

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 24 East of Scotland



Section 1: Today's railway

Route context

The East of Scotland Route serves two principal passenger markets; fast, frequent inter-urban services and commuting. It connects Scotland's principal cities of Glasgow, Edinburgh, Perth, Dundee and Aberdeen and includes the link between Edinburgh and the east of Scotland to the West Coast Main Line at Carstairs. It also encompasses the significant suburban networks that radiate around Edinburgh and around the north-east of Glasgow, the remainder of the Glasgow suburban network being covered by

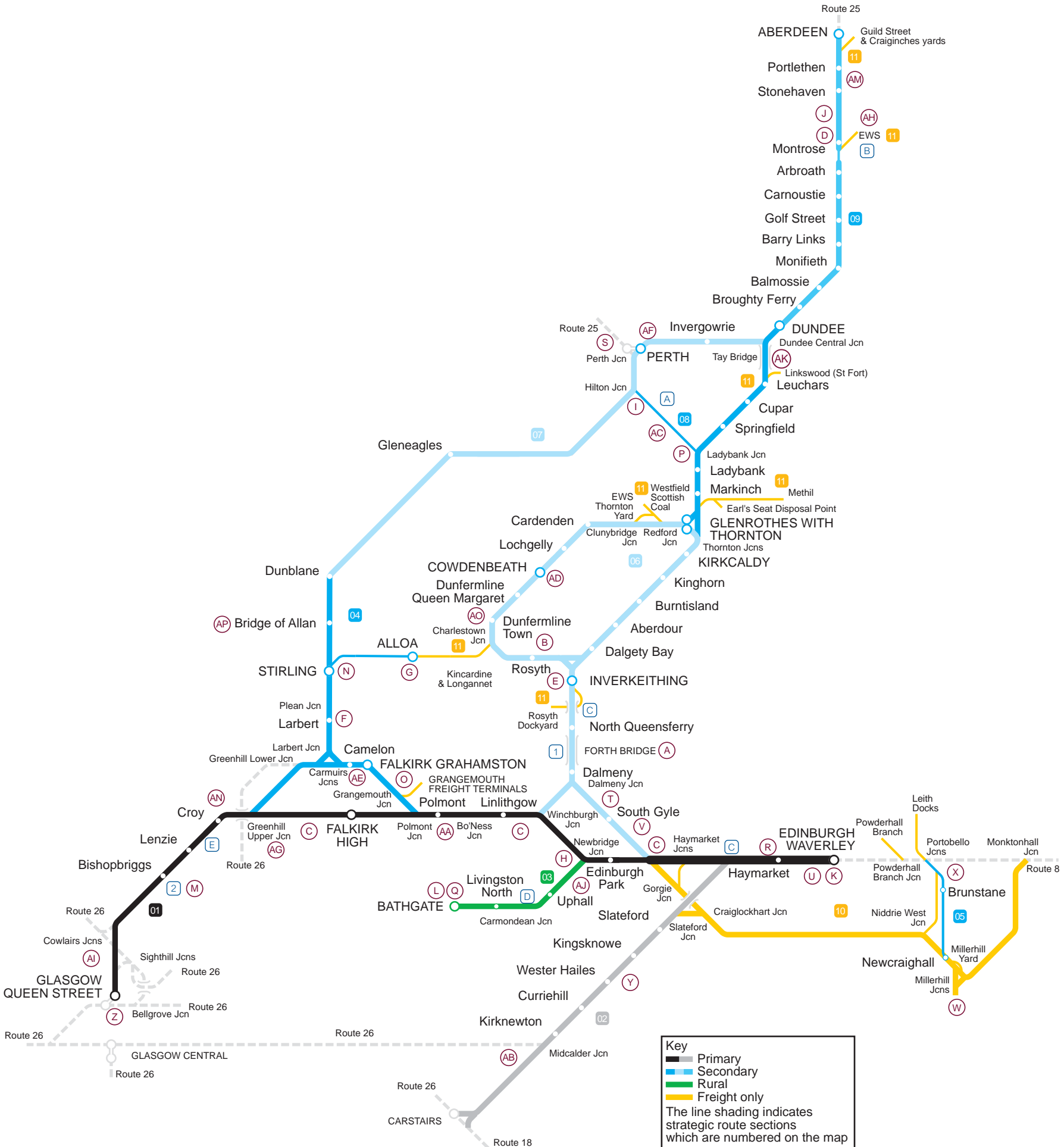
Route 26. The route also serves a number of freight terminals, the most significant of which are Millerhill, to the east of Edinburgh, and the growing hub at Grangemouth. Transport Scotland commissioned its Scottish Planning Assessment (SPA), as one of the inputs to the development of their strategy for rail in Scotland, and the Route Utilisation Strategy (RUS) for Scotland was published by Network Rail in March 2007. Both of these pieces of work have informed the requirements for Scotland's Railways, as set out in the High Level Output Specification which was published by Scottish Ministers in July 2007.

Today's route

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

- the main line between Glasgow Queen Street and Edinburgh Waverley via Falkirk (24.01);
- the main line between Edinburgh Waverley and Aberdeen via Fife (24.06, 24.08, and 24.09);
- the connecting main line between Greenhill Junction and Dundee (24.04 and 24.07);
- the connecting main line between Ladybank and Hilton Junction (24.08);
- the main line between Haymarket East Junction and Carstairs (24.02);
- the line from Polmont to Carmuir/Larbert Junctions (24.04);
- the line from Winchburgh to Dalmeny Junction (24.06);
- the Bathgate branch (24.03);
- the line from Portobello to Niddrie South Junction (24.05);
- the west side of the Fife Circle (24.06);
- the Edinburgh South Suburban Line (24.10); and
- freight branches(24.11) to Grangemouth, Rosyth, Longannet, Westfield and Methil.

Route 24 East of Scotland



Current passenger and freight demand

Following the publication of the Scottish Planning Assessment (SPA), analysis was undertaken for the Scotland Route Utilisation Strategy (RUS) which reported on current daily passenger numbers on a number of geographically aggregated sectors. 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.

For further information, see the published Scotland Route Utilisation Strategy at www.networkrail.co.uk

The RUS also reported on current peak hour load factors on individual service groups, averaged over the three hour 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.

Edinburgh's population had been in decline since the 1960s, although this has reversed over the last decade. There is significant and growing demand for commuter services from the surrounding areas of West Lothian and Fife into Edinburgh.

The rail network has a much lower market share for commuter services in the cities on this route away from the Central Belt due to its poor penetration of their suburbs with consequently less impact on train loadings.

