

Route Plans 2009
Route 26
Strathclyde and
South West Scotland



Connecting local communities



Network Rail helps bring Britain together. We own, operate and maintain the rail network, delivering improved standards of safety, reliability and efficiency.

Our investment programme to enhance and modernise the network is the most ambitious it has ever been. Delivering a 21st century railway for our customers and society at large.

Every day. Everywhere.

Route 26 Strathclyde and South West Scotland



Section 1: Today's railway

Route context

The Strathclyde and South West Scotland Route predominantly comprises the local Glasgow suburban rail network, the largest local passenger network in the UK outside London. These services operate in a mature market where quality of service and reliability are key to retaining and growing modal share. Reliable performance delivery is therefore of paramount importance to our customers and their passengers.

Long distance passenger traffic from the West Coast Main line via Carlisle and the East Coast Main Line via Edinburgh joins the route at Carstairs.

The route also serves a number of freight terminals, the most significant of which are Mossend and Coatbridge. The Kilmarnock to Gretna Junction section carries significant volumes of coal traffic from Ayrshire opencast sites and the deep-water terminal at Hunterston to English power stations.

Transport Scotland commissioned its Scottish Planning Assessment (SPA), as one of the inputs to the development of their strategy for rail in Scotland, and Network Rail published the Route Utilisation Strategy (RUS) for Scotland in March 2007. Both of these pieces of work have informed the High Level Output Specification (HLOS), which was published by Scottish Ministers in July 2007. This strategy details Network Rail's response to the outputs detailed in the HLOS.

Today's route

The principal elements of the Strathclyde and South West Scotland Route are described below. The relevant Strategic Route Section is shown in brackets:

- the Glasgow North Electric network from Helensburgh, Balloch and Milngavie in the west to Springburn and Drumgelloch in the east via Glasgow Queen Street Low Level (26.04);
- local diesel lines from Glasgow Queen Street High Level to Cumbernauld and Anniesland (26.12);
- the Scottish Central line from Motherwell to Greenhill Lower Jn via Mossend and Cumbernauld (26.10);
- the Argyle Line network (26.04) from points west of Partick to Motherwell via Bellshill (26.01) and Hamilton, Larkhall (re-opened in 2005), Coatbridge Central (26.10) and Lanark (26.11);
- the Glasgow South Electric network from Glasgow Central High Level to Neilston, Newton and the Cathcart Circle (26.09);
- the section of the West Coast Main Line between Glasgow Central High Level and Carstairs (26.01);
- local diesel lines from Glasgow Central High Level to Paisley Canal (26.06), Kilmarnock, East Kilbride (26.07), Whifflet (26.10) and Edinburgh via Shotts (26.02);
- the Ayrshire network from Glasgow Central High Level to Ayr and Largs (26.03);
- the Inverclyde network from Paisley to Wemyss Bay and Gourock (26.03);
- the South West network from Ayr to Stranraer (26.05) and Kilmarnock to Gretna (26.08) with connecting links between Kilmarnock and Barassie (26.08) and Mauchline and Newton on Ayr (26.13); and
- freight branches to Watsonhead, Deanside, Chalmerston, Killoch, Knockshinnoch and Greenburn (26.13).

Current passenger and freight demand

In recent years, Scotland's economy has been restructured away from the traditional manufacturing base towards a service led economy. As a consequence, Glasgow's population has been in decline since the 1960s although it has now stabilised. Key beneficiaries of this population outflow have been the adjacent council areas where significant additional demand has arisen on commuter services into Glasgow.

The Scottish Planning Assessment (SPA) and subsequent Scotland Route Utilisation Strategy (RUS) reported on current daily passenger numbers on a number of geographically aggregated sectors. For further information, see the published Scotland RUS at www.networkrail.co.uk. The information has been updated based on the most recently available data to give current daily passenger numbers using principal stations as shown in Figure 1.

The RUS also reported on current peak-hour load factors on individual service groups, averaged over the morning peak. The load factors for services that operate on this route are detailed in Figure 2, again updated based on the most recently available data.

31 percent of all commuting trips into Glasgow in the morning peak are made by rail. This is only just below the modal share achieved by rail in London where the problems of road congestion are much more acute. Some overcrowding is experienced on the Ayrshire corridor and East Kilbride Line, even though the majority of peak services are now worked by six-car formations. This is exacerbated by the growth of traffic at Prestwick Airport where rail has the highest modal share of passengers (30 percent) of any UK airport.

Freight traffic on the route is dominated by the coal traffic from Hunterston deep-water port in Ayrshire to Longannet power station which accounts for over four million tonnes per year. Following the closure of Scotland's last deep coal mine at Longannet in 2002 and the introduction of limits for sulphur dioxide emissions which can only be met by the use of imported and indigenous low sulphur coal, most of the power station's coal requirements are now fed by rail. This traffic, which is routed via Glasgow, Stirling and Alloa crosses a number of capacity-constrained sections on the route.

Figure 1 Current passenger numbers

Station	Daily Trips
Glasgow Central	66,004
Glasgow Queen Street	35,214
Partick	9,758
Paisley Gilmour Street	8,016
Charing Cross	6,792
Argyle Street	5,240
Ayr	4,427
Motherwell	2,635
East Kilbride	2,445
Mount Florida	2,434
Anderston	2,219
High Street	2,209
Milngavie	2,132

Figure 2 Peak loading

Service	Load Factor
East Kilbride	96%
Electrics – South West	94%
Barrhead/Kilmarnock	106%
Electrics – South East	67%
Electrics – North West	69%
Paisley Canal	55%
Cumbernauld	71%
Maryhill	29%

There is also a significant flow of imported coal from Hunterston and opencast coal from Ayrshire to English power stations of some four million tonnes per year, which is routed via the G&SW line.

In addition to these coal flows, significant volumes of wagonload, bulk cargoes and intermodal traffic are also carried, employing both diesel and electric traction.

Current services

Figure 3 shows the current level of service at peak and off-peak times.

The Strathclyde and South West Scotland network carries mixed traffic, with a significant range of speed, acceleration and stopping patterns of trains. On many corridors, this involves a complex mix of freight, urban, and inter-urban services with speeds up to 100 mph. There is little traffic segregation on the main corridors. As the route is predominantly two track with significant sections of single track, this leads to high levels of utilisation, imposing constraints on the timetable. Several sections of the route particularly around Glasgow and between Mauchline and Annan are operating at or close to capacity.

First ScotRail operates local passenger services in the Glasgow suburban area using a mix of electric and diesel trains. They also operate the South Western services as well as overnight sleeper services from Glasgow and Fort William to London Euston. Anglo Scottish daytime services from Glasgow Central are provided by Virgin Trains to, Birmingham and London and First Keolis TransPennine Express to Manchester. In addition, National Express East Coast (NEXC) operates to London Kings Cross via Carstairs and Edinburgh and CrossCountry run services to Birmingham and the South of England via Edinburgh.

DB Schenker, Freightliner Ltd, Freightliner Heavy Haul, Direct Rail Service (DRS) First GBRf , and Colas provide freight services over the route.

