NetworkRail

Delivering a better railway for a better Britain

Network Rail
Annual Return 2014

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Annual Return

Reporting on the year 2013/14

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Introduction

This Annual Return reports on our achievements, developments and challenges during 2013/14. It is the formal means by which we report progress in delivering the outputs established in the Periodic Review 2008 (PR08). As it is the final year of Control Period 4 (CP4) this Annual Return also provides an overview of our performance in CP4 (1 April 2009 – 31 March 2014).

The Annual Return is a public document that provides an important reference for stakeholders. In the interests of transparency, this and previous Annual Return publications are available on the Network Rail website together with a summary of the historical data.

The Annual Return is divided into the following sections:

- safety and sustainable development
- operational performance and stakeholder relationships
- network capability and network availability
- asset management
- activity volumes
- enhancement schemes.

Expenditure and efficiency is reported in the Regulatory Financial Statements as well as the Annual Report and Accounts which are published separately and are available on our website.

For most measures we have provided disaggregated information for England & Wales and Scotland together with the network total where appropriate, although there are some measures for which we only have network-wide information. We have also provided disaggregated data for the ten operating routes: Anglia, Kent, London North Eastern, London North Western, East Midlands, Scotland, Sussex, Wales, Wessex and Western, for measures where this is appropriate.

This Annual Return follows the agreed form as approved by the Office of Rail Regulation (ORR) in 2013 and is prepared in accordance with Condition 12 of our network licence.

There are no new measures introduced in this year's Annual Return. Notwithstanding this, we have provided additional information in some areas to provide a fuller picture of our performance in CP4.

Overview

A brief summary of our performance during 2013/14 and in CP4 is provided below. A summary of our performance for the five years in CP4 against our regulatory targets is shown in Table 1. Later sections of this Annual Return provide more detailed information.

Safety

Safety is at the core of everything we do, from our group board to every colleague in every depot, station, signal box and office. Our safety vision is that everyone returns home safe every day. We do not underestimate the challenge of achieving this in a group which serves members of the public, including those who travel as passengers, with over 34,000 employees working in ten routes, several businesses and a rail projects delivery business with a contractor workforce of up to 100,000.

Our vision has provided a common thread for all our work and communications around safety. It has also been adopted by many of our contractors. Our new chief executive, Mark Carne has emphasised the importance of our safety vision and the role that each person has in its achievement. Our vision, the belief that safety and business performance go hand in hand, and our underpinning personal commitments have been rolled out from the executive committee across our organisation.

We have developed our safety strategy which builds on our vision and provides a structured approach to improving the safety of passengers, the public and our workforce over the next decade. We started to implement our strategy this year.

Our safety initiatives have included the development and launch of 11 Lifesaving Rules which has simplified and focused our safety rules. We have also used the bow tie method of assessing risks as we develop our Business Critical Rules to control these key risks within the business. At the same time we have been reviewing safety roles and managing competency (e.g. the new Sentinel system based on smartcard technology enables better verification of everyone's credentials before they access the railway).

In CP4 we achieved a 31 per cent risk reduction at level crossings, ahead of 25 per cent risk reduction for the entire control period. This has largely been as a result of closing 804 level crossings.

The Passenger Safety indicator at the end of the year was 0.194 against a year-end target of 0.240 (the lower the number the better) – significantly better than target and the same time last year. We are focusing on activities at our Managed Stations to manage crowd flows and influence behaviour so that passenger injuries on our stations are reduced.

In 2013/14 there were no passenger fatalities on Network Rail Managed Stations. There were 54 major accidents with slips, trips and falls continuing to be the largest causes of accidents at Managed Stations. During CP4 we have continued to deliver enhancements at Managed Stations to mitigate these risks.

During the year there were 18 adult accidental fatalities and no accidental child fatalities. In addition, there were 286 suicides. We continue to work closely with Samaritans to understand what more can be done to reduce suicide risk on the railway.

There were three workforce fatalities in 2013/14 and 11 over the course of CP4; three fatalities were due to workers being struck by trains, two due to falls from height, one due to being overcome by fumes when working in a confined space and five due to driving related activities. We did not meet our target for workforce safety even though the overall risk to workforce safety decreased. We are taking steps to improve our safety culture and a strategic ten point plan has been established with each point being led by a member of Network Rail's Executive Committee.

There were fewer safety enforcement notices in 2013/14 than the year before, however these related to more significant and serious matters with network-wide implications (i.e. a rise in track geometry twist faults, the significant number of unearthed / unbounded location cabinets including some on stations platforms).

A summary of our safety KPIs and supporting measures which provide an indication of our safety performance are shown in Table 2.

Train performance

Control Period 4 (CP4) has been a challenging period with regard to performance. At a national level we ended the year 2.5 percentage points behind our target of 92.5 per cent. Performance in the year has again been severely affected by weather (the fourth year in CP4 that this has occurred). The storms, gales and floods across much of Britain during the winter of 2013/14 demonstrated once again not only how our weather patterns are changing, but also the impact that has on the railway. Whether it has been the dramatic demolition of the seawall at Dawlish, coastal damage and land slips in Wales, rising groundwater in the Thames Valley, or falling trees in Scotland, there has hardly been a part of the network that has not been affected.

Severe weather has had the biggest impact on the performance of the railway with the impact of external delays (things that we do not have principal control over such as cable theft and suicides) significantly reduced as a result of industry focus in this area. We are working to better understand the impact not just of the recent storms, but of the extreme weather events over the past few years. In September 2014 we will complete a series of resilience studies and identify further weather resilience plans for action in the coming months.

Over the past few years demand has continued to grow significantly ahead of initial expectations at the start of CP4. Over the course of CP4 total train miles have increased by 9.4 per cent resulting in a volume incentive payment of £61 million. However, the growing demand has put pressure on train punctuality. The railway is busier than it ever has been and so when incidents happen more trains are delayed.

In 2012, the ORR concluded that Network Rail should pay a financial penalty of £1.5 million for each 0.1 percentage point that performance fell short of the end of control period target in the Long Distance sector. We missed our end of CP4 target of 92 per cent for this sector by 5.1 percentage points, meaning that a potential penalty of up to £76.5 million was possible. However, having taken in to account the affect of adverse weather conditions and the impact of cable theft and suicides, ORR determined that a final sum of £53.1 million should be returned to funders, with the money being used to part-fund the improvement of wi-fi access on routes across England and Wales – a direct passenger benefit.

As Network Rail missed its performance target for the London and South East (LSE) sector by 3.4 percentage points, ORR concluded that Network Rail had breached its licence by not doing everything reasonably practicable to achieve its performance outputs. Network Rail has therefore also committed to investing a further £25 million on special weather resilience projects in the south east of England, recognising the particular impact this sector has suffered from weather events in the past few years which was a major contributor to missing punctuality targets.

We recognise that this has not been satisfactory and accept our part in the performance shortfall. We know punctuality is extremely important to passengers. We are disappointed that we did not meet the targets we were set for CP4. The reasons why were complex but one thing we did not predict was the extent of growth in passengers/train services over the five years. We have carried out detailed analysis to explain these shortfalls against our CP4 targets focussing in particular on where train performance is affected by changes in journey times; capacity and other outputs; the assumptions which informed our planning for CP4; the impact of adverse weather to inform the recovery plans we put in place

last year for the freight, long distance and LSE sectors; our plans for CP5.

We will use this analysis to inform our efforts on hitting the performance targets we have been set for the next five years. We expect the first two years of CP5 to be challenging but we are confident that with the initiatives we have underway we can meet the targets in the remainder of the CP5.

Table 3 provides a summary of our train performance KPIs for CP4.

Network availability

Network Rail maintains, renews and enhances the network while at the same time providing an operational railway. This requires effective possession planning to reduce disruption to the network. We use the Possession Disruption Indices for passenger and freight (PDI-P and PDI-F) as the principal measures of the availability of the network to run trains.

The end of CP4 target was a 37 per cent reduction in the disruption caused to passenger train services as a result of planned engineering works and a level of freight disruption that is no worse than the end of CP3. This was against the backdrop of delivering a £24 billion investment programme including major programmes of work such as Reading, Crossrail and Thameslink.

Whilst we narrowly missed our PDI-P target, disruption to passenger train services as a result of planned engineering works was reduced by 35 per cent over CP4 whilst disruption to freight services was reduced by 12 per cent. Over the course of CP4 disruptive possessions have been significantly reduced.

PDI-P was substantially ahead of target for the first four years of CP4. The upward pressure on the PDIs in the final year of CP4 is related to the deferral of some of the CP4 workbank from the early part of CP4. However, for CP4 as whole, the volume of possessions taken is 29 per cent less than the levels targeted. The average PDI-P period actual in CP4 is 0.25 lower than the average period target.

The overall improvement delivered has been supported by the CP4 Network Availability Implementation Plan and a programme of works utilising the seven day railway fund.

Table 4 shows the PDI results for CP4.

Network capability

Growth and demand on the network has continued to increase in CP4 compared to CP3. The increase in growth has been greater than forecast. In CP4 the delivery of our enhancements programme has helped improve the capability of the network to meet this challenge so that we have maintained the capability of our network during CP4.

Asset stewardship

We use the asset stewardship indicator (ASI) as a high level indicator of asset performance. We achieved our ASI target for Control Period end within the third year of the Control Period, and ended CP4 with a score 10.4 per cent better than CP3 exit.

Over 2013/14, despite challenging weather conditions, reliability and condition improvements were seen across a range of our key assets including:

- track geometry (in terms of poor track geometry and good track geometry) as well as rail breaks and track failures all bettering ORR CP4 end success criteria
- signalling condition
- structures assets subject to additional examinations
- a number of electrical power asset condition measures
- telecoms assets condition.

Telecoms failures were higher than forecast, reflecting software issues in rolling out GSM-R (the new communication system between signallers and train drivers). A programme of the necessary software patches is now under way to resolve the issues found.

Our structures and earthworks have been particularly affected by the extreme weather over the last winter, with flooding and storm surges affecting our embankments and sea defences such as at Dawlish and the Cambrian Coast.