The economies of Edinburgh and Glasgow, Scotland's two major cities, are becoming increasingly interlinked. The fast, frequent inter-urban service between Edinburgh and Glasgow Queen St plays an important role in connecting these centres. Rail journey times on this corridor are extremely competitive due to the increasing levels of road congestion around the two major conurbations. On the other inter-urban corridors road journey times can be as fast or faster than rail journey times as a consequence of major investment that has been carried out on the A9 and A90.

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.

Figure 1 Current passenger numbers

Station	Daily trips
Aberdeen	5,959
Bathgate	2,240
Edinburgh	32,481
Glasgow Queen Street	25,574
Haymarket	14,730
Inverkeithing	3,118
Perth	2,893
Stirling	1,446

Figure 2 Peak loading

Service	Load factor
Stirling to Glasgow	104%
Glasgow to Edinburgh via Falkirk	88%
Fife (Local) to Edinburgh	84%
Dunblane to Edinburgh	78%
Fife (Inter-Urban) to Edinburgh	77%
Edinburgh to Glasgow via Falkirk	77%
Glasgow to Edinburgh via Shotts	61%
Bathgate to Edinburgh	54%
North Berwick to Edinburgh	56%
Newcraighall to Edinburgh	27%

Figure 3 Current train service level (trains per hour)

Route section	Daytime	Evening
Glasgow Queen Street to Edinburgh	4	2
Glasgow Queen Street to Aberdeen	1	1
Edinburgh to Aberdeen	1	1
Edinburgh to Perth/Dundee	2	1
Edinburgh to Fife (local)	4	2
Edinburgh to Stirling/Dunblane	2	1
Edinburgh to Bathgate	2	1

This traffic, routed via Glasgow, Stirling and Alloa, crosses some capacity constrained sections on the route.

Other significant freight flows on the route are the Container and Cement traffic to Aberdeen and Inverness, some open cast coal from Fife to English power stations and petroleum from Grangemouth. Over recent years there has been a significant growth in Anglo-Scottish intermodal and express parcels traffic, largely in response to road congestion in England, the EU's Working Time Directive and increased fuel costs, all of which have improved rail's competitive position relative to road for these time-sensitive longer distance flows. Grangemouth has now emerged as a significant freight handling location following the construction of three new intermodal rail handling facilities, with growing Anglo-Scottish and domestic traffic.

Current services

Figure 3 shows the number of trains per hour during the day and in the evening.

The East of Scotland network carries mixed traffic, with a significant range of speed, acceleration and train stopping patterns. 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, this leads to high levels of utilisation, imposing constraints on the timetable. Several sections of the route particularly around Edinburgh, are operating at or close to capacity.

The principal passenger train operator on the route is First ScotRail. First ScotRail operate fast inter-urban services between the major cities on the route. With the exception of services from Edinburgh/Glasgow to Inverness, these operate on a minimum hourly frequency for most of the day. Services on the key Edinburgh to Glasgow corridor have operated on a 15 minute frequency since 1999.

Passenger traffic on the Edinburgh suburban network is predominantly commuter based, although there are also significant off-peak leisure flows into Edinburgh. The growing and dynamic economy in the east of Scotland and the establishment of the Scottish Parliament in Edinburgh, have resulted in a significant growth in demand.

The Scotland RUS proposed alterations to the timetable from Edinburgh to Fife, Perth, Dundee and Aberdeen to increase the number of services and provide faster journey times between the main cities. These proposals were implemented in December 2008. and provide significant additional seating capacity at peak times between Fife and Edinburgh. In addition services to/from Newcraighall have been linked to Fife services providing new through journey opportunities on this line.

Transport Scotland have recently completed the reconstruction of the Stirling/Alloa/Kinross line which opened in May 2008. This permits the operation of passenger services between Stirling and Alloa (by extending the existing Glasgow/Stirling service) and the diversion of the coal traffic for Longannet Power Station away from the existing congested sections of the Edinburgh/Glasgow line and the Forth.

CrossCountry run services via the East Coast Main Line through Edinburgh to Dundee, Aberdeen and Glasgow, providing additional capacity for the Edinburgh peak. First Keolis Transpennine Express run services via the WCML between Manchester Airport and Edinburgh. National Express East Coast (NEXC) run services to/from Kings Cross to Glasgow via Carstairs and to Aberdeen and Inverness. Virgin Trains run services from Edinburgh to Birmingham.

DB Schenker operate the majority of the coal traffic and the petroleum from Grangemouth amongst other flows. DRS also provide services from Grangemouth to Daventry, Aberdeen, Inverness and Elderslie. Freightliner Heavy Haul provides services to Longannet, Aberdeen and Inverness. GB Railfreight also operate over this route to Aberdeen. The greatest volume of freight traffic is carried on the sections between Greenhill Lower Junction and Longannet via Stirling, between Haymarket and Inverkeithing and on the Edinburgh South Suburban Line which runs from Slateford and Haymarket Junctions to the freight yard at Millerhill.

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

Traffic volumes are summarised in Figure 5.