Figure 3 Current train service level (trains per hour)

	Peak	Off Peak
Glasgow Queen Street LL to Helensburgh	3	2
Glasgow Queen Street LL to Airdrie	6	4
Glasgow Queen Street HL to Cumbernauld	2	2
Glasgow Queen Street HL to Anniesland	2	2
Glasgow Central LL to Larkhall	3	2
Glasgow Central LL to Lanark	3	2
Glasgow Central HL to Neilston	3	2
Glasgow Central HL to Newton	3	2
Glasgow Central HL to Paisley Canal	2	2
Glasgow Central HL to Kilmarnock	2	1
Glasgow Central HL to East Kilbride	4	2
Glasgow Central HL to Edinburgh via Shotts	1	1
Glasgow Central HL to Whifflet	2	2
Glasgow Central HL to Wemyss Bay	2	1
Glasgow Central HL to Gourrock	4	3
Glasgow Central HL to Ayr	3	2
Glasgow Central HL to Largs	2	1

Figure 4 Tonnage

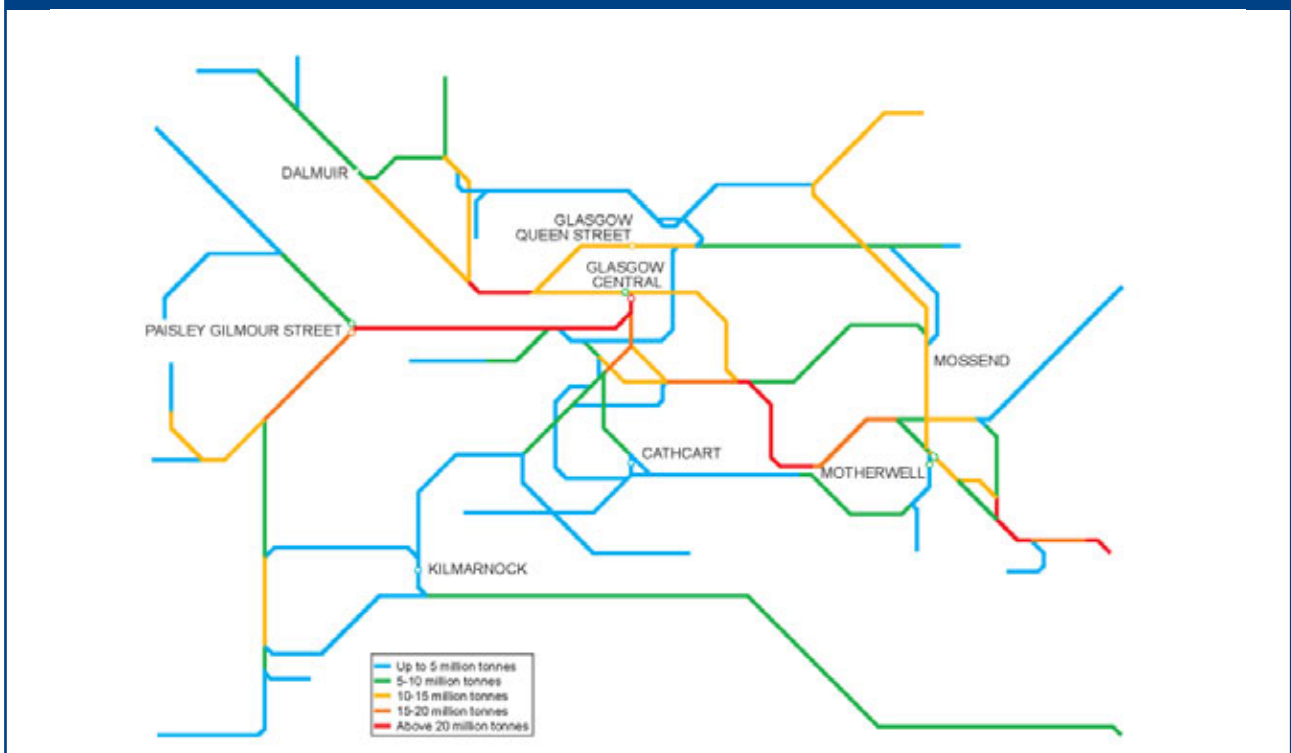


Figure 4 shows the total annual tonnage levels on the route.

Traffic volumes are summarised in Figure 5.

Figure 5 Current use			
	Passenger	Freight	Total
Train km per year (millions)	19	3	21
Train tonne km per year (millions)	2,919	2,863	5,781