Our key initiatives to address the challenges include increasing the reliability of our assets and reducing the number of failures, whether track, points or signals through a process of continuous improvement using targeted maintenance, lean techniques of working, as well as the latest technology, to maintain our infrastructure.

Our ORBIS programme (Offering Rail Better Information Services) is key to our move from an approach based on ‘find and fix’ to one of ‘predict and prevent’. This significant investment in our asset information data and systems makes it easier to capture information through the deployment of hand-held devices and advanced train-borne systems, giving us better information about how our rail network is performing, the condition our rail assets are in and where we need to make future investments.

We have also made good progress with our asset management initiatives, particularly those to reduce the number of asset failures, such as targeted

maintenance and the use of new technology. However due to external factors like the severe weather during CP4, even when the number of asset failures has reduced the impact of them and on resulting delay minutes has still been very large.

We have not delivered as many renewals as assumed in CP4 and some renewals have been deferred into CP5. Notwithstanding this we have maintained our assets in a sustainable way over CP4. The reasons for the differences by asset type are detailed in Section 4.

Table 5 shows a summary of our asset condition measures and Table 6 shows the volumes of asset renewals delivered during the year compared to previous years.

Enhancement schemes

In 2013/14 we continued to deliver our programme of investments resulting in the successful delivery of our overall investment commitments for CP4. We also delivered the £250 million fiscal stimulus package on projects. Section 6 provides the detailed progress for all projects for 2013/14. Some highlights for the year include; the completion of and 'switchover' to the western concourse for the Birmingham New Street station redevelopment work, work now being underway at five of the major Crossrail sites, the completion of the Gatwick Airport remodelling and passenger capacity scheme and progress in delivering the CP4 Strategic Freight Network schemes.

Whilst the vast majority of schemes achieved their CP4 milestones, a small number did not - notably the Strategic Freight Network, St Pancras to Sheffield line speed improvements, the Westerleigh to Barnt Green line speed improvement projects and Cardiff re-signalling project.

Stakeholder relationships

Our customer satisfaction survey showed a decrease in overall satisfaction from 66 per cent to 58 per cent. Train performance was mentioned as one of the principal causes for the drop in satisfaction and although we have continued to develop route action plans as part of the ways to progress collaborative working, we will need to work more closely with our customers on the areas that matter to them.

Passenger satisfaction, as measured by the results of the spring 2014 National Passenger Satisfaction survey, was 82 per cent. This is not significantly different to the results of the spring 2013 survey (when 82 per cent of passengers were also satisfied). However, those satisfied with train punctuality and reliability in spring 2013 was 77 per cent, three per cent lower than in autumn 2013. The principal driver for the drop in satisfaction was the impact of the adverse weather and the consequent flooding. A significant amount of effort has been put into targeting sites at risk of flooding and working with train and freight operating companies. Reducing all delays back to previous levels remains a high priority.

Overall passenger satisfaction at Network Rail's Managed Stations was 84 per cent, a one percentage point improvement on the spring 2013 survey. It was noted that Network Rail Managed stations that have recently completed improvements works have higher passenger satisfaction results.

Table 1: Performance against CP4 regulatory targets

Measure	*Target 2009/10*	*Actual 2009/10*	*Target 2010/11*	*Actual 2010/11*	*Target 20011/12*	*Actual 2011/12*	*Target 2012/13*	*Actual 2012/13*	*Target 2013/14*	*Actual 2013/14*	*CP4 target*
Passenger safety indicator (MAA)	0.248	0.155	0.246	0.182	0.244	0.251	0.242	0.234	0.240	0.194	0.240
Workforce fatalities and weighted injuries (MAA)	0.098	0.129	0.096	0.126	0.11	0.138	0.092	0.149	0.090	0.161	0.090
	Regulatory Target	*Actual 2009/10*	*Regulatory target 2010/11*	*Actual 2010/11*	*Regulatory Target 20011/12*	*Actual 2011/12*	*Regulatory Target 2012/13*	*Actual 2012/13*	*Regulatory Target 2013/14*	*Actual 2013/14*	*CP4 target*
PPM (% MAA) England & Wales Long distance	88.6	88.7	89.8	87.7	90.9	89.1	91.5	87.0	92.0	86.9	92.0
PPM (% MAA) England & Wales London & South East	91.5	91.5	92.0	91.1	92.4	91.7	92.7	91.0	93.0	89.6	93.0
PPM (% MAA) England & Wales Regional	90.5	92.5	91.0	91.5	91.5	92.5	91.9	91.1	92.0	91.0	92.0
PPM (% MAA) England & Wales Total	91.0	91.6	91.5	90.9	92.0	91.7	92.3	90.7	92.6	89.8	92.6
PPM (% MAA) Scotland Total (ScotRail)	90.9	90.6	91.3	90.1	91.7	90.7	91.9	93.0	92.0	91.4	92.0
Cancellations & significant lateness (% MAA) England & Wales Long distance	4.9	4.6	4.5	5.0	4.2	4.0	4.0	4.9	3.9	4.9	3.9
Cancellations & significant lateness (% MAA) England & Wales London & South East	2.3	2.5	2.2	2.6	2.1	2.4	2.0	2.5	2.0	3.1	2.0
Cancellations & significant lateness (% MAA) England & Wales Regional	2.6	2.1	2.5	2.4	2.4	2.0	2.3	2.5	2.3	2.3	2.3
Delay mins – passenger (000's) England & Wales[1]	6,270	6,274	5,790	6,898	5,430	6,537	5,190	7,030	4,980	7,644	4,980
Delay mins – passenger (000's) Scotland (ScotRail)[1]	436	537	410	531	391	483	386	378	382	447	382
Delay mins per 100 train km – freight	3.68	3.98	3.41	4.28	3.18	3.61	3.05	3.63	2.94	3.70	2.94
PDI – passenger (MAA)	1.02	0.63	0.91	0.52	0.83	0.54	0.68	0.64	0.63	0.69	0.63
PDI – freight (MAA)	1.00	0.82	1.00	0.89	1.00	0.85	1.00	0.79	1.00	0.87	1.00
Station Stewardship Measure (by category)											
A	2.48	2.38	2.48	2.30	2.48	2.26	2.48	2.21	2.48	2.16	2.48
B	2.60	2.46	2.60	2.40	2.60	2.37	2.60	2.34	2.60	2.32	2.60
C	2.65	2.52	2.65	2.47	2.65	2.43	2.65	2.40	2.65	2.36	2.65
D	2.69	2.54	2.69	2.47	2.69	2.41	2.69	2.39	2.69	2.35	2.69
E	2.74	2.58	2.74	2.50	2.74	2.43	2.74	2.39	2.74	2.36	2.74
F	2.71	2.56	2.71	2.50	2.71	2.47	2.71	2.47	2.71	2.44	2.71
Scotland (all stations)	2.39	2.39	2.39	2.33	2.39	2.28	2.39	2.33	2.39	2.23	2.39
Light Maintenance Depot stewardship measure											
England & Wales	2.52	2.47	2.52	2.46	2.52	2.40	2.52	2.38	2.52	2.37	2.52
Scotland	2.56	2.65	2.56	2.67	2.56	2.66	2.56	2.45	2.56	2.38	2.56
All LMDs	2.52	2.50	2.52	2.48	2.52	2.43	2.52	2.39	2.52	2.37	2.52

Notes:

1. The delay minutes totals are based on all PfPI (Process for Performance Improvement) delays, affecting applicable main scheduled passenger operators (franchised operators plus open access operators Heathrow Express, Grand Central, Wrexham & Shropshire and First Hull Trains). Wrexham & Shropshire figures are included until they ceased network operations during 2010/11. Prior to 2009/10 figures included delays and mileage for NEXUS Metro and Eurostar services; in 2008/09 these accounted for 12,059 minutes of delay.

2. MAA is Moving Annual Average.

Table 2: Summary of safety measures

Measure	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Workforce safety – Fatalities and weighted injuries MAA	0.129	0.126	0.138	0.149	0.161
Infrastructure wrong side failures (No.)	78	95	57	74	115
Level crossing misuse – incidents MAA	28.38	29.38	30.92	28.31	27.00
Category A signals passed at danger (No.)	274	299	276	249	293
Operational Close Calls MAA	21.69	17.69	23.46	23.08	23.77
Malicious acts per 100 route miles (No.)	4.42	4.42	4.36	3.09	2.69
Passenger Safety Indicator MAA	0.155	0.182	0.251	0.234	0.194

Notes:
- MAA is the moving annual average.
- Some of the 2010/11 figures have been restated as all numbers are taken at a specific point in time and with further refinements during the year some of these numbers change.

Table 3: Train performance KPIs for CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Public Performance Measure (PPM %) (national)	91.40	90.80	91.60	90.90	90.00
Total delay minutes (millions)	8.20	8.98	8.42	8.88	9.58
Passenger train delay minutes per 100 train km	1.43	1.55	1.43	1.51	1.64
Freight train delay minutes per 100 train km	3.98	4.28	3.61	3.69	3.70
Cancellations and significant lateness for England & Wales	2.6	2.8	2.4	2.7	3.0
Passenger and freight traffic (million train km)	513	522	536	536	538

Table 4: Disruptions to passengers and freight as a result of planned engineering possessions

	2009/10 Actual	*2010/11 Actual*	*2011/12 Actual*	*2012/13 Actual*	*2013/14 Actual*	*2013/14 Planned*
Possession disruption index (Passenger) – (PDI- P)	0.63	0.52	0.54	0.64	0.69	0.63
Possession disruption index (freight) – (PDI-F)	0.82	0.89	0.85	0.79	0.87	1.00