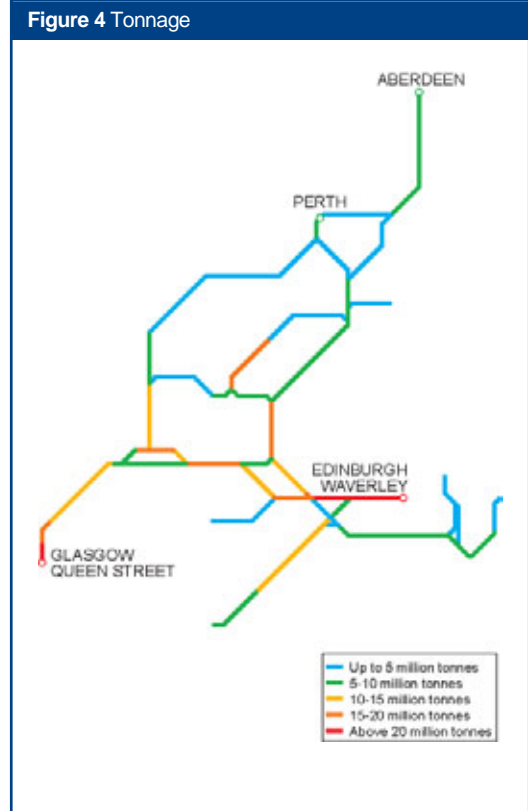
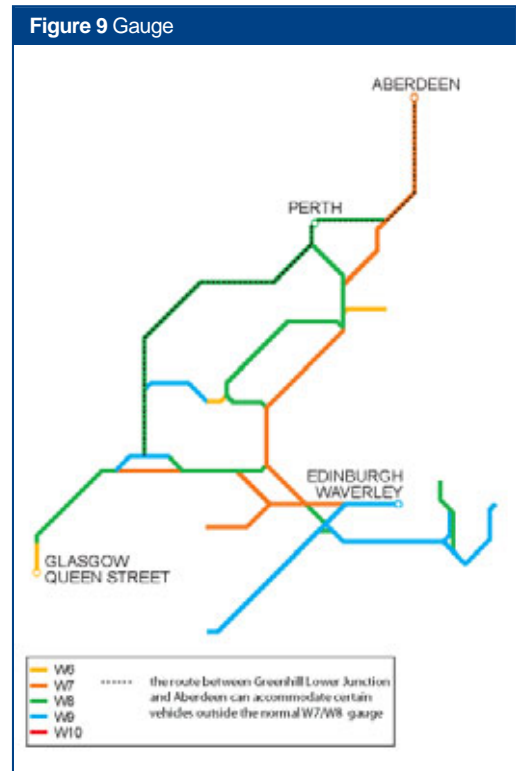
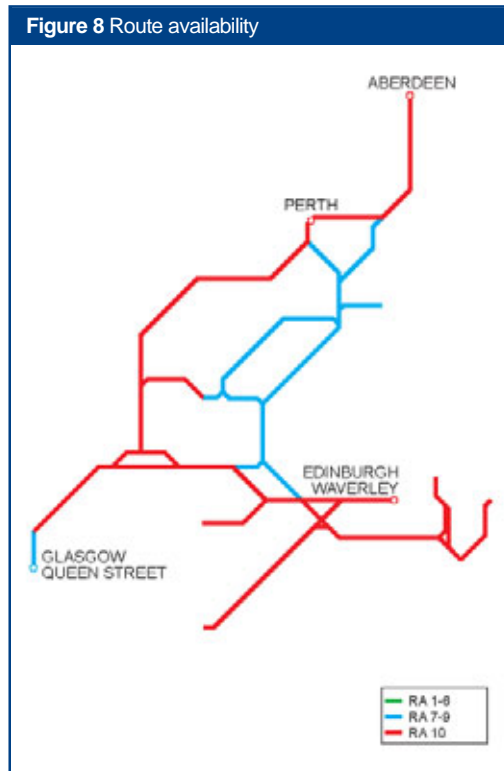
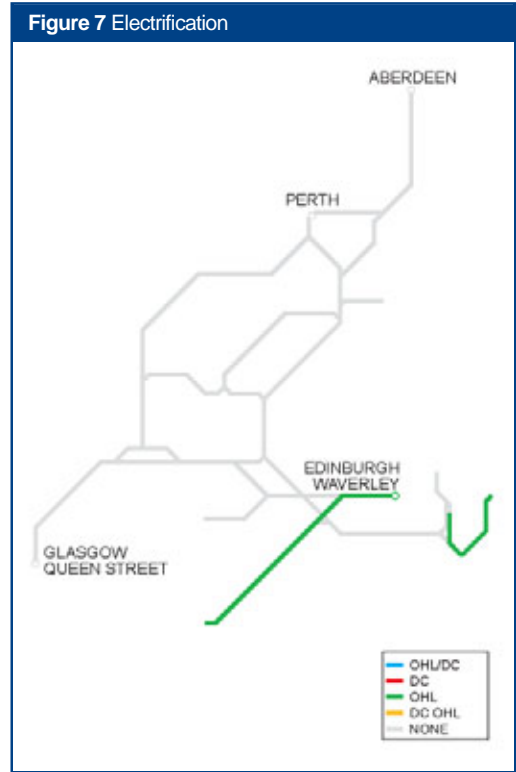
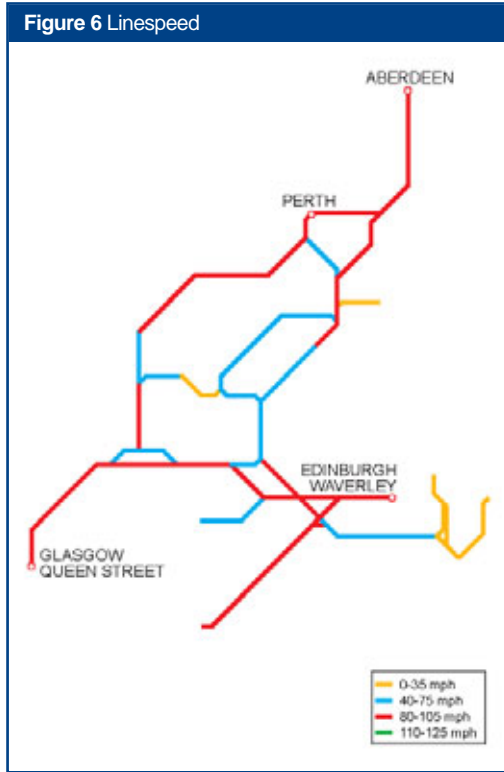


Figure 5 Current use			
	Passenger	Freight	Total
Train km per year (millions)	16	2	18
Train tonne km per year (millions)	3,120	1,185	4,305

Current infrastructure capability

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



Current capacity

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

- the congested two track approach to Glasgow Queen Street
- restrictive platform lengths at a number of stations, most significantly Glasgow Queen Street and Edinburgh Waverley (24.01)
- the single line section from Usan to Montrose (24.09)
- other single line sections between Portobello and Newcraighall (24.05), on the north side of the Fife Circle (24.06) and between Ladybank and Hilton Junction (24.08)
- key single lead junctions at Winchburgh (24.01), Midcalder (24.02), Portobello (24.05) and Dalmeny (24.06)
- restrictive signalling headways across the Forth (24.06) & Tay (24.08) Bridges, in the Stirling area (24.04) and between Haymarket and Carstairs (24.02).
- In addition to the above, key constraints for freight services are:
- the single line approaches to Millerhill Yard (24.10) and their existing control arrangements
- the capacity of Fouldubs and access to terminals around Grangemouth
- restrictive loading gauge and route availability at various locations
- lack of passing loops of adequate size to accommodate current maximum train lengths. This is particularly acute between Mossend (26.12), Grangemouth (24.04) and Stirling (24.08) and between Dundee and Aberdeen (24.09).

Work to redouble the Bathgate branch was completed in October 2008 and will be fully commissioned when the Airdrie/Bathgate Project completes in December 2010.