Current infrastructure capability

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

Figure 6 Linespeed

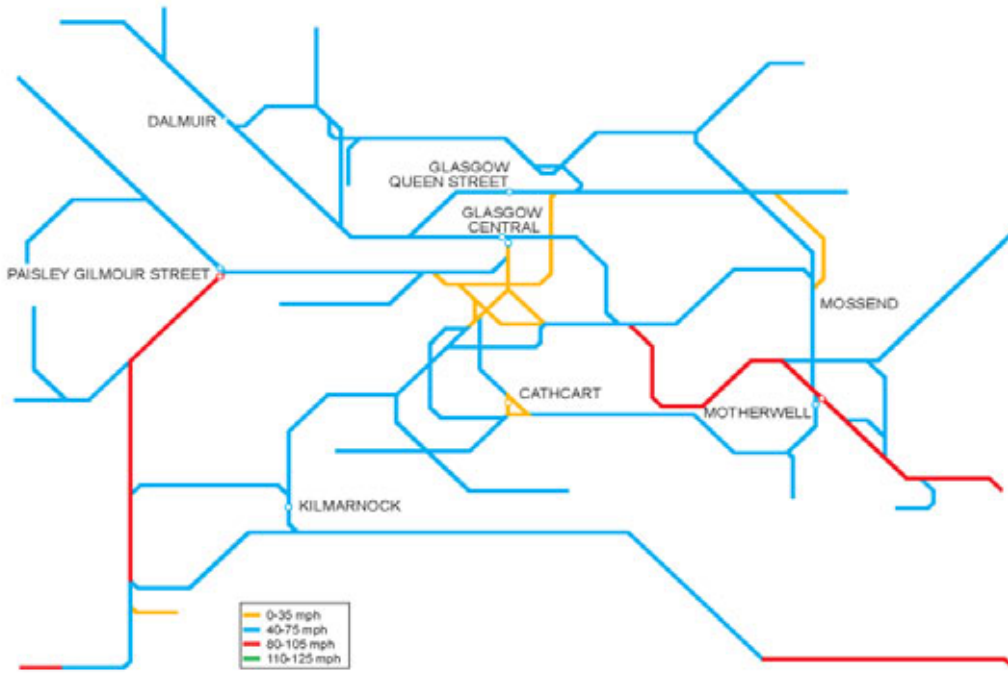


Figure 7 Electrification

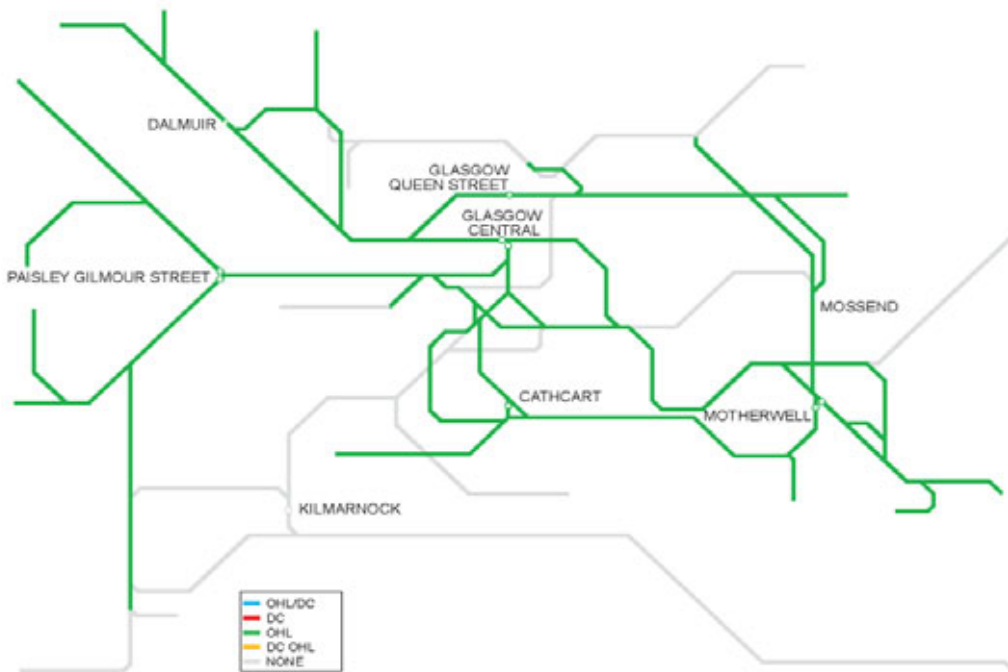


Figure 8 Route availability

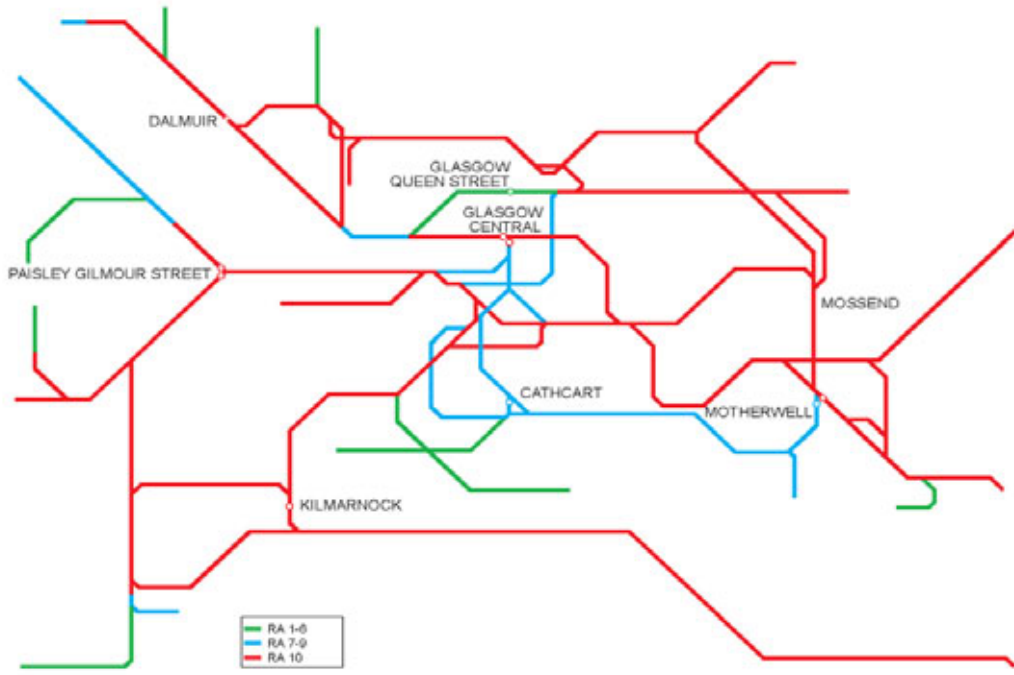


Figure 9 Gauge



Current capacity

The baselining work carried out as part of our Scotland RUS work has confirmed that there are a number of significant capacity constraints on the existing network. The most significant of these constraints for passenger services on this route are:

- the congested approaches to Glasgow Central High Level station (26.01/26.03), particularly the Muirhouse – Bridge Street section;
- the congested section between Finnieston and Hyndland (26.04);
- the congested section between Paisley Gilmour St and Glasgow Central High Level (26.03);
- restrictive platform lengths at a number of stations, most significantly Glasgow Central High Level and stations on the line to Kilmarnock (26.01/26.07);
- 13 single line sections across the route;
- key single lead junctions at Westerton (26.04), Bellgrove (26.04), Newton (26.01) and Busby Junctions (26.07) ; and
- lack of Stabling Capacity at Motherwell (26.01) and Ayr Townhead (26.03)

In addition to the above, key constraints for freight services are:

- the single line section between Mauchline and Newton on Ayr (26.08);
- a lack of stabling capacity at Mossend (26.10) and Falkland Yards (26.03);
- restrictive loading gauge and route availability particularly on the Shotts line; and
- lack of passing loops of adequate size to accommodate current maximum train lengths. This is particularly acute between Paisley and Hunterston (26.03) and Gretna and Kilmarnock. (26.08).

Current performance

Figure 10 shows the forecast 2008/09 PPM for Period 10 for the main Train Operating Companies (TOCs) running along the route.

Performance across Scotland has improved dramatically over the last four years with a circa 35 percent reduction in delay minutes leading to an improvement in First ScotRail's PPM from 83.1 percent to over 90 percent.

To achieve this, the focus has been on attention to detail particularly the reliability of strategic points and signalling equipment at key nodes.

Traditionally the Autumn period has resulted in a significant dip in performance. Weather conditions during 2008 have contributed to a worsenment in performance during Autumn 2008. Despite this improvements in other aspects of performance have meant that overall performance is still better than the same period in 2008.

The route is characterised by a large number of flat junctions and single line branches. For example, a train between Milngavie and Lanark (via Hamilton), a distance of 37 miles, traverses eleven flat junctions with three single line sections including one at each end of the journey. Thus, any delay can have serious knock-on effects across the network. To minimise this, enhanced maintenance regimes for strategic points and signalling equipment at these key nodes have been implemented.

Long distance high speed and slower local stopping passenger services jointly operate over a number of sections of this route. This mix of traffic can lead to performance problems during times of perturbation. We continually review the contingency plans for individual service groups in partnership with our train operating customers to make certain that overall delay is minimised in the event of any incident and allow normal services to be resumed as soon as possible. These enhanced plans have recently been introduced for North Electric and South Electric services. We are also undertaking reviews of the timetable on individual parts of the network to identify where adjustments would result in an improvement in service reliability. The Paisley Canal line has been identified as an area where such changes would deliver performance benefits.

On the G&SW and East Kilbride lines some alterations have been made to the timetable to improve the reliable operation of the train service.

Figure 10 2008/09 PPM

TOC	Forecast MAA	As at period
CrossCountry	89.8%	10
First Keolis Transpennine Express	90.2%	10
First ScotRail	90.7%	10
National Express East Coast	86.5%	10
Virgin Trains	81.3%	10

The freight companies continue to strive to reduce delays associated with the coal trains from Hunterston and the Ayrshire coal loading points following some hard work by the Freight Operating Companies to reduce their terminal delays.

There is an integrated control located within Buchanan House in Glasgow to enable prompt and effective response to any incidents in order to mitigate subsequent delays. We will continue to work with First ScotRail, the principal train operator in Scotland, to provide rapid decision making during perturbed working to enable a return to normal working as quickly as possible. The control centre delivers effective real time management of planned and un-planned disruptive events, to minimise the impact on passengers.

A multi-million pound signalling centre (West of Scotland Signalling Centre) and maintenance depot was completed and commissioned in December 2008 at Cowlairs, North Glasgow, providing modern facilities to meet the changing needs of a modern railway. The new signalling centre serves the west of Scotland and has renewed a 45 year old system and relocated staff to custom-built 21st century facilities. The new maintenance depot replaced a range of facilities around Glasgow which Network Rail inherited from maintenance companies

A number of initiatives are being progressed on this route to effect performance improvements.

Examples of these are:

- enhanced possession availability in the Glasgow Central (26.01) area to improve maintenance access opportunities;
- renewal of hydraulic point motor hoses on the North Electric lines (26.04);
- flood mitigation works at a number of locations
- anti-vandal measures at feeder stations and track section cabins;
- enhanced vegetation management regimes;
- improved maintenance plans with specialised teams to target repeat failures;
- improved operations planning to remove conflicts in the timetable; and
- ground position signals being replaced with LED signals.

Section 2: Tomorrow's railway: requirements

Future demand in CP4

Rail passenger demand has increased significantly in the last few years, reflecting increased employment, especially in Glasgow, and as a consequence of increased road congestion.

The Scotland RUS forecast an annual growth rate across Scotland averaging three percent per annum in passenger miles and this has been reflected in the Scotland HLOS. Our analysis indicates that this will not be evenly spread but that growth will be greater on the Ayrshire and Argyle lines and less on other lines on this Route.

Increased passenger demand will also occur on services on this route from the following major rail enhancement schemes between 2010 and 2013:

- Cumbernauld electrification (26.12);
- Airdrie to Bathgate (26.04/24.03); and
- Glasgow Airport Rail Link (26.03).

We are currently discussing the level of additional demand that each of these will generate with the individual scheme promoters.

In addition to the above additional demand generated by specific major projects, the RUS forecasts that the services that operate over the route will enjoy passenger growth as the economy expands. This arises largely as a result of the significant regeneration works planned for the inner areas of Glasgow including advance works for the Commonwealth Games in 2014, combined with the associated forecast employment growth. Significant population growth is therefore predicted in the small and medium sized towns in the adjoining areas. These changes are supported by Local Structure Plan policies which seek to deliver plan-led expansion in many of these areas. A key component of these policies is the provision of high quality rail links into Glasgow, including longer trains on the Ayrshire services. Stabling capacity for the new longer trains on the Ayrshire services and subsequent cascade of traction to other parts of the route will require increased and improved facilities. Options at various key locations are currently being investigated.