Table 5: Comparison of network asset measures with previous years

Measure	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Good track geometry	137.7	137.0	136.5	138.1	137.7
Poor track geometry	2.38	2.48	2.58	2.38	2.32
Intervention/ Immediate action geometry faults per 100km	40.3	39.7	41.3	40.3	36.5
Broken rails (No.)	152	171	127	178	126
Rail breaks and immediate action defects per 100km	5.80	4.49	3.82	4.14	4.00
Immediate action rail defects per 100 km	5.31	3.94	3.39	3.48	3.55
Condition of asset TSRs (No.)*	1,729	1,348	1,864	1,958	2,268
Civils – Assets subject to additional inspections (No.)	844	810	789	801	711
Earthworks failures (No.)	57	42	28	144	127
Tunnels condition	Bore 88	Bore 89	Bore 88	See Page 115	See Page 115
	Portal 92	Portal 92	Portal 89	See Page 115	See Page 115
Bridge condition score	2.24	2.22	2.22	2.26	2.28
Signalling failures causing delays of more than 10 mins. (No.)	18,324	16,506	15,647	15,010	14,962
Signalling asset condition	2.37	2.41	2.38	2.37	2.33
AC power incidents causing >500 minute train delays (No.)	46	61	50	52	61
DC power incidents causing >500 minute train delays (No.)	14	14	16	8	16
AC traction feeder stations and track sectioning points condition	2.70	2.56	2.57	2.29	2.35
DC traction feeder stations and track sectioning points condition	2.32	2.36	2.45	2.38	2.34
AC contact systems condition	1.6	1.6	1.6	1.4	1.3
DC contact systems condition	1.9	1.9	2.0	2.0	2.0
Telecoms condition	0.92	0.94	0.95	0.97	0.98
Points failures	7,118	5,803	5,162	5,022	4,387
Train Detection failures	6,058	5,215	4,926	4,607	4,536
Track failures	6,685	5,880	5,521	5,345	5,984
Power incidents causing train delays of more than 300 minutes	75	100	71	65	84
Telecom failures causing train delays of more than 10 minutes	770	689	698	697	1,310
Station stewardship measure					
Category A	2.38	2.30	2.26	2.21	2.16
Category B	2.46	2.40	2.37	2.34	2.32
Category C	2.52	2.47	2.43	2.40	2.36
Category D	2.54	2.47	2.41	2.39	2.35
Category E	2.58	2.50	2.43	2.39	2.36
Category F	2.56	2.50	2.47	2.47	2.44
Scotland (all categories)	2.39	2.33	2.28	2.33	2.23
Light maintenance depot stewardship measure (network)	2.50	2.48	2.43	2.39	2.37
Asset reliability (no. of infrastructure incidents causing delay)	**46,078**	**42,129**	**40,500**	**39,743**	**42,144**

Notes:
For all measures in this table, except Good Track Geometry and Telecoms Condition, a lower figure indicates improvement. Some historical data has been restated due to refinement in the reporting systems.

Table 6: Activity volumes

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Rail (km of track renewed)	810	587	774	699	783
Sleeper (km of track renewed)	438	445	567	501	526
Ballast (km of track renewed)	509	525	573	522	552
Switch & crossings (No. of full units replaced)	231	269	285	264	323
Signalling (SEUs)	813	798	1,266	978	1,883
Bridge renewals (No.)	n/a	340	261	214	229
Culvert renewals (No.)	13	25	31	16	13
Retaining wall renewals (No.)	5	11	10	10	4
Earthwork renewals (No.)	n/a	103	117	148	182
Tunnel renewals (No.)	24	49	48	30	35

Regulatory and governance matters

2013 Periodic Review

On 7 February 2014 we formally accepted the ORR's final determination which established outputs and funding for the next five years. Our plans for the next five years will focus on the busiest parts of Britain's rail network, making a real difference to passengers and providing a significant boost to the economy.

We worked closely with the ORR to transpose the Final Determination into operators' Track Access Contracts (TACS). The TACS reflect changes for Control Period 5 (CP5) such as the introduction of the Route Efficiency Benefit Sharing (REBS) mechanism.

In addition we agreed to a number of changes to our network licence. Many of the changes were requested by Network Rail and clarify and simplify our existing obligations and give effect to the ORR's periodic review determination.

Operational performance in CP4

In 2012, the ORR concluded that Network Rail should pay a financial penalty of £1.5 million for each 0.1 percentage point that performance fell short of the end of control period target in the long distance sector. We missed our end of CP4 target of 92 per cent for the long distance sector by 5.1 percentage points, meaning that a potential penalty of up to £76.5 million was possible. However, having taken in to account the affect of adverse weather conditions and the impact of cable theft and suicides, ORR determined that a final sum of £53.1 million should be returned to funders, with the money being used to part-fund the improvement of wi-fi access on routes across England and Wales – a direct passenger benefit.

As we missed our performance target for the London and South East (LSE) sector by 3.4 percentage points, ORR concluded that we had not done everything reasonably practicable to achieve our performance outputs and had breached our licence. Network Rail has therefore also committed to investing a further £25 million on special weather resilience projects in the south east of England, recognising the particular impact this sector has suffered from weather events in the past few years which was a major contributor to missing punctuality targets. An updated delivery plan will be published in September to reflect this, and we will be working with the ORR, the Department for Transport (DfT) and industry and passenger groups to deliver a fund plan. This will be agreed with the ORR by 31 December 2014 and will be primarily based on the Climate Change Resilience Plans that we are currently developing.

The Regional sector achieved its CaSL (MAA) target in 2013-14. However the PPM (MAA) was 1.0 percentage point below target. The ORR's investigation and analysis showed that, taking into account external factors and in this case, particularly TOC on self delays and cancellations, Network Rail would have achieved its PPM regulated target for 2013-14. On this basis, the ORR determined that no licence breach occurred in this sector.

Train performance in Scotland ended CP4 0.6 percentage points behind target. Notwithstanding this performance was good since December 2013 as a result of some targeted asset investment and collaborative working with First ScotRail to ease pressures resulting from the timetable recast in December 2012. As a result ORR concluded that in 2013/14, Network Rail had done everything reasonably practicable to achieve its regulated performance outputs in Scotland.

Freight performance ended CP4 at 3.70 Network Rail caused delay minutes per 100 train kilometres (26 per cent worse than target). However, when assessed against the new Freight Delivery Metric, which measures the punctuality of all freight services at destination, 93.4 per cent of trains arrived on-time in 2013/14. The Freight Joint Board also stated that the below target performance had not caused serious customer issues. As a result the ORR decided that no licence breach had occurred.

Governance Issues

Network Rail remains committed to maintaining high standards of corporate governance, business ethics and integrity across the business, recognising these to be vital to the sustainable long-term performance of the company. During 2013/14 Network Rail voluntarily complied with the UK Corporate Governance Code.

As part of its programme of Diversity and Inclusivity, the Board has agreed that:

- in seeking candidates for appointment to the Board, the nomination and corporate governance committee will only engage the services of search consultants who have open and inclusive recruitment processes that draw from an appropriately diverse pool of candidates
- it will have an aspirational target of at least 25 per cent of the non-executive directors being women by 2015.

Following the change to the membership structure in 2012, the company had 41 public members at 31 March 2014 and the Department for Transport as a special member.

In order that the members can discharge their responsibilities the company has arranged during 2013/14:

- seven meetings to update members on financial results, governance, remuneration, safety and performance matters
- focussed member engagement groups providing members the opportunity to volunteer to receive more in-depth briefings from the board and senior managers in five key strategic areas - safety, people, future, performance & finance and risk
- two meetings with the ORR to consider the regulator's view on the company's performance.

Transparency

Our voluntary disclosure scheme continued to grow in 2013. Updated on a quarterly basis, we have now published over 60 different categories of information. This includes information on our procurement performance, expenditure in key areas, and key operational publications such as the sectional appendix and working timetable.

During 2013 we added more real time information to our operational systems. Consistent with the principles of Governments' open data agenda, these have allowed a range of developers to build and improve websites and smart phone apps, which show the public what is happening on the network in real time and enable them to make more informed journey choices.

Reclassification

In December 2013, the Office for National Statistics published their conclusion that a change in European accounting rules meant we are to be reclassified as a central government body. This change will result in changes to our borrowing arrangements. Otherwise, the reclassification does not have an immediate impact on our corporate status or activities, though it is inevitable that there will be some change when the reclassification actually takes effect in September 2014. We have an agreement with the Department for Transport setting out the shared objective of not changing anything unnecessarily and we will work together over the coming months to preserve as far as possible our ability to manage our business independently and on a long-term basis.

Introduction

The Annual Return 2014 reports on Network Rail's stewardship of the rail network in 2013/14. As it is the final year of Control Period 4 (CP4) it also provides an overview of our performance for the whole of CP4 (1 April 2009 – 31 March 2014).

We have included information by the ten operating routes wherever possible. A map of the operating routes is provided at the end of this section.

We have provided five years of data wherever this is possible so that the results for every year of CP4 are shown.

It should be noted that some of the previous year's figures were not final at the point of publication. As a result, a few of last year's figures have been subsequently updated. Where figures have been updated we have provided an explanation for this. In particular the operational performance figures have all been refreshed for the five years of CP4 to take into account resolution of disputes and final delay attribution. As a result many of the performance numbers reported in previous Annual Returns have been updated in this Annual Return to more accurately reflect the end of CP4 outturn.

Scope of reporting against targets

The targets included within this Annual Return are either regulatory targets as determined in the Periodic Review 2008 or Network Rail forecasts in Delivery Plan updates.

Most asset condition information is based on assessments from a sample of assets. As more surveys are conducted each year, the reliability of the data reported for each asset category will improve.

Independent Reporters

Since October 2002, Network Rail together with the ORR has employed Independent Reporters. The role of the Reporters is to provide independent technical audit services to the ORR and Network Rail. Whilst undertaking this role, they are expected to deliver benefits to Network Rail through suitable recommendations about how we can improve our business processes. Ove Arup has been appointed to review our outputs and the processes, systems and data related to the reporting of our performance throughout the year including data in this Annual Return. The Reporter has therefore been considering the quality, accuracy and reliability of the data and related processes that we use for reporting our performance during the year. The contract provides for audits throughout the year and for the Reporter to focus on specific areas each quarter. The Ove Arup reports can be found on the ORR's website under 'Network Rail Regulation' and 'Independent Reporters'.

Confidence reporting

As part of the Reporter reviews, a confidence grade for the measure and area that they have reviewed is provided. This confidence grade provides an indication of the accuracy and reliability of the measure.