The following projects have been completed recently:

- Mossend to Elgin gauge enhancement project which has provided improved clearance for a wider range of freight vehicles on this section of the route
- the Edinburgh Waverley project, which will enable the introduction of additional services at the west end of the station through the provision of a more flexible station throat and additional platforms
- The reconstruction of the Stirling/ Alloa/ Kincardine line for passenger traffic between Stirling and Alloa and freight traffic throughout has been completed by Transport Scotland. This enables diversion of the coal traffic from Hunterston to Longannet power station away from the congested Edinburgh to Glasgow and Edinburgh to Fife lines.

Figure 10 2008/09 PPM

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

Current performance

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

Performance across Scotland has improved significantly 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 a moving annual average of over 90 percent today. 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 2007.

Long distance high speed and slower local passenger services operate over a number of sections of this route. This mix of traffic can lead to performance problems during times of perturbation, particularly at junction locations.

The Network Rail and First ScotRail controls are co-located within the same office 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.

We are undertaking reviews of the timetable on individual parts of the network to identify where adjustments would result in an improvement in service reliability. Improved timetables have been introduced in Fife and on services from Glasgow Queen Street. We are also reviewing our regulating policies to ensure that overall delays are minimised in the event of any out of course running.

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

- weatherproofing initiatives at key locations
- targeted renewal of power and multi-core signalling cables
- enhanced management of strategic spares
- enhanced maintenance regime for under-track cable routes
- improved renewals handback processes
- enhanced bridge bashing contingency plans.

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 Edinburgh, and as a consequence of increased road congestion.

The Scotland RUS predicted an annual growth rate across Scotland of three percent per annum in passenger miles and this has been reflected in the Scottish Ministers' HLOS. Our analysis indicates that this will not be evenly spread but that growth will be greater on the Edinburgh to Glasgow and Fife lines and less on other lines on this Route.

In addition increased passenger demand will occur on services on this route from the following major rail enhancement schemes between 2008 and 2013:

- Airdrie to Bathgate (26.04/24.03)
- Scottish Borders Railway (24.05).

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

There are several on going work streams dedicated to improving journey times and creating a 'World Class' railway. For more details of this initiative see the Strategic Direction section of this Route Plan.

In addition Transport Scotland supported by First ScotRail and ourselves has reviewed the long term future of the routes between Edinburgh and Glasgow on behalf of Scottish Ministers. In late 2007 they announced the development of a package of improvements to electrify and enhance the routes to deliver additional capacity and reduce journey times. We are currently undertaking development work on behalf of Transport Scotland and further information will be available in due course.

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;
- 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;
- is easy and accessible to use.

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, six fall within Route 24 they are:

- Edinburgh to Glasgow Rail Improvements
- Grangemouth road and rail access upgrades
- Rail improvements between Aberdeen and the Central Belt
- Inverkeithing to Halbeath railway line
- East of Scotland Rail Improvements
- Edinburgh Haymarket Station Upgrade

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 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
May 2009	E & G Journey Time Improvements (Phase 1)	Line speed enhancements	Journey time reduced by c 1 minute
July 2009	Six-car Glasgow-Dunblane/Alloa	Bishopbriggs Platform Extension	Some peak services operate as six-car trains
Dec 2010	Airdrie/Bathgate	New line complete	Four trains per hour Glasgow Queen Street Low Level to Edinburgh via Airdrie and Bathgate
Dec 2010	Stirling Middle	Remodelling of Stirling Middle Junction	Will enable extended passenger journey times to be removed from Glasgow to Alloa trains and improve freight opportunities.
Jan 2011	Additional calls at Gogar	New station at Gogar Completion of Edinburgh Tram Phase 1 (tie responsibility)	Additional calls in some Edinburgh/Fife and beyond services to provide link to Edinburgh Airport once the tram line opens.
Dec 2012	Hourly Inverness/Central Belt	Infrastructure Enhancements between Perth and Inverness (Route 25)	Hourly service with reduced journey time between Inverness and Perth to Edinburgh.
Dec 2013	Borders Railway	New line complete (being progressed by Transport Scotland)	Edinburgh/Newcraighall services extended to Tweedbank every half hour.
Dec 2014 –16	E & G Journey Time (Phase 2) & Capacity	Electrification of E & G, Cumbernauld, Alloa and Dunblane complete Dalmeny Chord complete Garngad Chord complete Finnieston Turnback complete Various Jn & Signalling Enhancements	Six trains per hour Glasgow Queen Street High Level to Edinburgh with reduced journey times and improved interchange with Edinburgh Airport via Edinburgh Tram network. Reduced journey times Glasgow/Edinburgh to Dunblane/Alloa. Queen Street/Cumbernauld diverted to Queen Street Low Level

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 details 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
- 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 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 19 includes schemes currently identified which appear to fit within this category. Tables 18 and 19 indicate within which tier each project falls. Network rail's proposals for delivering this were included in the Strategic Business Plan in 2007 (updated in 2008).

Scottish Ministers are committed to the following further projects (included within Tier 2 of the HLOS) which are being progressed: re-instatement and

electrification of the Airdrie-Bathgate line and re-instatement of part of the former Waverley Route from Newcraighall to Tweedbank (Scottish Borders Railway). Network Rail are contracted to undertake the delivery of the first of these (financially included in Route 26) and expect to work closely with the developers of the other.

On behalf of the rail industry, Network Rail published the Scotland and Freight Route Utilisation Strategies (RUS) in March 2007. These documents detail the strategic projects which are required to meet current and future growth on the rail network. The strategy detailed in the RUS formed the basis of the response to the HLOS.

Within Route 24 the strategy predominately focuses on increased capacity at Edinburgh Waverley and Glasgow Queen St, including enhanced passenger access and station facilities; line speed enhancements between Edinburgh and Perth; additional services between Fife and Edinburgh; and additional/improved infrastructure between Aberdeen and Dundee and between Larbert and Stirling to improve capacity, particularly for freight.

Enhancements are planned to facilitate the operation of six-car trains between Glasgow Queen Street and Stirling, specifically platform lengthening at Bishopbriggs and also to facilitate additional express services from Edinburgh to Aberdeen.

Edinburgh and the South East region is expected to enjoy Scotland's strongest economic growth over the next 20 years. Significant population growth is predicted in Edinburgh and in Fife, the Lothians and the Borders. 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 Edinburgh.

The RUS reported on projected daily passenger numbers on a number of geographically aggregated sectors during the three hour morning peak period over the next 20 years.

For further information, see the published Scotland Route Utilisation Strategy at www.networkrail.co.uk.

As part of Network Rail's world class initiative, the Glasgow to Edinburgh via Falkirk line was identified as a pilot route. Significant work has been carried out to develop and deliver targets consistent with our vision which is to provide 'a World Class experience with faultless delivery'.