The RUS reported on projected daily passenger numbers on a number of geographically aggregated sectors during the morning peak period over the next 20 years. For further information, see the published Scotland RUS at www.networkrail.co.uk.

Future freight demand on the route is forecast to grow now that Scottish Power is in the process of fitting the necessary Flue Gas De-sulphurisation equipment at Longannet power station meeting the requirements of the emissions control directive. This will permit the use of Scottish open cast coal and guarantee the plants future beyond 2015.

Other factors that will affect future freight demand on the route are the increased use of rail on trunk flows within the logistics chain, the national recycling strategy, the construction of the associated waste transfer stations and the availability of grants towards the creation of new freight terminals.

To continue to meet the changing needs and demands of the modern railway, control of Paisley Signalling will transfer into the new purpose built signalling centre at Cowlairs in 2012.

Future demand beyond CP4

Sustainability is at the heart of the improvements we are delivering between now and 2014, and it is integral to the Government's long-term rail strategy. Sustainability demands a broader look at priorities for the railway alongside other modes, to find the best balance between the needs of the economy, society and the environment. Our ambitions are for a railway that contributes to the economic success of the nation by enabling more people and freight to travel in a way that minimises the environmental impact; a railway that is flexible enough to adapt and respond to social changes, protecting the network and improving its ability to operate for longer in the day and more consistently over the working week; a railway that is easy and accessible to use, and one that is built on stable foundations of safety, reliability and sound finance.

Transport Scotland published the Strategic Transport Projects Review (STPR) in December 2008 considering options for improvement to the Transport infrastructure in Scotland beyond 2012. The proposals include 11 major packages of work targeted at improvements in rail infrastructure. Of these, two fall within Route 26 they are:

- West of Scotland Strategic Rail Enhancements
- Rail enhancements between Inverclyde, Ayrshire and Glasgow

Network Rail and Transport Scotland will continue to work together to develop these options to increase capacity and improve capability on the network.

Section 3: Tomorrow's railway: strategy

Figure 11 summarises the key milestones during CP4 and CP5 in delivering the proposed strategy for the route.

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

Figure 11 Summary of proposed strategy milestones			
Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
Dec 2009	G&SW enhancements	Redoubling of Gretna/Annan and signalling improvements Annan/Mauchline	Performance and capacity improvements
Dec 2009 ²	South Electrics recast	Nil	Improved reliability of Glasgow South electric services
Dec 2009	G&SW/Stranraer Recast	Nil but facilitated by G&SW enhancements above.	Stranraer services separated from Glasgow/Carlisle/Newcastle services to better match passenger demand and improve reliability
Dec 2009 ²	Glasgow/Kilmarnock	Construction of extended loop from Lugton to Stewarton and extension of platforms to six-car	Two trains per hour Glasgow to Kilmarnock service with some peak services six-car
Dec 2009 ²	Edinburgh/Glasgow via Shotts		Hourly Semi Fast Glasgow Central/Edinburgh Waverley via Shotts
Dec 2010 ²	New Rolling Stock (Ayrshire)	Platform extensions Additional Stabling/Maintenance Capacity	Reduced journey times and longer trains to increase seating capacity
Dec 2010	Airdrie/Bathgate	Construction of new line	Four trains per hour Glasgow Queen Street Low Level to Edinburgh via Airdrie and Bathgate
May 2013 ²	Glasgow Airport Rail Link	New branch line between Paisley and the airport, together with enhancements	Four trains per hour Glasgow Central to Glasgow Airport

¹ Provision of additional services via Shotts will require significant infrastructure improvements on the common sections of route.

² Impacts on Glasgow Central capacity (See Section on Current Capacity)

Figure 11 Summary of proposed strategy milestones			
Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
		between Glasgow Central and Paisley	
Dec 2013 ^{1, 2}	Edinburgh/Glasgow via Carstairs	See Note 1	One train per hour Semi Fast Glasgow Central/Edinburgh Waverley via Carstairs
Dec 2013	Cumbernauld Electrification	Construction of "Garngad" chord and electrification of Alexandra Parade to Cumbernauld line Additional City Centre Turnback Facility	Diversion of Glasgow to Cumbernauld service to Glasgow Queen Street Low Level and integration with North Electric services
Dec 2016 ²	Whifflet Electrification	Electrification and upgrading of Rutherglen to Whifflet	Diversion of Glasgow to Whifflet services to Glasgow Central Low Level and integration with existing Argyle Line services
Dec 2017 ²	Paisley Canal Electrification	Electrification of Corkerhill to Paisley Canal	Integration of the Paisley Canal Branch into the wider Glasgow South electric network.
Dec 2018 ²	East Kilbride Electrification	Electrification of Muirhouse to East Kilbride	Integration of the East Kilbride Branch into the wider Glasgow South electric network.
Dec 2018 ²	Barrhead Electrification	Electrification of Muirhouse to Barrhead	Integration of the Barrhead Line into the wider Glasgow South electric network.

Strategic direction

Improved use of the rail network is a central element of Scottish Ministers' plans for effective delivery of its rail objectives. Scottish Ministers published Scotland's Railways in December 2006, which promotes sustainable economic growth and sets the context for the development of sustainable transport solutions for Scotland over the next 20-25 years. This strategy promotes connectivity between major towns and cities, supports faster journey times on key routes and aims to improve quality, accessibility and affordability of Scotland's railways as well as reducing emissions.

From this strategy, Scottish Ministers' published a High Level Output Specification (HLOS) in July 2007. The HLOS detailed Scottish Ministers' aspirations for the rail network between March 2009-2014 which include:

- the delivery of services that minimise the impact on the environment and make sure that rail is a real alternative to road and air travel for passenger and freight travel and environmentally superior both within Scotland and for cross-border journeys;
- partnership working between Network Rail, First ScotRail, Transport Scotland, Regional Transport Partnerships, local authorities and other key stakeholders;
- the promotion of integrated, innovative and efficient working practices both in respect of current operations and network planning
- the promotion of integration between transport modes and the provision of effective, secure interchange facilities;
- a reduction in the time taken to progress projects from feasibility to delivery; and
- continued improvements to operational and financial performance, including improved resilience.

The HLOS specified outputs in three 'Tiers.' Tier 1 requires the existing network to be retained with the ability to cope with known growth and performance improved. Tier 2 specifies specific major projects for development and delivery while Tier 3 includes the development of further enhancements. Tier 1 includes a Small Projects Fund to support growth through measures to improve capacity or capability or performance. Table 18 includes schemes currently identified which appear to fit within this category. Tables 17 and 18 indicate within which tier each project falls.

On behalf of the rail industry, Network Rail published the Scotland and Freight Route Utilisation Strategies (RUS) in March 2007. These documents summarise the current operating restrictions on the network and analyse future growth and the impact on rail. A number of options have been proposed, which will address the current and predicted restrictions on the network. These options set out the strategic direction for the rail infrastructure over the next 10 years. Within Route 26, these options predominately focus on additional capacity on the approach to and within Glasgow Central High Level Station, additional capacity on the Ayrshire corridor by operating longer trains, platform extensions and/or selective door opening and increased freight capacity on the G&SW route between Scotland and England.

We have delivered improvements to the G&SW route consisting of the redoubling of the eight miles between Gretna and Annan and continue to work towards installing four additional signal sections which collectively will reduce the current circa 30 minute headway on the route to circa 15 minutes. We expect to commence delivery during 2009/10.

On behalf of Transport Scotland we are upgrading the line between Barrhead and Kilmarnock to provide sufficient capacity to operate a half hourly service in each direction with the ability to use six-car formations at peak periods by December 2009.

Scottish Ministers are committed to the following further projects included within Tier 2 of the HLOS which are being developed and delivered: re-instatement and electrification of the Airdrie – Bathgate line and construction of the Glasgow Airport Rail Link (GARL). This consists of a new line between Paisley and Glasgow Airport with the upgrading of the existing line between Glasgow and Paisley and improvements at Glasgow Central. Network Rail is currently constructing the Airdrie to Bathgate line and delivery of the works has now started with a target completion of December 2010.