It should be noted that from 2011/12 the confidence grading system was slightly modified. An explanation of the previous confidence grading system can be found in the Annual Return 2011. As confidence grades in this Annual Return also include confidence grades awarded by the previous Reporter and those from reviews prior to 2011/12, some confidence grades will be based on the previous system. The modified confidence grading system is very similar to the previous one as the ORR developed it to enhance the previous system and minimise any confusion.

Tables 7 and 8 provide an explanation of the reliability and accuracy grades.

Table 9 provides a summary of all confidence grades awarded by the previous and present Reporter for all measures or information that have been reviewed by Reporters. Some of these confidence grades are very old and may no longer be relevant as improvements have been made to those measures. We have included them for completeness as no further reviews have been done for those measures and we have provided explanations in the detailed sections. There are also some measures that have not been reviewed and therefore do not have confidence grades. We have indicated where this is the case.

Table 7: System reliability grading system

System Reliability Band	*Description*
A	Appropriate, auditable, properly documented, well-defined and written records, reporting arrangements, procedures, investigations and analysis shall be maintained, and consistently applied across Network Rail. Where appropriate the systems used to collect and analyse the data will be automated. The system is regularly reviewed and updated by Network Rail's senior management so that it remains fit for purpose. This includes identifying potential risks that could materially affect the reliability of the system or the accuracy of the data and identifying ways that these risks can be mitigated. The system that is used is recognised as representing best practice and is an effective method of data collation and analysis. If necessary, it also uses appropriate algorithms. The system is resourced by appropriate numbers of effective people who have been appropriately trained. Appropriate contingency plans will also be in place to ensure that if the system fails there is an alternative way of sourcing and processing data to produce appropriate outputs. Appropriate internal verification of the data and the data processing system is carried out and appropriate control systems and governance arrangements are in place. The outputs and any analysis produced by the system are subject to management analysis and challenge. This includes being able to adequately explain variances between expected and actual results, time-series data, targets etc. There may be some negligible shortcomings in the system that would only have a negligible affect on the reliability of the system.
B	As A, but with minor shortcomings in the system. The minor shortcomings would only have a minor effect on the reliability of the system.
C	As A, but with some significant shortcomings in the system. The significant shortcomings would have a significant effect on the reliability of the system.
D	As A, but with some highly significant shortcomings in the system. The highly significant shortcomings would have a highly significant effect on the reliability of the system.

Notes:
1. System reliability is a measure of the overall reliability, quality, robustness and integrity of the system that produces the data.
2. Some examples of the potential shortcomings include old assessment, missing documentation, insufficient internal verification and undocumented reliance on third party data.

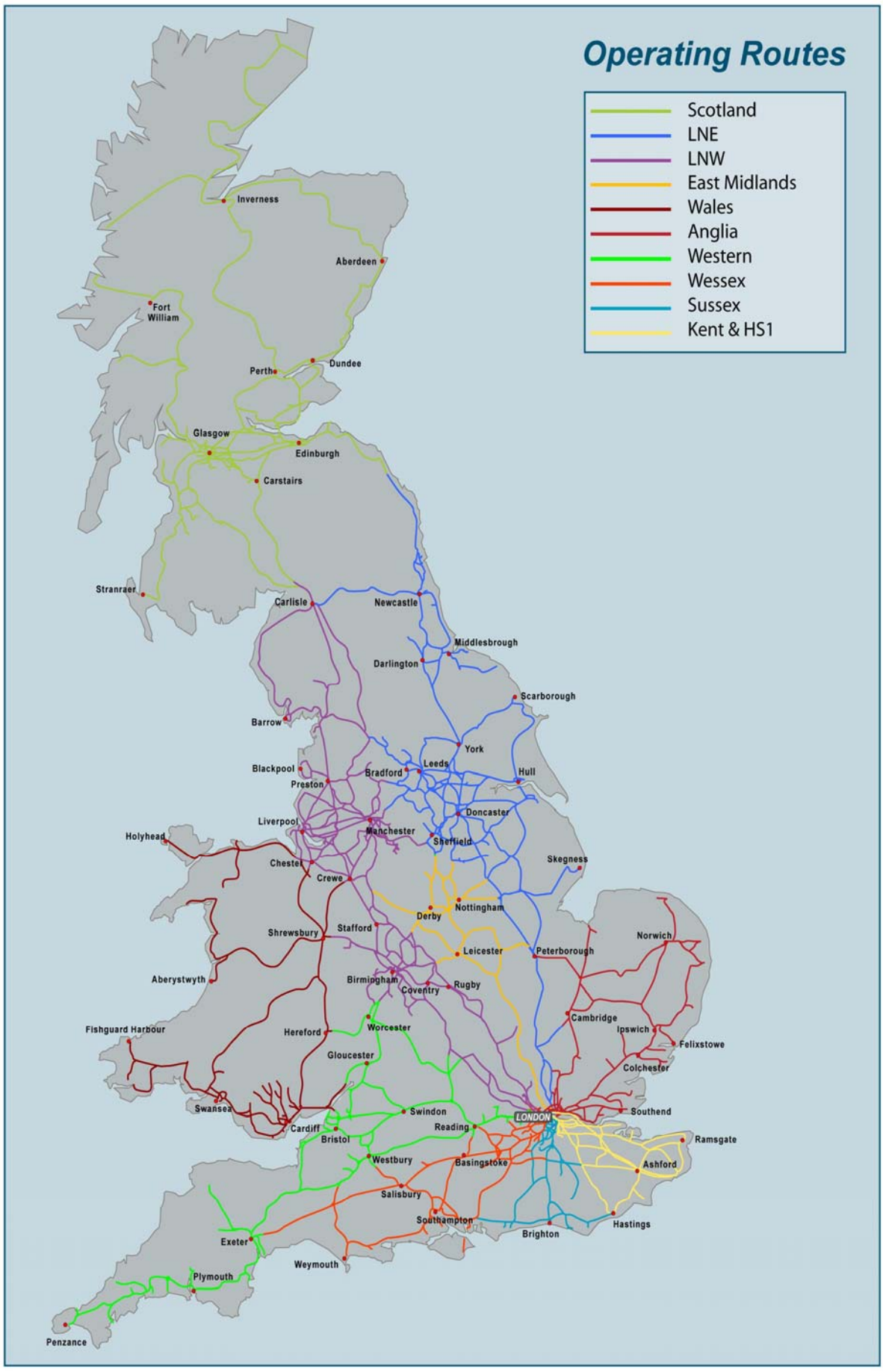
Table 8: Accuracy grading system

Accuracy band	*Description*
1*	Data used to calculate the measure is accurate to within 0.1 per cent
1	Data used to calculate the measure is accurate to within 1 per cent
2	Data used to calculate the measure is accurate to within 5 per cent
3	Data used to calculate the measure is accurate to within 10 per cent
4	Data used to calculate the measure is accurate to within 25 per cent
5	Data used to calculate the measure is accurate to within 50 per cent
6	Data used to calculate the measure is inaccurate by more than 50 per cent
X	Data accuracy cannot be measured

Notes:
1. Accuracy is a measure of the closeness of the data used in the system to the true values.
2. Accuracy is defined at the 95 per cent confidence level - i.e. the true value of 95 per cent of the data points will be in the accuracy bands defined above.

Table 9: Summary of Confidence grades	
Measure / Information	***Confidence grade***
Safety and sustainable development	
Workforce Safety	B2
Passenger Safety	B3
Safety improvement commentary	-
Percentage of at risk employees that have been screened for Noise Induced Hearing Loss (NIHL)	D6
No. of at risk employees screened for HAVS (Hand Arm Vibration Syndrome)	D6
No. of referrals to OH (Occupational Health) providers due to musculoskeletal condition	B2
No. of referrals to OH providers due to stress related absence	B2
Employers liability	-
System Safety	-
Infrastructure wrongside failures	A1
Category A SPADs	A1
Level Crossing Misuse	A3
Irregular Working	B3
Criminal Damage	B3
Public Safety	-
Sustainable Development (Environmental performance)	-
Operational performance and Stakeholder relationships	
Public Performance Measure (PPM)	A1
Delay minutes	-
Delays to passenger train services	A1
Delays to freight train services	A3
Freight delivery metric	-
Delay minutes by cause	-
Asset failures (Track/ non-track delay minutes)	A1
Right time performance	C2
Cancellations & Significant Lateness (CaSL)	A2
Customer satisfaction	A1
Passenger satisfaction	-
Network capability and availability	
Linespeed capability	B2
Gauge capability	B2
Route availability value	B2
Electrified track capability	B2
Network change	-
Discrepancies between actual and published capability	-
Platform lengths	-
Network availability – Possession Disruption Index – Passenger	B2
Network availability – Possession Disruption Index – Freight	A1
Asset management	
Excellence in asset management	-
Rail age/ type	-
Broken rails	A1
Rail defects	A2
Track Geometry – Good Track Geometry (M3)	B2
Track geometry quality – Poor Track Geometry (M3)	A1

Table 9 continued: Summary of Confidence grades	
Measure / Information	***Confidence grade***
Track geometry faults	A1
Track buckles	A2
TSRs (Temporary Speed restrictions)	B2
Track failures	-
Earthwork failures	A2
Earthwork condition	B2
Tunnel condition	-
Bridge condition	C3
Bridge examination	-
Bridge assessment of strength	-
Signalling failures	-
Signalling asset condition	B2
Points failures	-
Train detection failures	-
Telecoms condition	-
Telecoms failures	-
Alternating current traction power incidents causing train delays	B2
Direct current traction power incidents causing train delays	BX
Electrification condition – AC traction feeder stations and track sectioning points	XX
Electrification condition – DC traction substations	XX
Electrification condition – AC traction contact systems	C4
Electrification condition – DC traction contact systems	C4
Power incidents causing train delays of more than 300 minutes	-
Assets subject to additional inspection	-
Rail breaks and immediate action defects per 100 km	-
Station Stewardship Measure	B2
Light Maintenance Depot Stewardship Measure	C2
Activity volumes	
Track renewals (not separated by rail, sleepers, ballast and S&C as it was reviewed together and given one confidence grade)	B1
Signalling renewals	B1
Level crossing renewals	-
Telecoms renewals	C5
Civils renewals (not separated out as it was reviewed together and given one confidence grade)	B1
Drainage volumes renewals	-
Drainage expenditure	-
Electrification and plant renewals	C4
Operational property volumes	-
Enhancements programme	
Enhancement schemes information	-