Over the past 12 months the pilot has completed a number of key initiatives including:

- delivery unit and operational building improvements along with significant levels of lineside scrap and graffiti clearance
- targeted training and development of key Delivery Managers on the route to provide smarter and more efficient working.

The ongoing future Projects will include:

- the introduction of Intelligent Infrastructure across the route with 256 assets fitted with remote condition monitoring that will enable a 'predict and prevent' approach to infrastructure faults
- the trialling of a new polymer troughing route at Polmont that could also serve as a safe walking route. The product is made from recycled plastic and is environmentally friendly.

The whole package is expected to be developed and delivered throughout the next 10 years and it is anticipated that the principles included within this initiative will be rolled out across the network in forthcoming years.

Development in the utilisation of all routes between Glasgow and Edinburgh, through the reduction in journey time and increased frequency are also key aspirations of Scottish Ministers' to meet passenger expectations. Network Rail has been working closely with Transport Scotland and First ScotRail to develop a package of incremental enhancements to services between Glasgow and Edinburgh and from those cities to Stirling and Dunblane to increase capacity and reduce journey time over the next ten years. This is known as the Edinburgh to Glasgow Improvement Programme (E.G.I.P.) and is expected to increase the passenger capacity on the main Edinburgh/Glasgow route by up to 50 percent with fastest journey times reduced by c 10 - 12 minutes by 2016. E.G.I.P. also includes improvements between Glasgow Central and Edinburgh included in Route 26.

Similar improvements will be delivered on the routes towards Stirling, Dunblane and Alloa.

The Freight Route Utilisation Strategy (RUS) published in March 2007, provides a robust forecast for freight growth on the route, which is fundamentally linked to the future of Longannet power station. Scottish Power has decided to equip the station with the necessary Flue Gas De-sulphurisation equipment required to meet the requirements of the emissions control directive. This will guarantee its future beyond 2015. The equipment is not currently planned to be fitted at Cockenzie, Scotland's second major coal fired power station which is expected to close by 2012.

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 with the potential construction of associated waste transfer stations and the availability of grants towards the creation of new freight terminals. Feasibility work is being progressed on options to provide W10 clearance from the North East of England to Mossend near Glasgow which would provide a second route between England and Scotland for intermodal traffic. On Route 24 this will affect the line between Monktonhall Junction on the East Coast Main Line and Midcalder Junction between Edinburgh and Carstairs.

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 99 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. The type of level crossing will reflect the traffic on a particular route.

Listed below is a breakdown of the level crossings on Route 24 detailing the types and where they appear on the 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.

Inchyra Level Crossing (24.07) is due to close in 2009 and an alternative route is being provided. Network Rail is currently reviewing options for Kirknewton Level Crossing (24.04). Kingsknowe Level Crossing (24.04) will require upgrading to cater for anticipated traffic growth.

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. Grange (24.07) and Cornton (24.04) automatic half barrier crossings are currently being reviewed as part of a new development in these Areas.

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 63 UWCs identified in Route 25 associated with this closure programme.

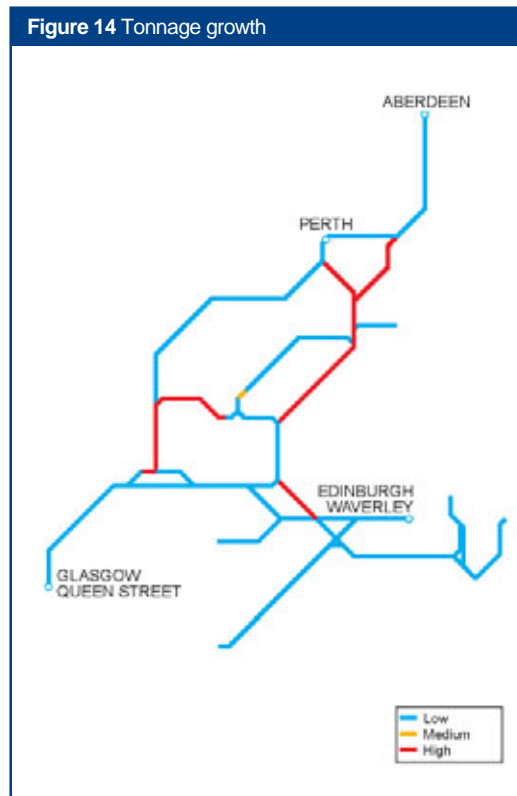
Network Rail is also involved in raising awareness of the dangers of level crossings particularly in rural areas by making regular safety presentations at the Royal Highland Show.

Figure 12 Crossings by Strategic route sections

	SRS	Number
Carstairs South Jn - Haymarket East Jn	24.02	7
Motherwell – Dundee (via Perth)	24.04	31
Stirling North – Cambus Jn (Alloa)	24.04	5
Haymarket West Jn - Aberdeen	24.06	20
Inverkeithing Central Jn – Thornton North Jn	24.06	1
Dunblane - Dundee	24.07	5
Ladybank Jn – Hilton Jn	24.08	6
Dundee – Aberdeen	24.09	5
Freight Lines	24.11	19

Figure 13 Level Crossings by type on Route

Description	Number
Automatic Half Barriers	13
Automatic Open Crossing, Locally Monitored	1
Manually Controlled Gates or Barriers	6
Manually Controlled Barriers Monitored by CCTV	8
Miniature Warning Lights or Stop Lights	6
Open Crossing	1
Pedestrian only Crossing (Public)	13
TrainMan Operated Crossing	1
User Worked Crossing (Private)	49
Station Crossing	1



Future train service proposals

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

Within Route 24 reduced journey time, particularly on the inter-urban routes is a key aspiration for Scottish Ministers' in the delivery of future services in Scotland. The identified growth in passenger numbers on the route will require additional peak capacity particularly between Edinburgh and Glasgow and between Edinburgh and Fife.

To facilitate the expected growth on this route additional rolling stock will be required. In the short term this is likely to consist of additional Diesel Multiple Units (DMUs) for the Fife and Aberdeen routes and Electric Multiple Units (EMUs) for the re-opened line from Glasgow to Edinburgh via Bathgate (replacing the current DMUs in use east of Bathgate). In the longer term if electrification of other routes is progressed as currently anticipated further additional EMUs will be provided.

In order to stable, clean and maintain these additional trains a new electrified carriage servicing depot is being built at Bathgate and improvements to the facilities at Perth are proposed. Longer term additional facilities are likely to be required to cater for this growth in rolling stock volume.