As far as GARL is concerned, Network Rail is currently developing the improvements to the existing network and to provide the rail infrastructure on the branch from Paisley to the airport. This aligns closely with the renewal of the signalling in the Paisley area and considerable synergies are being achieved by integrating these two pieces of work. We are also working closely with Transport Scotland, which is responsible for the construction of the viaducts etc on the new branch. The target completion date for this is May 2013. Advanced works have now commenced.

Following the recommendations included in the Scotland RUS and the Strategic Transport Projects Review we have been working with Transport Scotland and First ScotRail on plans for the provision of improved services between Glasgow Central and Edinburgh Waverley. It is anticipated this will move towards providing two trains per hour with a journey time of around 65 minutes. Full implementation of this will require considerable infrastructure upgrade particularly between Rutherglen and Newton and additional rolling stock, but it is planned to deliver an additional semi-fast service via Shotts by 2009. This will help to provide extra capacity between the two cities as well as improving the link between North Lanarkshire (particularly the development area of Ravenscraig) and Edinburgh. This is part of the Edinburgh to Glasgow Improvement Programme (E.G.I.P.) described in more detail in Route 24.

Much of the Glasgow suburban network is already electrified but it is anticipated that over time the proportion of electrified railway will continue to grow. The line between Rutherglen and Whifflet is targeted as a useful in-fill scheme. This will permit the better integration of the Glasgow to Whifflet service with the remaining Lanarkshire services (possibly including a major recast of existing services) and, by diverting the trains to Glasgow Central Low Level, will free up some capacity at Glasgow Central High Level. Taking account of the planned enhancements, the long-term strategy, mentioned in the Scotland RUS to increase capacity at Glasgow Central needs to be developed in more detail. For further information, see the published Scotland RUS at www.networkrail.co.uk.

Similarly north of the Clyde, we plan to continue the development work on the option to electrify the Cumbernauld line which, together with the construction of a short piece of new railway known as the Garngad chord, would allow the Glasgow to Cumbernauld service to be diverted to Glasgow Queen Street Low Level, freeing up capacity at the High Level station.

Contributions from the discretionary fund, which was established in CP3, allowed enhancements to be progressed subject to a suitable industry business case. A number of freight related schemes are being funded from this source

In CP4 the discretionary fund will be replaced by the Small Projects Fund (SPF) in Scotland. A key feature of this funding provision is the ability to provide minor enhancements at the same time as major renewals are undertaken. In CP4 we anticipate this will include redoubling of Busby Junction in 2013, improvements to the crossovers on the Inverclyde lines, signalling enhancements to the Shields to Paisley Corridor and additional signalling at Dumfries. Other enhancements will be identified as the renewal programme is developed in more detail.

The provision of a new turnback siding west of Charing Cross (known as "Finnieston Turnback") is now being progressed as part of the EGIP programme.

Project Development Fund

This fund will be available in CP4 with the primary purpose being the initial development of projects as detailed within the Strategic Transport Projects Review (STPR). Other industry partners can also suggest projects but these will only be progressed if endorsed as appropriate by Transport Scotland.

Level Crossings

The term level crossing (LC) describes an intersection at the same elevation of a road, footpath or bridleway and one or more rail tracks. The Office of Rail Regulation (ORR) classify LCs as either active or passive, depending on whether warning is given of a train's approach. There are over seven thousand crossings on Network Rail infrastructure and seventeen different classification types, ranging from full road width barriers to footpath. There are 62 level crossings of various types on this route. Our general policy is to close level crossings where practicable to enhance safety but a secondary benefit of this is that it may assist in our ability to increase line speeds thereby reducing journey times. Moss Road Level Crossing (26.04) has been upgraded from a user worked crossing to automatic half barrier. In addition to this there are two level crossings scheduled to be renewed on a like for like basis at Gailles (26.03) and Ardmore East (26.04). Work at both crossings is scheduled to take place in 2009/10.

There are a number of potential developments (e.g. housing) on the route, where there could be an opportunity to upgrade, or close level crossings subject to suitable funding and planning constraints. There are two such crossings, both automatic open crossings, which

are locally monitored, at Ardrossan. The combined rail and road traffic movement determines the maximum line speed at this type of crossing and will have to be monitored as the development progresses.

Network Rail is about to undertake a User Worked Crossing (UWC) National Closure Programme with the objective of having 150 UWCs across the network closed and removed by March 2010. There are 3 UWCs identified in Route 26 associated with this closure programme.

Network Rail is also involved in raising awareness of the dangers of level crossings particularly in rural areas, e.g. by making regular safety presentations at the Royal Highland Show. The type of level crossing will reflect the traffic on a particular route. Where there is a substantial increase in frequency or speed over a level crossing the risk assessment will have to be revisited and some crossings may require to be upgraded.

Listed below is a breakdown of the level crossings on Route 26 detailing the types and where they appear on the route.

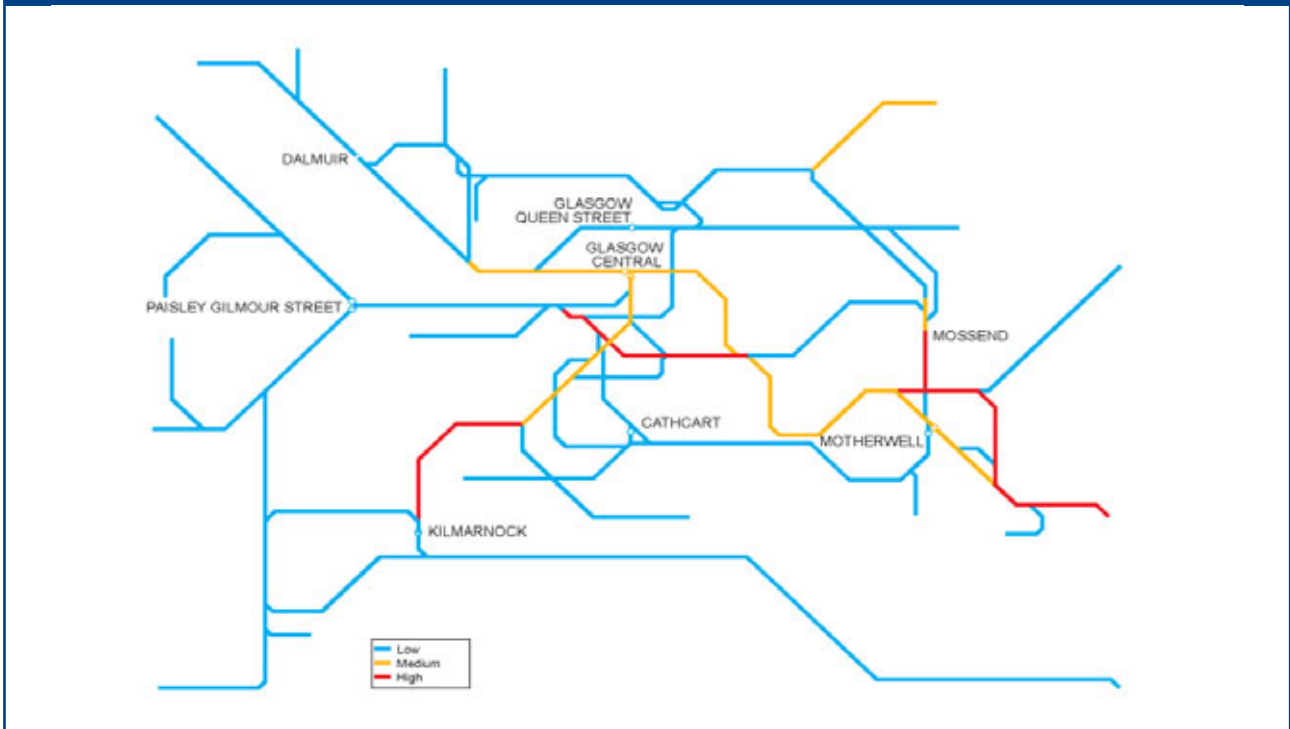
Figure 12 Level Crossings on Route

Description	Number
Automatic Half Barriers	4
Automatic Open Crossing, Locally Monitored	2
Manually Controlled Gates or Barriers	3
Manually Controlled Barriers Monitored by CCTV	7
Miniature Warning Lights or Stop Lights	2
Pedestrian only Crossing (Public)	9
TrainMan Operated Crossing	1
User Worked Crossing (Private)	34