Operating Routes
Scotland
LNE
LNW
East Midlands
Wales
Anglia
Western
Wessex
Sussex
Kent & HS1
Inverness
Aberdeen
Fort William
Perth
Dundee
Glasgow
Edinburgh
Carstairs
Stranraer
Carlisle
Newcastle
Middlesbrough
Darlington
Scarborough
Barrow
York
Blackpool
Bradford
Leeds
Hull
Preston
Doncaster
Liverpool
Manchester
Sheffield
Holyhead
Skegness
Chester
Crewe
Nottingham
Derby
Shrewsbury
Stafford
Norwich
Leicester
Peterborough
Aberystwyth
Birmingham
Coventry
Rugby
Cambridge
Fishguard Harbour
Hereford
Worcester
Ipswich
Felixstowe
Gloucester
Colchester
Swansea
Swindon
LONDON
Southend
Cardiff
Reading
Bristol
Ramsgate
Westbury
Basingstoke
Ashford
Salisbury
Southampton
Hastings
Brighton
Exeter
Weymouth
Plymouth
Penzance

Section 1 – Safety and sustainable development

Introduction

In this section we report on our principal safety, health and environmental performance measures. The section also sets out the initiatives we are taking to improve our safety, health and wellness, and sustainable development risk management arrangements.

Safety performance

This covers aspects of safety which are the responsibility of Network Rail and our contribution to safety within the rail industry. There are two main safety measures - the Passenger Safety Indicator (PSI) which reports passenger safety risk associated with Network Rail activity, and the Workforce Fatalities and Weighted Injuries (FWI) measure, which reports workforce safety. Through these two measures we monitor our contribution to the industry target for CP4 of achieving a three per cent reduction in the risk of a fatality or injury from accidents on the railway for passengers and rail workers.

We also report on the key aspects of system safety using the following KPIs:

- infrastructure wrong side failures
- category A signals passed at danger (SPADs)
- operational 'close calls'
- level crossing events
- criminal damage.

System safety is an indication of the overall safety of passengers, workforce and the public in respect of the risks associated with all aspects of design, construction, maintenance and operation of the railway system.

Where appropriate, these KPIs are averaged over 13 four-weekly periods to provide a Moving Annual Average (MAA) performance figure.

Passenger safety

Definition

The level of passenger safety is measured by the Passenger Safety Indicator (PSI). This is derived from a combination of two separate data sources, of which the first is train accident risk data from the Precursor Indicator Model (PIM). Produced by the Rail Safety & Standards Board (RSSB) every quarter, the PIM provides a guide to the current train accident risk profile and the trends in this profile. It calculates this using precursor events data, such as broken rails or landslips, which are combined into six main groups (infrastructure failures, irregular working, public behaviour at level crossings, objects on the line, signals passed at danger, and trains and rolling stock). A subset of the PIM is calculated, identifying passenger risks only, and it is that number that is used in calculating the PSI. Assessing train accident risk in this way avoids the effect of low frequency, high consequence events that could potentially distort the PSI. Any accidents are highlighted in our Safety Health & Environment Performance (SHEP) report.

The second element of the PSI is calculated as the weighted number of personal injuries to passengers, at station level crossings and Network Rail managed stations only, reported in SMIS (Safety Management Information System). This comprises those defined as reportable under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) as well as those which are not reportable, normalised per one billion passenger kilometres.

Results

Table 1.1 shows the results of the Passenger Safety Indicator for 2013/14 compared with previous years. Our target for the end of CP4 is 0.24 or lower. Figure 1.1 shows the breakdown of the PSI period by period.

Commentary

There were no passenger fatalities on Network Rail managed stations in the year. However there were 54 major accidents. Slips, trips and falls continue to be the largest primary causes of accidents and safety enhancements were undertaken during CP4 at a number of these stations in order to mitigate this risk. At the end of the year, the PSI was 0.194, which is 17.1 per cent better than the prior year's figure of 0.234.

There has been an 18 per cent annual increase in the passenger component of train accident risk for which Network Rail is the risk controller. The most significant pre-cursor events are cutting failures (flooding and landslips caused by adverse weather), signals passed at danger and operating incidents. It is now seven years since the last passenger fatality as a result of a train accident.

At the end of CP4, PSI was 19.2 per cent better than the target of 0.24. This is largely due to a reduction in passenger major injuries at Network Rail managed stations which has countered the 40 per cent increase in the passenger component of train accident risk since 2010/11 (primarily as a result of irregular working, earthworks failures and objects on the line, e.g. trees caused by adverse weather conditions). The risk estimate for the industry passenger safety metric represented a decrease of 7.5 per cent compared with the baseline metric (primarily as a result of a reduction in assaults and platform edge incidents, e.g. passengers falling from station platforms).

Table 1.1: Passenger safety

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Passenger Safety Indicator (MAA)	0.155	0.182	0.251	0.234	0.194

Notes:
The reported figure for each year has been amended as per the change in new PIM categorisation and updates throughout the year.

Figure 1.1: Passenger Safety Indicator (broken down by period)

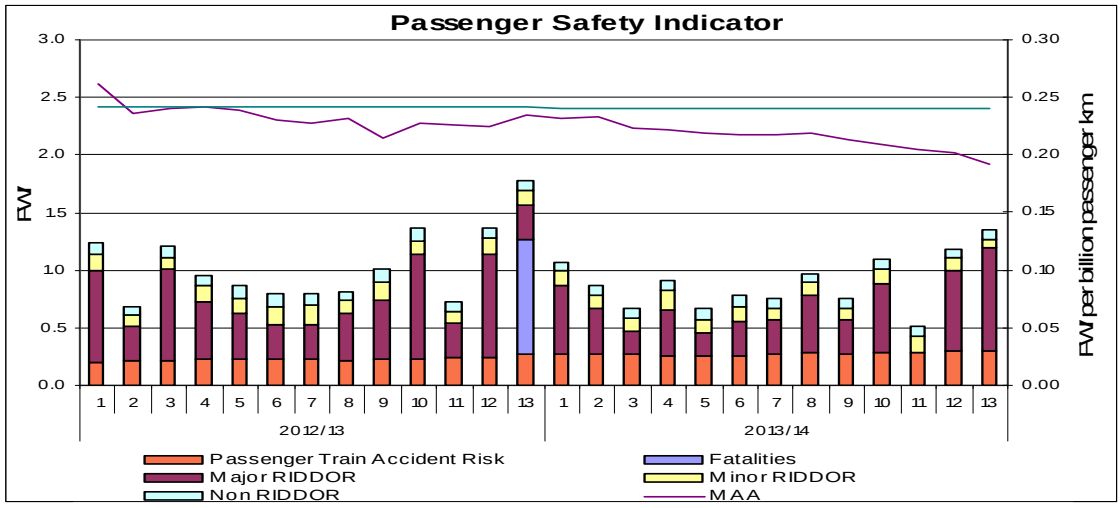
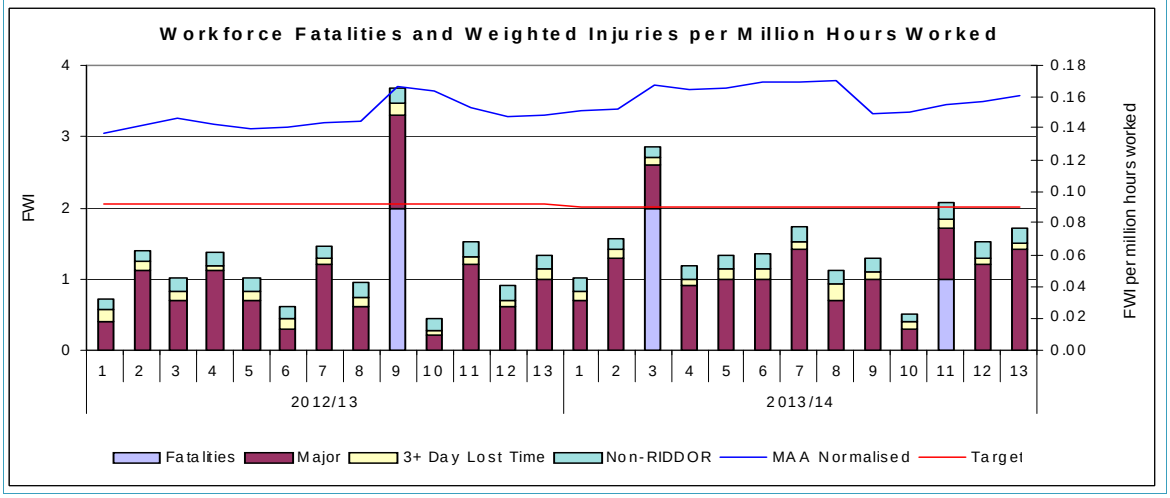


Table 1.2: Workforce safety

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Fatalities	3	1	2	2	3
Major injuries	96	101	101	104	122
Lost time injuries (RIDDOR Reportable)	146	202	309	322	310
FWI (MAA)	0.129	0.126	0.138	0.149	0.161

Notes:
The previously reported figures for 2010/11 for lost time injuries (100) and Major injuries (203) have been updated following a review and reconciliation of the data underpinning the previously reported yearly figure.
2011/12 Major (98) and Lost Time (314) updated and 2012/13 Major (101) and Lost Time (322) have been updated due to a reconciliation of the data underpinning the previously reported figures. Overall difference of +10 reported accidents.

Figure 1.2: Fatalities and Workforce Injuries (broken down by period)



Workforce safety

Definition

Workforce safety is primarily measured by the workforce safety fatalities and weighted injuries (FWI) measure. This measure comprises the weighted number of personal injuries that are reported in the Safety Management Information System (SMIS) for all Network Rail staff and contractors working on Network Rail's managed infrastructure, normalised per one million hours worked. This measure provides information to help monitor and control accidents and injuries to the workforce.