If the proposed future electrification scheme occurs, there will be a need for a new electrified

maintenance depot as currently the only EMU maintenance facility in Scotland is at Shields near Glasgow and is virtually at capacity. In addition further stabling, and cleaning facilities will be required, possibly in the Stirling area and this is being reviewed as part of the EGIP Project of work.

Future capability

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

Within Route 24 Newbridge Junction was renewed as a double junction in October 2008. At the same time the single line section of the Bathgate branch between Cawburn Jn and Bathgate Station (exclusive) was converted to a double track formation. This will facilitate the operation of the proposed four trains an hour on this section when the Airdrie/Bathgate line is re-opened in 2010.

Speed and signalling improvements are being included in planned S&C renewals where appropriate such as at Carmuir East Junction. At Midcalder Junctions the existing single lead junction is proposed to be converted to a double junction to improve capacity.

The future capability of the network will be designed to deliver reduced journey times, to meet the key aspiration of Scottish Ministers. Current development work is focussed on the Edinburgh to Glasgow line with a short term aspiration to increase the line speed for passenger trains to 100 mph on the sections which are not already at that level. Longer term the focus is likely to include junction improvements at Winchburgh and the creation of a new chord at Dalmeny as well as electrification to permit the operation of additional and faster trains on the Edinburgh/Glasgow line.

Future capacity

Passenger numbers on Route 24 are projected to grow by up to 30 percent over the next 10 years. Analysis from the RUS and Strategic Planning Assessment (SPA), commissioned by the Scottish Executive, highlights key future operating constraints.

Traffic levels on the route have increased incrementally over recent years. For example, Edinburgh Waverley now handles 580 trains per day compared to the 380 trains per day it handled 30 years ago.

As a consequence, the route is now operating at maximum capacity over a number of sections.

Figure 15 Forecast PPM MAA – CP4 plan

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

The Edinburgh Waverley (24.01) project was completed in December 2007 delivering additional capacity that can accommodate the operation of an additional four trains per hour during the peak period at equivalent performance levels to those currently achieved.

Beyond that a number of opportunities have been identified where modest infrastructure enhancement would yield significant improvement in the outputs that the network can deliver. The optimum method of undertaking these works is normally by extending the scope of a planned renewal when the incremental enhancement cost is significantly lower than the cost of delivery as a stand alone project. Some of these have been completed recently or are being progressed currently. These include the capacity and speed improvements associated with the switch and crossing renewals at Larbert Junction, Hilton Jn (24.04) and Montrose (24.09) and linespeed improvements between Ladybank Jn and Hilton Jn. Improved headways have been delivered between Larbert and Stirling. Further work is required in the Stirling Area between Stirling and Dunblane which is currently being developed. There are aspirations for future stations on this route to Perth and if accepted these proposals will require a further review of the Timetable.

In addition the Scotland Route Utilisation Strategy considered how current constraints could be eased and performance enhanced through timetable restructuring and minor infrastructure enhancements.

The most significant of these options are considered to be:

- relieving the single lead junction bottlenecks at Portobello Jn (24.05) and Midcalder Jn (24.02)
- improvements at Glasgow Queen Street High Level station (24.01) where only four of the seven platforms can handle a six-car train
- progression of further work in the longer term at Edinburgh Waverley to provide further operating flexibility and address the lack of long platforms. This may require the removal of road vehicles

from the station level to ease passenger congestion.

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

- Haymarket station is currently one of the most congested stations on the Scottish rail network and passenger numbers are forecast to increase further on completion of the Edinburgh Tram project in 2011. Transport Scotland has recently completed a study to evaluate the options for redeveloping the site to address this issue and create an enhanced facility that will permit proper integration of all transport modes. Further discussions are required to agree implementation arrangements.
- passenger congestion is experienced in the peak hours at South Gyle station, principally due to the lack of passenger circulating space as a result of narrow platforms. This may be eased by the proposals for a new Gogar Station

Following the decision of Scottish ministers not to proceed with the Edinburgh Airport Rail Link, it was agreed to progress a new station at Gogar between South Gyle and Dalmeny with an interchange to the new Edinburgh tram giving a link to Edinburgh Airport. This is likely to worsen the capacity issues between Haymarket and Inverkeithing.

Although most station platforms on the route can accommodate six coach train formations, a small number still have platform lengths that are only capable of handling five or less vehicles. Consideration needs to be given to extending these for operational consistency, particularly during perturbation when additional stops may be introduced. We are currently progressing the extension of Bishopbriggs station to full six-car length. Other key affected stations on this Route are Ladybank, Invergowrie and Springfield. The latter two have particular issues due to their very low usage and it may therefore be more appropriate to fit the rolling stock on these routes with Selective Door Opening (SDO) equipment.

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.

On this route specific performance driven enhancements proposed include the remodelling of Portobello Junction to provide a double junction and the electrification of the North lines between Haymarket Central Junction and Princes Street Gardens. Both of these would be desirable to support the Tier 2 enhancement projects specified by Scottish Ministers.

Figure 16 Train operators	
Operator	Route
Virgin Trains	18
National Express East Coast	8
First Keolis Transpennine Express	9
CrossCountry	17

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
- 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 A2B scheme minimising impact on existing network
- 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 and includes the impact of the opening of the Airdrie to Bathgate line. 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.

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 with most lines having lengthy periods with no trains. Exceptions to this include Edinburgh to Haymarket and Haymarket to Carstairs where access is largely limited to weekends.

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 likely to be required on this route over the next few years. These will permit major renewals and enhancements, specifically S&C renewals to double the junctions at Midcalder (24.02) and Stirling Middle (24.04).

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

The significant enhancements planned for the Edinburgh/Glasgow line are likely to require major blockades although we are committed to reducing the disruption involved to passengers as part of our 'World Class' workstream.

Long term opportunities and challenges

Significant 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 Borders Rail Link projects as well as the improvements to the Edinburgh to Glasgow line. The second is the background growth on existing services that arises as a consequence of the growth in the Edinburgh economy and the continued migration of population from the city to the adjoining hinterland. In the longer term the Projects to be delivered by the Strategic Transport Projects Review (STPR) will improve and enhance the capacity on this route.

The volume of additional housing in Fife and West Lothian proposed in the respective Council's structure plans will require consideration to provide sufficient capacity particularly to/from Edinburgh if the economy of that city continues to grow as forecast.

Modest freight growth is forecast, now that Scottish Power are fitting the necessary Flue Gas De-sulphurisation equipment at Longannet power station. In addition there are aspirations (currently unfunded) to increase key routes to W10 gauge.

The key challenge to the rail industry in the coming years will be to deliver the planned increased service levels, maintain performance and deliver a reduced journey time to meet passenger demands between the major conurbations.