Figure 13 Level Crossings by Strategic route sections

	SRS	Number
WCML: Glasgow Central - Carstairs	26.01	4
Ayr Lines, Wemyss Bay and Gourock	26.03	4
Glasgow North Electric routes	26.04	9
Stranraer - Ayr	26.05	18
Gretna Jn – Kilmarnock – Barassie Jn	26.08	13
Newton – Gartsherrie South/Rutherglen Jn	26.10	1
Lanark Branch	26.11	1
Knightswood North Jn – Cowlairs Jn plus Cowlairs Jn – Carmuir Jns	26.12	1
Freight Lines	26.13	11

Figure 14 Tonnage growth



Future train service proposals

Improved use of the rail network is a central element of the Scottish Government's plans for effective delivery of its rail objectives. The Scottish Government has committed to delivering a number of enhancement projects on this route which will assist the rail network. Development in the utilisation of all routes between Glasgow and Edinburgh, through the reduction in journey time and increased frequency are key aspirations of Scottish Ministers' to meet passenger expectations. The first stage of this to be delivered will be the introduction of the new hourly semi-fast service via Shotts (Dec 2009).

In addition to the service enhancements included above, the opening of GARL will facilitate a four trains per hour service between Glasgow Central and Glasgow Airport calling at Paisley Gilmour Street. As well as providing a fast and frequent connection to the airport, this will also provide additional capacity between Glasgow and Paisley, freeing up space on the Ayrshire and Inverclyde services for longer distance passengers.

The opening of the line between Airdrie and Bathgate will permit the extension of four North Electric trains per hour from Airdrie to Edinburgh providing a new connection from North Lanarkshire to West Lothian and Edinburgh.

Following the enhancements to the Glasgow and South Western route and between Barrhead and Kilmarnock mentioned above, it is anticipated that there will be a recast of services using the line between Glasgow Central and Muirhouse Junction. This is expected to deliver a better Glasgow/Dumfries/Carlisle service and a more robust Glasgow South Electrics and East Kilbride service as well as the half -hourly service between Glasgow and Kilmarnock. In accordance with the Scotland RUS recommendations, services to/from Stranraer would be focussed on a shuttle between Stranraer and Kilmarnock with through services to Glasgow largely provided by linkage with the enhanced Glasgow/Kilmarnock service.

Figure 14 indicates the forecast percentage change in tonnage to 2017.

Future capability

A number of initiatives are being progressed to enhance the capability of the route. The most significant of these are summarised below:

- speed improvements as part of planned S&C renewals; and
- signalling improvements associated with planned renewals.

Future capabilities of the network will be progressed in-line with Scottish Ministers aspirations to reduce journey time between key locations.

Figure 15 Forecast PPM MAA – CP4 plan

	2009/10	2010/11	2011/12	2012/13	2013/14
Cross Country	90.0%	90.2%	90.6%	90.9%	91.3%
First Keolis Transpennine Express	91.7%	92.2%	93.2%	93.8%	94.0%
First ScotRail	90.9%	91.3%	91.7%	91.9%	92.0%
National Express East Coast	86.6%	88.2%	89.5%	90.5%	91.1%
Virgin Trains	85.0%	87.8%	90.3%	90.6%	90.9%

Future capacity

Traffic levels on the route have increased incrementally over recent years without any significant investment in additional capacity. As a consequence, the route is now operating at maximum capacity over a number of sections. The following measures are planned to address this:

- the Scotland RUS has proposed a number of options which address how constraints could be eased and performance enhanced through timetable restructuring; and
- a number of opportunities have been identified where infrastructure enhancement would yield significant improvement in the outputs that the network can deliver. Typically, the optimum time to undertake these works is as an add-on to a planned renewal. In such cases, the incremental enhancement cost is significantly lower than the cost of delivery as a stand-alone project.

Several further measures are envisaged as being necessary to accommodate the predicted growth. The most significant of these are considered to be:

- re-instating the double junctions at both Newton West and Bellgrove, this work is being carried out as part of the Edinburgh to Glasgow Improvement Programme (EGIP);
- provision of additional capacity on the Kilmarnock to Gretna line (currently being delivered as described above);
- relieving the identified single line and single lead junction bottlenecks as major renewals fall due such as Busby Jn and Westerton Jn;
- provision of additional capacity at Glasgow Central Station including low level. (Feasibility Study commissioned 2008.)

Certain stations will require works to enable them to cope with the predicted growth in passenger numbers. Partick station is currently being re-constructed to improve the interchange between trains, the subway, buses and taxis. The design also includes additional passenger circulating areas to relieve the congestion that is currently experienced.

Platform extensions were carried out at a number of stations in 2004 to permit six-car trains to operate on the East Kilbride line. Current growth predictions suggest that platform extensions will also be required to permit longer trains to operate on the Glasgow to Kilmarnock line. Glasgow to Ayr and Largs lines will have the platforms extended to seven-car length with a passive provision for eight-car using selective door opening technology. The Inverclyde route will also benefit from extended platforms to facilitate the introduction of the new rolling stock with selective door opening technology to facilitate seven car trains. Options for delivering these extensions were included in the Scotland RUS and are being progressed.

Future performance

Figure 15 sets out the planned PPM for each train operator. The steps we are taking to achieve these performance improvements are described in the Performance section of the Delivery Plan. Specific enhancements to improve performance on this route are included in the project list below.

We will be renewing a number of other junctions within CP4 such as Hyndland East on a like for like basis as no viable alternative could be identified. The renewal of the signalling interlocking at Glasgow Central will also take place on a like for like basis. Where appropriate we will take the opportunity to improve the layout when carrying out renewal works to enhance performance. At Busby Junction we are taking the opportunity to re-instate the double lead junction in conjunction with the signalling renewal around 2013

On the busy G&SW line we have recently completed the redoubling of the line between Gretna and Annan and are progressing other capacity enhancements such as additional signalling which will also deliver a more robust timetable.

First ScotRail

The performance of the First ScotRail franchise is currently 90.7 percent PPM and this is expected to fall to 90.5 percent by the end of March 2009 as an outcome of the 2008/09 J-PIP which is supported by the local delivery groups.

The key performance issues and opportunities for the TOC have been identified as:

- requirement to have a continued joint focus on the day to day performance risk, including a focus on the delivery of right time performance;
- timetable reviews for South Electrics likely to be implemented in December 2009.;
- understanding and mitigating the impact of climate change;
- minimising the disruption and capturing the benefit of planned renewal and enhancement work throughout the Scottish network;
- reducing the level of unexplained delay through 'S' class messaging which will allow signal aspects to be displayed;
- focussing on improving asset reliability with particular focus on preventing repetitive failures;
- joint work to ensure a successful implementation of the Kilmarnock and GARL schemes minimising impact on existing network; and
- improvements in TOC/FOC on TOC delays.

The Long Term Performance plan is being developed around these key points and performance by 2013/14 will reach 92.0 percent (the Scottish HLOS requirement). This includes an allowance for traffic growth. This figure was reached through working with the TOC and although the initial expiry date of the First ScotRail franchise is prior to April 2014 the PPM figure is in line with the operator aspirations. First ScotRail has an aspiration for PPM to be above this figure by April 2014.

Further work is required in Scotland to assess the potential impact of tier 3 enhancement schemes and no account of these has been included within this plan to date.

The future performance section for the other operators in this route can be found in the following Route Plans.

Network availability

Engineering access on the route can largely be accommodated overnight. On a number of Glasgow suburban routes, access to run later trains has recently been agreed on certain nights and discussions are ongoing on the possibility of extending this. Such access needs to be balanced with the need to maintain the reliability of the railway. In addition, the mix of services on the line from Glasgow to Carstairs limits access except at weekends. A cyclical maintenance strategy has been agreed for the G&SW route with the night time freight services diverted via other routes every twelfth week.