Results

Table 1.2 shows workforce safety FWI for 2013/14 compared with previous years.

Commentary

Sadly, there were three workforce fatalities in the year. On 19 June 2013, Michael Morris and Zach Payne, two contract welders employed by Renown, whilst returning to their depot, by road, from a railway worksite were fatally injured in a collision and subsequent fire on the A1 near Newark. On 22 January 2014, John Wright, a member of the our ultrasonics test team based at Doncaster maintenance delivery unit was struck by a train at Newark Northgate, whilst undertaking lookout duties, and sustained serious injuries. John was taken to hospital but, tragically, succumbed to his injuries on 31 January.

There were eleven workforce fatalities in the control period: three were due to being struck by trains; two due to falls from height; one due to being overcome by fumes when working in a confined space; and five due to driving-related activities.

At the end of the control period, the 13 period Fatalities and Weighted Injuries (FWI) rate was 0.161. This Workforce Safety Indicator was 79 per cent worse than our target of 0.09 (a target set before the level of workforce accident RIDDOR under-reporting had been identified and which has subsequently been rectified earlier in this control period).

In total there were 122 major injuries in the year, compared with 104 in the previous year, and more than in any of the previous years of the control period. The FWI trend has been generally rising over the year, is higher than last year's figure of 0.149, and higher than in any of the previous years of the control period.

Slips, trips and falls remain consistently the most common cases of accidents to Network Rail's workforce, accounting for 30.1 per cent of all workforce injury accidents, and 47.5 per cent of 3+ days lost time injuries and RIDDOR reportable accidents. The next most common causes of injuries are contact injuries, struck by object and manual handling.

Control Period 4 High Level Output Specifications (HLOS)

For Control Period 4 the DfT HLOS specified a three per cent reduction in both passenger risk and workforce risk over the control period. The HLOS targets for both risk categories were shown as an index starting at 100 per cent at the beginning of CP4, with a target of 97 per cent for March 2014. Both of the measures comprised two elements: train accident risk and movement/non-movement risk, as defined by the Safety Risk Model (SRM) - a detailed model of the hazardous events that could lead directly to injury or fatality during the operation and maintenance of the mainline railway.

The SRM shows the level of residual risk, with existing controls, for passengers, railway workforce, and public. The model covers all Network Rail infrastructure and is maintained by RSSB on behalf of the rail industry. Based on version 8 of the SRM, the passenger safety metric for the March 2014 assessment is 0.980 FWI per billion passenger kilometres. This represents a decrease of 3.1 per cent compared with the baseline metric. The workforce safety metric for the March 2014 assessment is 0.110 FWI per million workforce hours. This represents a decrease of 18.7 per cent compared with the baseline metric.

System safety

System safety is an indication of overall safety of passengers, workforce and the public in respect of risks associated with all aspects of the design, construction, maintenance and operation of the railway.

Table 1.3: Infrastructure wrong side failures hazard ranked 50+

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	66	83	51	67	110
Scotland	12	12	6	7	5
Network-wide	**78**	**95**	**57**	**74**	**115**

Notes:
The figures detailed for each previous year are different due to a review and reconciliation of incidents and scores. Difference of +25.

Infrastructure wrong side failures

This measure comprises the number of higher risk (hazard index of 50 or above) infrastructure failures. Table 1.3 shows the number of infrastructure wrong side failures for 2013/14 compared with previous years.

The trend in 50+ wrong side failures has increased over the year, with a total of 115 such failures in the year compared with 74 in the previous year. Track failures, of which there were 40 (compared with 23 in the previous year), accounted for the greatest number, followed by structures failures, of which there were 22 (compared with ten in the previous year), and then signalling failures, of which there were 17 (compared with eight in the previous year).

The year on year figures did not fluctuate significantly in the first four years of the control period. However, the substantial increase this year has been as a direct result of the adverse weather conditions experienced in the latter part of the year, and which resulted in the creation of a cross-functional strategic crisis management team. This supported the business to meet the short-term challenges posed by the weather, and has enhanced Network Rail's approach to increasing the resilience of the rail network to weather and climate change in the medium to long term.

Category A SPADs

This measure reports all Category A SPADs, which are instances where signals have been passed when a stop aspect, end of in-cab signalled movement authority, or indication (and any associated preceding cautionary indications) was displayed correctly and in sufficient time for the train to be stopped safely at the signal or end of in-cab movement authority. Table 1.4 shows the number of Category A SPADs for 2013/14 compared with previous years.

There were 293 Cat A SPADs in 2013/14 compared with 249 in 2012/13, and the figure is above the average of the first four years of the control period of 274. The MAA (normalised per thousand signals) is 0.64, which is 18.5 per cent worse than the year end target of 0.54 and 4.9 per cent worse than last year. Of the 293 Cat A SPADs, there were 22 instances where the train reached the fouling point (six of the 22 signals involved were fitted with TPWS [Train Protection Warning System]), the same number as the previous year (when five were fitted with TPWS), and three resulting in derailment compared with one in the previous year. We continue to work with rail industry colleagues to address and reduce risks leading to SPADs.

Operational 'close calls'

A close call is defined as any unsafe act (formerly termed 'irregular working') or unsafe condition that in different circumstances could have led to an accident or personal injury or could have resulted in damage to property or equipment. These are occasions where no one was hurt or nothing was damaged, but this is more by chance than by the application of systemic controls.

Following developments to the reporting system and additional communications put in place to encourage and support its use, the number of close calls being reported continued to increase during the year. There were a total of 37,284 close calls for the year, (17,076 from Network Rail employees and 20,208 primarily from our Infrastructure Projects / Asset Management contractors), beating our year end target of at least 20,000 close calls reported. An increase in the number of close call reports is a positive indicator of our safety culture.

The 'operational close call' measure comprises the number of incidents, in a four week period, that introduce significant risk to the railway (categorised as potentially significant and potentially severe) based on an evaluation of their actual or potential consequence. Table 1.5 shows the 13 period MAA figure for operational close call incidents for 2013/14 compared with previous years.

The MAA of potentially significant and potentially severe operational close call incidents is 23.77, which is three per cent worse than last year, and is at its highest for the control period. The categories accounting for the greatest proportion includes an operator (e.g. a signaller) giving permission for protection to be placed when a train has not yet passed the site of work; signalling a train into a possession/line blockage; vehicles or pedestrians trapped between gates at a level crossing; permission given to cross the railway when the line is not clear. However, the category 'protection' (typical events include: working on an open line; using an inadequate safe system of work; the lookout failing to

Table 1.4: Category A Signals Passed at Danger (SPADS)

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	255	272	247	234	275
Scotland	19	27	29	15	18
Network-wide	**274**	**299**	**276**	**249**	**293**

Notes:
The figures previously reported for 2011/12 (277) and 2012/13 (252) have been amended following the downgrading of incidents that were originally categorised as SPADs.

Table 1.5: Operational close calls (OCCs)					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
OCCs MAA England & Wales	20.54	16.61	21.84	21.70	21.77
OCCs MAA Scotland	1.15	1.08	1.62	1.38	2
OCCs MAA network-wide	21.69	17.69	23.46	23.08	23.77
Potentially significant	231	179	244	205	208
Potentially severe	50	54	61	95	102

Notes:
The figures detailed for 2010/11, and 2011/12 are different to those previously reported as a result of updates received. Difference of +11.

provide adequate warning of an oncoming train) has had the largest increase over the year.

Our Delivery Plan (DP) for CP5 includes a number of initiatives to reduce risks around taking isolations and keeping our workforce safe when working trackside.

Level crossing events

This measure comprises the number of incidents where a motorised vehicle is struck by, or strikes, a train or any incident where a pedestrian or user of a non-motorised vehicle is struck and fatally injured by a train, or any near miss with a motorised vehicle or non-motorised vehicle or pedestrian. Table 1.6 shows these significant level crossing events for 2013/14 compared with previous years.

There were seven adult fatalities (two road vehicle occupants and five pedestrians) and no child fatalities at level crossings during the year. The total number of significant level crossing incidents for the year was 351, compared with 368 in the previous year, and the rate of significant level crossing events at the end of the period was 27.0, compared with 28.31 last year, and is at its lowest level for the control period.

Despite the numbers fluctuating from year-to-year, there has been a reduction in near-misses reported with road vehicles at level crossings since the beginning of the control period. Though not as low as in the first year of the control period, the number of near misses reported with non-vehicle users has reduced over the last three years. The figure for road vehicle collisions has been static for the last three years of the control period. The figure for trains striking pedestrians has increased in the last three years but is lower than the number in the first year of the control period.

Level crossing risk reduced by 10.5 per cent during 2013/14 as measured by the Level Crossing Risk Indicator Model (LCRIM). A total of 804 level crossings were closed in CP4 contributing to a 31 per cent reduction in the overall level of predicted risk as measured by the LCRIM against a target of 25 per cent for the control period.

We are continuing to enhance our strategy for reducing level crossing risk, including the continuation of our annual national advertising campaign aimed at raising awareness for motorists of the dangers of misusing level crossings. We have developed, and will be implementing in the early part of next year, a nationwide awareness programme targeting motorists who are employed to drive. Aimed at reducing the number of incidents at level crossings involving professional drivers, the programme will educate them on the safe use of level crossings.

Table 1.6: Level crossing events					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Level crossing events (MAA) England & Wales	26.46	27.92	29.07	27.00	25.31
Level crossing events (MAA) Scotland	1.92	1.46	1.85	1.31	1.69
Level crossing events (MAA) Network-wide	28.38	29.38	30.92	28.31	27.00
Collisions with road vehicles (including fatality)	14	5	10	10	10
Adult pedestrian fatality	5	4	2	4	7
Child pedestrian fatality	1	0	1	0	0
Near miss with road vehicle	138	113	110	95	95
Near miss with non-vehicle users	209	260	279	259	241
Total number of significant level crossing events	369	382	402	368	351

Table 1.7: Criminal damage (malicious acts)					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Malicious acts per 100 route miles	4.42	4.42	4.36	3.09	2.69

Criminal damage

This comprises the number of malicious acts on, or directly affecting, Network Rail infrastructure, normalised per 100 route miles. Table 1.7 shows the number of malicious acts per 100 route miles for 2013/14 compared with previous years.