Infrastructure investment in CP4

Figure 17 Infrastructure investment in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2009	Ⓢ Montrose S&C Renewal :Enhancement Content	Removal of existing northbound loop. Re-instatement of trailing crossover at Montrose North to provide longer length looping facility	Enhanced looping facility for freight services	Small Projects Fund	8
2009	Ⓣ Laurencekirk New Station	Re-opening of Laurencekirk passenger station	New station facility (including car park)	Transport Scotland	6
2009	Ⓢ Grangemouth Fouldubs Remodelling	Remodelling of track in Fouldubs area to provide increased freight capacity and allow longer trains to be accommodated	Performance/Capacity/Potential for Freight Growth	Small Projects Fund	3
2009/10	Ⓐ Drumshoreland (Old Station) Renewal	Superstructure & substructure renewal.	Renewal	NR	5
2009 to 2012	Ⓐ Forth Bridge	Annual maintenance programme	Annual maintenance	NR	6
2010	Ⓚ Edinburgh Waverley PAVA	Public Address	Renewal	NR	3
2010/11	Ⓚ Tay Bridge Dundee	Re-Painting with steelwork repairs	Re-Painting with steelwork repairs	NR	6
2010/11	Ⓝ Stirling Middle S&C Renewal : Enhancement Content	Renewal and Enhancements	Performance and Capacity improvements	Small Projects Fund	1
2010	Ⓢ Re-instatement of Airdrie/Bathgate Line (Tier 2)	New Rail Link	Re-instatement of disused line	Periodic Review 2008	6
2010	Ⓡ Redevelopment of Edinburgh Haymarket station (Tier 3) ¹	Station Redevelopment	Enhanced facility to improve accessibility and integration with other transport modes	Third Party	3
2010	Ⓢ Improvements at Perth Station for stabling and servicing (Tier 3)	Improved servicing and stabling facility at Perth Station	Increased capacity for diesel trains on the network	Third Party	2
2011	Ⓣ Gogar Station (Tier 3) ²	Opening of new station between South Gyle and Dalmeny	New station with interchange with Edinburgh tram providing linkage with Edinburgh Airport	Transport Scotland	3
2010	Ⓢ North Lines Electrification (Tier 3) ²	Electrification of North Lines between Haymarket and Princes Street Gardens	Enhanced performance	Transport Scotland	3
2010/11	Ⓐ Den of Cowie Re-Painting	Steelwork strengthening and Re-Painting works	Re-painting	NR	5
2011/12	Ⓜ Bishopbriggs Rockfall Protection	Scale, devegetation, rockfall protection measures	protection measures and drainage	NR	2

¹ In addition City of Edinburgh Council are developing a major 'Public Realm' scheme to improve the area around the station in conjunction with developers

² These schemes are part of the Edinburgh to Glasgow Improvement Programme (E.G.I.P.)

³ Network Rail is only responsible for interface with the Borders Link Project

Figure 17 Infrastructure investment in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2011/12	AN Croy Rockfall Protection & Drainage	Scale, devegetation, rockfall protection measures and drainage	protection measures and drainage	NR	2
2011/12	U Haymarket North Tunnel	Brickwork repairs, shot-creting and repointing open joints.	Repairs	NR	5
2011/12	AM Glenury Viaduct Re-Painting	Re-Painting works	Repainting	NR	2
2012	V Edinburgh - Inverkeithing signalling headways (Tier 1/3) ²	Provision of additional signals to reduce existing long signal sections	Performance and Capacity improvements. Part Network Rail Discretionary Funds	Transport Scotland	3
2013	W Borders Rail Link (Tier 2) ³	New rail link.	New passenger railway from Newcraighall to Galashiels & Tweedbank	Periodic Review 2008	2
2013	X Redoubling Portobello Junction (Tier 3)	Double junction onto the Newcraighall branch including second platform at Brunstane.	Performance and capacity improvements	Transport Scotland	1
2013	Y Gauge Improvements (Tier 3)	Gauge clearance of the route from Edinburgh to Midcalder Junction	To accommodate the carriage of deep sea container traffic from East Coast Ports to Scotland (Mossend)	Transport Scotland	–
2014	Z Glasgow Queen Street Capacity Enhancement (Tier 3) ²	Remodelling of Glasgow Queen Street to deliver more six-car platforms and increased circulating space	Ability to operate more six-car trains to/from Glasgow Queen Street and cope with increased passenger numbers	Transport Scotland	2
T.B.D.	AO Dunfermline LLPA	Long Line Public Address	Renewal	NR	2
2009	AE Carmuir East	Renewals, Equivalent Units and Associated Plain Line	Renewal	NR	5
2010	AD Laurencekirk	Renewals, Equivalent Units and Associated Plain Line	Renewal	NR	4
2016	AA Edinburgh – Glasgow electrification and enhancements (Tier 3) ²	Electrification of the line between Edinburgh Waverley and Glasgow Queen Street including extensions to Dunblane/Alloa and appropriate diversionary routes. Construction of 'Dalmeny Chord' and other associated works	Ability to operate electric trains on the route with reduced journey times and increased Frequency	Transport Scotland	3

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

Figure 18 Candidate SPF schemes in CP4 (<£5m)

Implementation date	Project	Project description	Output change	Funding	GRIP Stage
2011/12	(AB) Midcalder Jn Enhancements	Remodelling of track at Midcalder Jn in connection with junction renewal	Capacity improvement	Small Projects Fund	1
2010	(AC) Ladybank/Hilton Line Speed Enhancements Phase 2	Increase in line speed to reduce journey time between Edinburgh and Perth	Capacity improvement and journey time reduction	Small Projects Fund	1
2010	(AD) Fife freight enhancements	Gauge enhancements to permit 9' 6" containers to operate from Stirling to Cameron Bridge and Perth	Enhanced gauge	Small Projects Fund	–
2009	(AE) Carmuir East Jn S&C Renewal : Enhancement Content	Provision of additional signals/ upgrading of existing ground signals to provide enhanced turnback facilities during diversions	Performance and Capacity improvements.	Small Projects Fund	6
2009	(AF) Barnhill Signalling and S & C Enhancements	Remodelling of Barnhill (nr Perth) to increase linespeeds	Reduced journey time/Performance improvement	Small Projects Fund	1
2010	(AG) Greenhill Area Signalling Renewals	Provision for additional southbound Signal section between Carmuir West and Greenhill Lower	Capacity Improvement	Small Projects Fund	3
2011	(AH) Laurencekirk Up loop	Conversion of existing siding at Laurencekirk into a loop facility	Increase capacity by permitting freight trains to be overtaken where appropriate.	Small Projects Fund	1
2011	(AI) Cowlairs Signalling Enhancements	Repositioning of signals/review of overlaps	Enhanced Performance	Small Projects Fund	–
2010/11	(AJ) Bridge of Allan Signalling Renewal			Small Projects Fund	
2011/12	(H) Newbridge West Jn S&C Renewal	Removal of Up Loop connection	Increase in Up line speed	Small Projects Fund	

Renewals Activity

Figure 19 shows the estimated renewals costs and activity volumes.