There are aspirations for both passenger and freight to operate over longer periods of the day particularly on the suburban and inter-urban routes for passenger and 24 hour operation has recently been introduced for the Hunterston to Longannet freight flow. Consideration is being given as to how this requirement can be balanced on further routes with the need for infrastructure maintenance.

A number of extended blockades are planned on this route over the next few years. These will permit switch and crossing, track and bridge renewal and enhancement work to be undertaken in the most efficient manner. There are some significant engineering blockades during 2009/10. These include Glasgow Central Platform 12, and various locations on the Ayrshire and Inverclyde routes for platform extension works including Ayr Townhead and Shields Depots for the introduction of new rolling stock. In addition the Coltness Branch will be closed for the renewal of the bridge carrying the main line over the branch and there will be significant disruption in 2010/11 between Glasgow and Paisley in connection with the construction of the Glasgow Airport Rail Link.

Details of these are being discussed with the affected train operators.

Figure 16 Train operators

Operator	Route
Virgin Trains	18
National Express East Coast	8
First Keolis Transpennine Express	9
CrossCountry	17

Long term opportunities and challenges

Growth in passenger numbers is forecast on this route as a consequence of two factors. The first of these is Transport Scotland's programme of major enhancement projects, in particular the Airdrie to Bathgate and Glasgow Airport Rail Link projects. The second is the background growth on existing services that arises as a consequence of the growth in the Glasgow economy and the continued migration of population from the city to the adjoining hinterland.

The key challenge to the rail industry in the coming years will be to deliver the planned increased service levels and maintain performance. Particular issues for this route will include coping with growth on the routes with single line sections such as the East Kilbride line which is already approaching capacity and the number of closely spaced flat junctions. The approaches to Glasgow Central as well as the actual Station platforms are also becoming increasingly congested and in the long term it is likely that increased capacity will be required between Muirhouse Jn and Glasgow Central and within Glasgow Central Station; a Feasibility study was commissioned in 2008 to look at options to improve Glasgow Central station capacity.

In discussion with Transport Scotland, various long term options are being considered to enhance the infrastructure and improve services around Glasgow which they have included in the proposals included in the Strategic Transport Projects Review. This includes further electrification (for example to East Kilbride, Barrhead/Kilmarnock and/or Paisley Canal) and possibly conversion of some lines to Light Rail.

Infrastructure investment in CP4

Figure 17 Infrastructure investment in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2009	(AB) Newton	Track Side Cabin	Renewal	NR	3
2009	(E) Eglinton St	Feeder Station	Renewal	NR	3
2009	(J) Glasgow/Kilmarnock Upgrade (Tier 1)	Extension of Lugton Loop to south of Stewarton, including 2 nd platforms at Dunlop and Stewarton and platform extensions to the existing platforms at Dunlop and Kilmaurs	Capacity Enhancement	Periodic Review 2008	6
2009	(AC) Ayrshire CIS	Customer Information System	Renewal	NR	3
2009	(AC) Ayrshire LLPA	Long Line Public Address	Renewal	NR	4
2009/10	(AD) Dalmarnock Tunnel	Tunnel strengthening	Bridgeguard 3	NR	5
2009/10	(AA) Garriongill Jn Intersection Bridge	Replace Structure	Replace Structure	NR	4
2009/10	(U) Whifflet	Renew Whifflet North Junction	Renewal	NR	Dev
2009/10	(AJ) Brownhill	Renew crossover, associated points and plain line	Renewal	NR	Dev
2010	(C) Glasgow Central PA	Public Address	Renewal	NR	3
2010	(C) Glasgow Central LLPA	Long Line Public Address	Renewal	NR	3
2010	(AB) Motherwell LLPA	Long Line Public Address	Renewal	NR	3

Figure 17 Infrastructure investment in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2010	Ⓚ Re-instatement of Airdrie/Bathgate Line (Tier 2)	Re-instatement of disused line between Drumgelloch and Bathgate including electrification of line between Drumgelloch and Haymarket	Four trains per hour Glasgow Queen Street Low Level to Edinburgh via Airdrie and Bathgate	Periodic Review 2008	6
2010	Ⓛ Ayrshire Platform Extensions (Tier 3)	Platform lengthening at selected stations to accommodate longer trains	Increase in seating capacity	Transport Scotland	2
2010	Ⓜ Gourock Station	Renewal and Provision of improved interchange facilities	Better access for foot and car passengers using station	Network Rail	
2010	Ⓝ Stranraer Station	Relocation of station to improve interchange	Improved station and interchange facilities	Third Party	3
2010	Ⓞ Dalmuir Station	Provision of new station buildings	Enhanced station facilities	Third Party	
2009 – 2011	ⓐ Kilwinning Interlocking	Kilwinning Interlocking Rewire	Renewal	NR	6
2011	Ⓠ Queen St & Paisley LLPA	Long Line Public Address	Renewal	NR	3
2011	Ⓜ Tunnel lighting	Anderston Tunnel	Renewal	NR	Dev
2009 – 2012	Ⓢ Ayr Interlocking	Ayr Interlocking Rewire	Renewal	NR	1
2009 – 2012	Ⓨ PCR/GARL	PCR/GARL (Enhancement funded via RAB)	Renewal/Enhancement	Periodic Review 2008	4
2012	Ⓞ Glasgow Airport Rail Link (Tier 2)	New branch line between Paisley and the airport, together with enhancements between Glasgow Central and Paisley	Four trains per hour Glasgow Central to Glasgow Airport	Periodic Review 2008	4
2012/13	Ⓜ Gourock and Colgrain Coastal Defence	Long term works to protect quay wall, station and Rock Armour	Coastal Defence Long Term Works	NR	2
2013	Ⓡ Gauge Improvements (Tier 3)	Gauge clearance of the line from Midcalder Junction to Mossend	To accommodate the carriage of deep sea container traffic from East Coast Ports to Scotland (Mossend)	T.B.D.	3

Figure 17 Infrastructure investment in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2013	(S) Finnieston Turnback (Tier 3) 3	Provision of facility to permit turnback of trains from Queen Street Low Level direction before congested Finnieston to Hyndland section	Improved Performance. Additional Capacity.	Transport Scotland	–
2013	(T) Garngad Chord & Cumbernauld Electrification (Tier 3) ³	Construction of “Garngad” chord, electrification of Alexandra Parade to Cumbernauld line and upgrade of Bellgrove Junction/Station	Diversion of Glasgow to Cumbernauld service to Glasgow Queen Street Low Level and integration with North Electric services	Transport Scotland	–
2009 – 2014	(AH) Cathcart Signalling Centre	Cathcart SC Area	Complete Renewal	NR	3
2009 – 2014	(AE) Motherwell North (WCML)	Motherwell North (WCML) Relay Room Renewals	Renewal	NR	1
2010 – 2014	(AE) Motherwell Area Re-Signalling	Motherwell Phase 2 Re-Signalling works	Renewal	NR	Dev
2011– 2014	(AC) Ayrshire Re-Signalling	Ayrshire Re-Signalling Phases 1,2 & 3	Renewal	NR	Dev
2011– 2015	(AI) Yoker Recontrol	Migration of Yoker IECC to West of Scotland Signalling Centre	Renewal	NR	Dev
2016	(U) Whifflet Electrification (Tier 3)	Electrification and upgrading of Rutherglen to Whifflet (No Longer part of EGIP)	Diversion of Glasgow to Whifflet services to Glasgow Central Low Level and integration with existing Argyle Line services	Transport Scotland	

³ These schemes are part of the Edinburgh to Glasgow Improvement Programme (E.G.I.P.)