The MAA for 2013/14 is 2.69 which is a 12.9 per cent improvement when compared with 3.09 for the previous year. We will continue to work with rail industry colleagues, representatives of the local communities, and the British Transport Police (BTP) to further reduce railway crime.

Public safety

Table 1.8 shows the number of public fatalities categorised as adult accidental fatalities, child accidental fatalities or suicides and suspected suicides. Excluding safety at level crossings, there were 18 accidental adult fatalities and no accidental child fatalities during the year compared with 41 and two respectively in the prior year. In addition, there were 286 suicides including potential suicides during the year compared with 239 in the prior year (note that the final classification of suicides / trespasser fatalities can take many months due to awaiting coroners' verdicts). Throughout the control period the average number of suicides and trespasser fatalities remained relatively consistent but there was a general reduction in the number of malicious acts.

During the latter part of 2013/14, the BTP launched two operations (Operations Avert and Avert 2) employing a range of high visibility tactics at priority locations across the network to focus on:

- reducing suicide risk through proactive intervention
- increasing awareness of suicidal behaviour and vulnerability
- minimising disruption
- as well as targeting trespass and route crime generally.

The tactics employed include: increased numbers of and multi-agency patrols; using railway safety accredited staff to identify vulnerable individuals and track walk prime trespass areas; local community engagement through schools, youth clubs, GP surgeries and mental health organisations; increased national and local media coverage; and real-time monitoring of CCTV at prioritised locations.

To support life saving interventions, to help the BTP manage and control the response to incidents on our network and to achieve our shared objectives in relation to suicide prevention and minimising disruption to the railway, a new suicide prevention hotline was launched in January 2014. This will allow rail employees to get through to the BTP more quickly.

Workforce health surveillance and screening

Network Rail has three third-party organisations that provide a range of occupational health services for managers and employees. The majority of our occupational health services are provided by BUPA Health Clinics, with the in-house occupational health team of South West Trains (SWT) providing occupational health services for our employees in the Wessex Alliance (4.9 per cent of our workforce) and Health Care Connections (HCC) overseeing our apprentices based in Portsmouth (less than two per cent of our population).

Achieving greater consistency of data and information between these service providers remains an area for improvement and will be one area of focus for our work over the coming year.

Exposure to asbestos and lead

Network Rail does not itself undertake work which is classified as licensable (higher risk) under the 2012 Control of Asbestos at Work regulations. We therefore have no employees who are licensed to work with asbestos. However, during 2013/2014 there were two occasions involving potential accidental exposure to asbestos. As a result, 21 employees were referred to our occupational health provider for health checks; all attended and no abnormalities were found.

We have no employees who are under health surveillance as required by the Control of Lead at Work Regulations 2002, and no accidental exposures were recorded during the year.

Exposure to silica

In response to the potential risk of respirable crystalline silica (which can enter the body by inhalation and penetrate to the lung alveoli) to employees and contractors, a cross-industry Ballast Dust Working Group (BDWG) was established. The BDWG is an association of eight members with the

Table 1.8: Public fatalities (excluding level crossing events)

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Adult accidental	61	28	55	41	18
Child accidental	2	0	1	2	0
Suicides / Suspected Suicides	225	203	239	239	286

common interest of identifying, mitigating and managing the risks associated with ballast handling and the silica containing dusts created through the process of attrition. The BDWG has the goal to protect the health, safety and welfare of all employees and other people who might be affected by ballast handling activities within the rail industry. Further information is available at the following:

http://www.safety.networkrail.co.uk/Toolbox-for-Supervisor/National-Supply-Chain-NSC/Ballast-Dust-Working-Group

Musculoskeletal referrals

In 2013/14, there were a total of 4,938 management referrals to our occupational health service (OHS) providers (BUPA and SWT). A total of 1,810 referrals (36.6 per cent of the total) were related to musculoskeletal and connective tissue conditions, which is an increase of 646 compared with the number of referrals in 2012/13 (1,164). Investigations into this increase have shown that the apparent rise has been caused by improvements in the way referrals are classified and recorded. Of those referred for musculoskeletal and connective tissue conditions, back and lower limb complaints accounted for the majority (64 per cent). Further detail of anatomical regions for referrals is provided in Table 1.9.

Management referrals are sub-categorised as being occupational in nature, having an occupational element to them, or as being non-occupational in nature. Analysis of clinical data indicates that there have been reductions in both the proportion of referrals classified as being non-occupational in nature (from 88 per cent in 2012/13 to 85 per cent in 2013/14) and the proportion of referrals classified as being occupational in nature (from nine per cent in 2012/13 to six per cent in 2013/14). However, there has been an increase in the proportion of referrals deemed to have an occupational element to them (from 2.8 per cent in 2012/13 to 8.6 per cent in 2013/14). Further investigation into the exact nature of these referrals will allow for improvements in preventive measures to reduce risk of occupational-related musculoskeletal conditions. Table 1.10 provides further detail on total numbers and proportions of referrals.

It is important to note that, with a growing focus on the benefits of early referral to occupational health, there is an expectation that the overall numbers of referrals will increase as managers and employees recognise the benefits of referrals into this service. Over time, however, the total number of referrals is expected to reduce as preventive measures are implemented to reduce overall risk.

Psychological referrals

Of the 4,938 management referrals in 2013/14, 874 (17.7 per cent of the total) were classified as being psychological in nature, which is a reduction from the previous year (22.2 per cent of referrals in 2012/13 were psychological in nature). Of the 874 psychological referrals in 2013/14, 75 (8.5 per cent) were deemed to be occupational in nature, 41 (4.7 per cent) had an occupational element and 754 (86.3 per cent) were non-occupational. Compared with the previous year, there was a minor reduction in both those which were occupational in nature and those which had an occupational element (0.6 per cent and 1.3 per cent reductions, respectively). Table 1.11 provides further details of numbers and proportions of management referrals for psychological health.

Table 1.9: Musculoskeletal Referrals anatomical breakdown

Anatomical breakdown	***No. in 2013/14***
Upper limb (neck shoulder arms)	388
Lower limb (ankles knees hips feet)	583
Back (lumbago sciatica scoliosis)	590
Other MSD	210

Table 1.10 Musculoskeletal Referrals by occupational nature

	2012/13 referrals	***% of total management referrals in year***	***2013/14 referrals***	***% of total management referrals in year***
Total Musculoskeletal Referrals	1,164	28.8	1,810	36.6
Non-Occupational	1,027	88.2	1,487	85
Occupational	105	9.0	105	6.0
Occupational Element	32	2.8	151	8.6

Notes:
Breakdown figures may not match totals given due to a number of management referrals being classified by occupational health service providers as 'unknown'. This is largely due to further review of the case being required or a failure to record the classification of the referral by the attending clinician. We recognise this as an important issue and are working with our service providers to reduce its occurrence.

Table 1.11 Psychological Referrals

	2012/13 referrals	*% of total management referrals in year*	*2013/14 referrals*	*% of total management referrals in year*
Total Psychological Referrals	897	22.2	874	17.7
Non Occupational in Nature	761	84.9	754	86.3
Occupational in Nature	82	9.1	75	8.5
Occupational Element	54	6.0	41	4.7

Following work to improve data provision, we are now able to report the specific clinical conditions related to psychological health referrals over the previous year. Of the 874 management referrals related to psychological health, 150 cases (17.2 per cent) were categorised as anxiety (20 per cent of these were deemed occupational in nature), 231 cases (26.4 per cent) were categorised as depression (7 per cent of these were deemed occupational in nature) and 343 cases (39.2 per cent) were categorised as stress (13.8 per cent of these were deemed occupational in nature).

As with musculoskeletal referrals, there is an expectation that the numbers of individuals referred to occupational health for psychological conditions is expected to rise in the short term as managers and employees recognise the benefits of early referral. As preventive measures are implemented, there is an expectation for overall numbers to reduce over the medium term.

Noise and hearing loss

A total of 6,872 employees were identified as requiring hearing tests during the year. 177 were tested at pre-placement, 4,026 were tested as part of their competence fitness assessments (in order to ensure their hearing is adequate for track safety) and 1,687 as part of our health surveillance programme. In total, therefore, 5,890 employees (85.7 per cent of the target population) underwent some form of testing for hearing loss in the year (further details are provided in Table 1.12).

Until now, our approach to identifying potential hearing loss has been to include all track workers who may be at some risk of both age-related and noise-induced hearing loss. However, we recognise that this broad-brush approach may miss some individuals who are truly at risk and include some individuals who are at minimal risk. As such, work will begin to improve the means by which we calculate risk and manage our health surveillance programme.

Analysis of clinical data indicates that 90.6 per cent of all employees assessed were found to have acceptable hearing ability (HSE Category 1), 7.9 per cent were found to have mild hearing impairment (HSE Category 2), 2.9 per cent to have poor hearing (HSE Category 3), and 0.1 per cent with rapid hearing loss (HSE Category 4). Of the 164 cases classified as HSE Category 3, 122 were new cases and four were deemed as worsening cases (see Figure 1.3).

Hand Arm Vibration Syndrome (HAVS)

At the start of 2013/14, a total of 8,086 employees were identified as potentially at risk of HAVS based on their roles and therefore requiring health surveillance. We have worked to improve our identification of those classified as 'at risk' and needing to take part in health surveillance, with a reduction in the those deemed potentially at risk from 14,924 in 2012/13 to 8,806 in 2013/14.

In addition, assessment and feedback from line managers indicated that 754 of the 8,086 employees

Table 1.12 Noise at work health surveillance

		% of total management referrals in year	*2013/14 referrals*	*% of total management referrals in year*
Total Assessed	3,236		5,890	85.7 of the 'at risk' population)
1 Acceptable Hearing Ability (HSE Category 1)	2,875	88.8	5152	90.6
2 Mild Hearing Impairment (HSE Category 2)	255	7.9	452 (324 new, 13 worsening)	7.9
3 Poor Hearing (HSE Category 3)	104	3.2	164 (122 new, 4 worsening)	2.9
4 Rapid Hearing Loss (HSE Category 4)	2	0.1	6 (3 new)	0.1

Notes:
Total in categories for noise will differ from total assessed due to recording of 'unknown' classifications by occupational health service providers. We recognise this as needing to be addressed and will work with our service providers to reduce occurrence of these issues.

initially identified as 'at risk' were no longer at risk from vibratory tools and were removed from the surveillance programme, leaving a total of 7,332 deemed 'at risk'.