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

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

Figure 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	1	12	10	10	16	50
Signalling	6	7	9	8	4	33
Civils	65	61	31	11	10	179
Operational property	13	42	41	38	5	139
Electrification	0	0	0	0	0	0
Telecoms	2	1	3	2	2	10
Plant and machinery	2	1	1	2	2	8
Total	88	124	95	71	39	417
Renewals volumes						
Track						
Rail (km)	14					
Sleeper (km)	19					
Ballast (km)	23					
S&C (equivalent units)	1					
Signalling						
SEUs (conventional)	32	0	0	0	0	32
SEUs (ERTMS)	0	0	0	0	0	0
Level crossings (no.)	0	0	2	2	0	4

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
24.01	Glasgow QS – Edinburgh Waverley	EGM	Primary	Transport Scotland	No	W9(W8)	10	90	AC (Partial)	CL	4 (3)	2(4)
24.02	Carstairs – Haymarket West Jn	ECA	Primary	Transport Scotland	No	W9	10	95	AC	CL	8 (5)	2
24.03	Bathgate – Branch	NBE	Rural	Transport Scotland	No	W7	10	75	none	CL	15	2(1)
24.04	Dunblane/Alloa – Polmont Jn/Greenhill Upper Jn	SCM (PMT)	Secondary (Rural)	Transport Scotland	No	W8	10	100(60)	none	AB	4	2
24.05	Newcraighall – Portobello Jn	NDE	Rural	Transport Scotland	No	W9	10	30	AC	CL	5	1
24.06	Fife Loop	ECN (CWH)	Secondary	Transport Scotland	No	W8 (W7)	10(8)	80(75)	none	CL	5	2
24.07	Dundee – Dunblane	SCM	Secondary	Transport Scotland	No	W8	10	100(60)	none	AB	10	2
24.08	Dundee/Hilton Jn – Markinch	SCM (CDC)	Secondary	Transport Scotland	No	W8 (W7)	10(8)	80(55)	none	CL	15 (10)	2(1)
24.09	Dundee – Aberdeen	ECN	Secondary	Transport Scotland	No	W7	10	80	none	AB	10 (15)	2
24.10	Edinburgh Suburban Lines	SUB (NDE)	Freight	Transport Scotland	No	W9	10	40	none	CL	5	2
24.11	Other freight	LHS (CPH)	Freight	Transport Scotland	No	W8	10	30(20)	none	CL	OTW	1

Capacity and operational constraints

- A** Ladybank – Hilton Junction: single line section
- B** Usan – Montrose: single line section
- C** Haymarket – Inverkeithing: three aspect signalling
- E** Glasgow Queen Street – Greenhill Upper Junction: line close to capacity

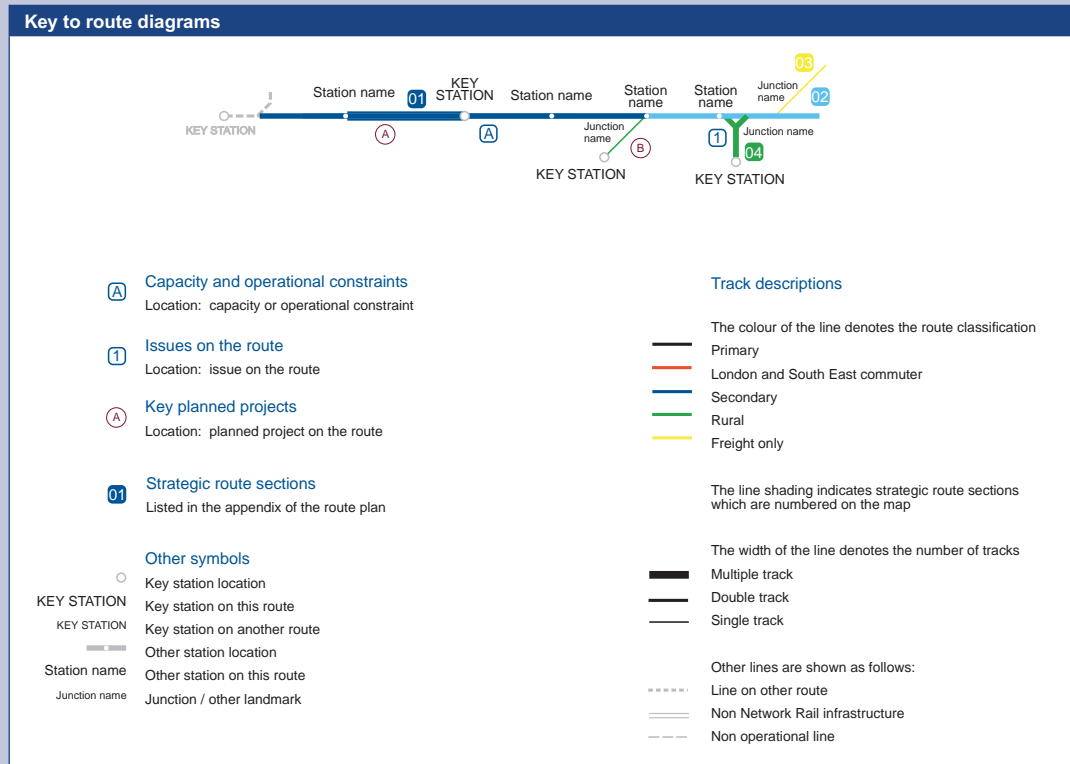
Other issues on the route

- 1** Forth Bridge: limited freight tonnage permitted
- 2** Bishopbriggs: limited platform length

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

Cover printed on box board which is both FSC and TCF. Text pages printed on Greencoat Velvet which is produced from pulp containing 80% recycled fibre. The remaining 20% virgin pulp is 10% totally chlorine free and 10% elemental chlorine free. Greencoat has been awarded both the National Association of Paper Merchants and the Eugropa recycled marks, two of the most prestigious and recognisable recycled certificates available.

**This Route Plan is part of a set.
To view or download the others
visit www.networkrail.co.uk**

Network Rail
Kings Place
90 York Way
London N1 9AG
Tel: 020 3356 9595