Small Projects Fund (SPF) Tier 1 candidate schemes in CP4

Figure 18 Candidate Small Project Fund Tier 1 schemes in CP4 (<£5m)

Implementation date	Project	Project description	Output change	Small Projects Fund	Grip Stage
2009	Ⓟ Greenock Central Turnback Facility	Provision of additional signalled routes to provide enhanced turnback facilities. Relocation of existing crossovers	Improved Performance.	Network Rail	
2010	Ⓞ Glasgow Central Platforms	Provision of additional platform capacity as part of GARL	Improved Performance, Additional Capacity	Small Projects Fund	4
2012	Ⓝ Shields/Paisley Bi-Directional Signalling	Additional bi-directional facilities between Shields and Paisley to provide enhanced maintenance access opportunities	Improved Performance. Additional Capacity.	Small Projects Fund	4
2012/13	Ⓜ Dumfries improved turnback	Improvements to provide a southbound turnback move from northbound platform	Improved Performance. Additional Capacity.	Small Projects Fund	4
2013	ⓧ Mauchline/Ayr Resignalling	Replacement of existing Key Token signalling with Track Circuit Block signalling including replacing Annbank G/F with control from Mauchline SB	Additional Capacity	Small Projects Fund	
2013	Ⓣ Glasgow South Suburban Resignalling (Enhancement element)	Doubling of Busby Jn and provision of new turnback facility at Whitecraigs	Additional capacity/Improved Performance	Network Rail	

Renewals activity

Figure 19 shows the estimated renewals costs and volume activity.

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

It should be noted that in order to manage the deliverability of our Civils, Signalling & Electrification plans we have included an element of over planning in our work banks.

As a consequence the sum of our route plans exceeds our plan for the network as a whole. It is likely that a small proportion of the activities in these areas will slip to subsequent years

Figure 19 Summary of estimated renewals costs and activity volumes

£m (2009/10 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
Renewals						
Track	9	17	23	30	29	108
Signalling	19	16	22	24	25	106
Civils	12	8	21	21	18	80
Operational property	11	17	17	15	13	73
Electrification	3	3	3	3	3	15
Telecoms	4	3	3	4	2	16
Plant and machinery	1	1	1	1	1	5
Total	59	64	90	97	93	403
Renewals volumes						
Track						
Rail (km)	29					
Sleeper (km)	21					
Ballast (km)	23					
S&C (equivalent units)	4					
Signalling						
SEUs (conventional)	1	0	0	170	0	171
SEUs (ERTMS)	0	0	0	0	0	0
Level crossings (no.)	2	0	0	0	0	0

Appendix

Figure 20 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference and RA is Route Availability												
SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
26.01	WCML: Glasgow Central – Carstairs	WCM	Primary	Transport Scotland	No	W10	10	100(60)	AC	CL	4 (3)	4 (2)
26.02	Midcalder Jn – Holytown Jn	EGS	Secondary	Transport Scotland	No	W9	10	70	none	CL	8	2
26.03	Ayr lines, Wemyss Bay and Gourrock	AYR (GOU)	Secondary	Transport Scotland	No	W9 (W7)	10(7)	90(70)	AC	CL	4 (2)	2 (1)
26.04	Glasgow North electric routes	NEM (YKR)	Secondary	Transport Scotland	No	W8 (W7)	10(7)	60(50)	AC	CL	4 (3)	2 (1)
26.05	Stranraer – Ayr	STR	Rural	Transport Scotland	No	W8	5	65(20)	none	TB (ETB)	15	2 (1)
26.06	Paisley Canal Branch	CNL	Secondary	Transport Scotland	No	W7	10	50	AC (partial)	CL	5	1
26.07	Muirhouse Jn – East Kilbride/Kilmarnock	GBK (EKE)	Secondary	Transport Scotland	No	W7 (W6)	10(5)	70(40)	none	CL(TB)	15	2 (1)
26.08	Gretna Jn – Kilmarnock – Barassie Jn	GSW (BAK)	Secondary	Transport Scotland	No	W9 (W8)	10	80(70)	none	AB (TB)	20	2 (1)
26.09	Eglington Street Jn – Neilston/Newton including Cathcart Circle	KHL (NNH)	Secondary	Transport Scotland	No	W7	7(5)	50(40)	AC	CL	4 (2)	2
26.10	Newton – Gartsherrie South/Rutherglen Jn	RCB (SCM)	Secondary	Transport Scotland	No	W9	10(7)	75(70)	AC	CL	6 (4)	2
26.11	Lanark Branch	LNK	Secondary	Transport Scotland	No	W6	5	60	AC	OTW	10	1
26.12	Knightswood North Jn – Cowlairs Jn plus Cowlairs Jn – Carmuir Jns	MRL (CBD)	Secondary	Transport Scotland	No	W9 (W8)	10	70(60)	none	CL	8 (5)	2
26.13	Freight Lines	CND (LGS)	Freight	Transport Scotland	No	W9	9	20(5)	none	OTW	20	1

Capacity and operational constraints

- A Finnieston – Hyndland: double track at capacity
- B Barrhead – Kilmarnock: single line section
- C Milngavie branch: single line section
- D Bellgrove – Finnieston: signalling headways and limited track capacity
- E Glasgow Central – Paisley Gilmour Street: double track at capacity
- F Paisley Gilmour Street – Kilwinning: signalling headways
- G Ardrossan – Largs: single line passenger section
- H Barassie – Kilmarnock: single line section
- I Busby – East Kilbride: single line with limited crossing facility
- K Glasgow Central High Level Station - Muirhouse Junction: limited track and platform capacity
- L Newton North Jn – Single lead Junction onto West Coast Main Line

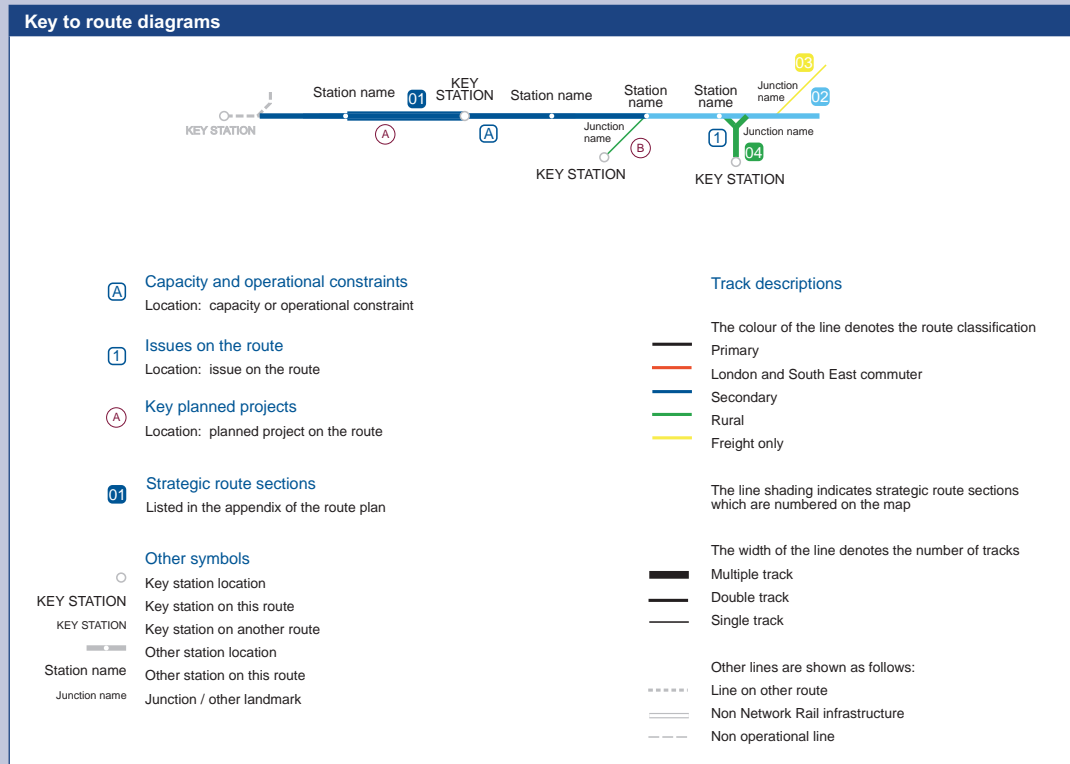
Other issues on the route

- M

Note

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

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



GRIP stages

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

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