with EGIP due to synergies and access strategy requirements. This last point is essential to minimise disruption on the Central Scotland rail network.

Key assumptions

A number of specific assumptions are detailed fully in the Project Requirements Specification and sponsor's remit, however a key assumption in developing the project is that the existing network layout will not be changed. In the study work done so far no increase in service frequencies on any of the sub-route sections has been considered. During GRIP stage 3 it will be necessary to undertake timetable modelling to identify any conflicts and constraints.