During this year, a total of 3,637 HAVS assessments were completed at various tiers. A significant number of these assessments were at Tier 1 (pre-employment assessment), so would not be included in the start-of-year target. Therefore, 2,672 of the 7,332 required Tier 2 and Tier 3 assessments were completed, equating to a compliance rate of 36.4 per cent. We have set ourselves a strategic target of achieving 100 per cent compliance with health surveillance programmes as part of our ten year health and wellbeing strategy and continue to work to increase compliance rates.

A total of 100 cases of HAVS were identified by our health screening, plus one case of Carpal Tunnel Syndrome. A total of 52 of these cases were newly identified at all levels of severity (not previously diagnosed at Network Rail) with an additional five cases in which the condition stage had worsened since last tested. Overall, this compares to 73 newly diagnosed cases in 2012/13. Of those newly diagnosed, 25 cases were classified as Stage 1, 14 as Stage 2 early, seven as Stage 2 late and six as Stage 3, whilst three of those diagnosed with worsening HAVS were classified at Stage 2 early and two were classified at Stage 2 late.

We now also identify those employees that were identified with HAVS in previous employment, and are now part of the Network Rail health screening programme. Figure 1.4 shows the classification outcomes for those identified with HAVS during the course of the year.

Of the total 3,637 individuals assessed, 99.3 per cent were found to be fit to continue their work (with or without restrictions). We have a strategic target of 99 per cent of employees being deemed fit for their work, which indicates a positive position to maintain. With regard to fitness to work, of the 101 cases identified (including the one case of Carpal Tunnel Syndrome), 66 (65 per cent) were deemed fit, 10 (9.9 per cent) were deemed fit with restrictions, 9 (8.9 per cent) were deemed temporarily unfit and 16 (15.8 per cent) were deemed permanently unfit.

Figure 1.3: Audiometry results by HSE category

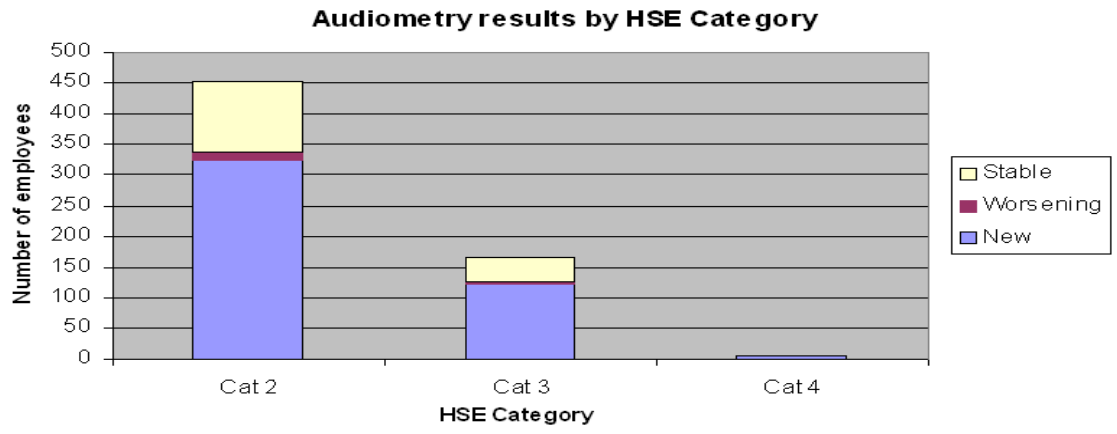
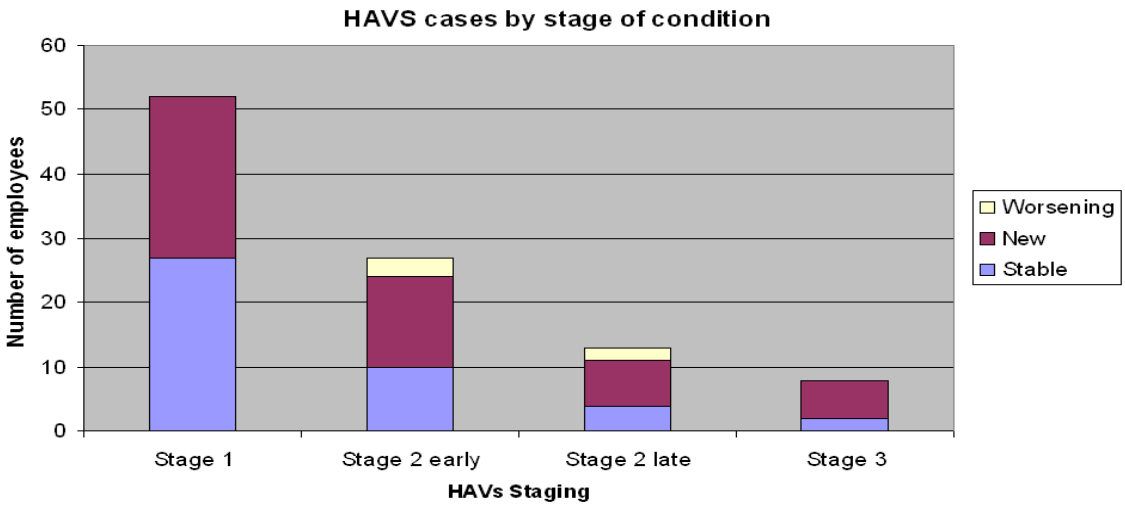


Figure 1.4: HAVS causes by stage of condition



Employers liability

Network Rail purchases employers liability insurance as required by statute. The insurance provides cover for death, bodily injury, or disease sustained by employees during the course of their employment in circumstances where Network Rail is legally liable. Table 1.13 provides the status of claims at 31 March 2014. The number of open claims reported is a snapshot of the claims which remain open for consideration at the end of 2013/14. This includes claims open prior to 2013/14 and includes some claims which may have been open for a number of years whether or not any compensation has or will be paid. Table 1.12 also includes the number of claims opened during 2013/14 and closed during the same period.

When Network Rail was created it took over the liability for open and/or potential claims predating the company's existence. It is important to clarify that an open claim does not immediately assume compensation has or will be paid. A claim will be rejected in circumstances where Network Rail has no liability but may be 'open' prior to that and remain open for a subsequent period. Similarly 'closed' claims within 2013/14 are those which have reached a stage where no further work is required and so can be closed. 'Closed' is not an indication of whether a claim has been accepted or rejected.

Environmental performance

Results

Table 1.14 shows our progress with the five environmental key performance indicators that were set out in our 2009 CP4 Delivery Plan. These cover:

- Carbon dioxide emissions
- Operational waste recycling
- Infrastructure waste recycling
- Significant environmental incidents
- Sites of Special Scientific Interest (SSSIs).

Definitions, scope and exclusions for each of these metrics are shown in the notes following Table 1.14 (energy data is provisional).

Table 1.13: Status of employer liability claims

Category	*31/03/2010*	*31/03/2011*	*31/03/2012*	*31/03/2013*	*31/03/2014*
Open	405	417	471	461	374
Opened (during each year)	241	328	-	215	226
Closed (during each year)	170	154	244	232	304

Table 1.14: Environmental performance

Indicator	*Measure*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
1- Network Rail carbon missions (CO_2)	CO_2 emissions relating to managed stations, offices and depots (expressed as a change on 2006/07 estimated base year). Target: 20% reduction by 2014 compared with 2006/07	-4%	-13%	-14%	-14%	-18%
2 - Operational recycling	Managed station, office and depot waste mass recycled or re-used. Target: 60% diversion from landfill by 2014.	16%	28%	48%	58%	59%
3 - Infrastructure recycling	Infrastructure waste mass managed by National Delivery Service recycled, recovered or reused. Target: 97% diversion from landfill by 2014.	92%	90%	86%	86%	95%
4 - Environmental incidents	Number of environmental incidents (e.g. spillages) categorised as significant. Target: no more than 6 significant incidents per year.	2	2	2	5	12
5 - Land management	Network Rail owned Sites of Special Scientific Interest (SSSIs) rated favourable or recovering status (21 specific sites in England). Target: 95% favourable / recovering by 2010.	82%	100%	100%	100%	100%

Notes

1. Network Rail Carbon Emissions (CO_2):	1.1 Data is calculated using DEFRA / DECC Government conversion factors for greenhouse gas reporting 2013.
	1.2 This data relates to the 20 per cent target to reduce carbon emissions from Network Rail managed stations, offices and depots against a 2006/07 baseline. It comprises natural gas and non-traction electricity usage.
	1.3 Data for Network Rail managed stations is based on a mixture of actual and estimated meter readings from our energy suppliers. It includes areas of the stations that are used exclusively by Network Rail or are shared by Network Rail and third parties i.e. excludes tenanted areas.
	1.4 Data for offices is based on a mixture of actual and estimated meter readings from our energy suppliers. This data does not include electricity and gas consumption in offices where utilities are paid for within landlord service charges. This consumption was similarly not included in our 2006/07 baseline.
	1.5 Data for depots is based on a mixture of actual and estimated meter readings from our energy suppliers for approximately half of all depot sites. This figure is then doubled to reach an estimated total figure for depots.
	1.6 Note since gas oil was not included in the 2006/07 baseline it has been excluded from the calculations for 2013/14.
2. Operational Recycling:	2.1 This data relates to the target to redirect 60 per cent of waste sent to landfill arising from Network Rail managed stations, offices and depots.
	2.2 Data is provided by our waste management contractors: SITA UK for our managed stations; MITIE for offices; and UK Waste Solutions for depots.
	2.3 Although our target is for offices, managed stations and depots, as in previous years the data includes a number of signalling centres and signal boxes.
	2.4 Waste that is diverted from landfill is either recycled or used to provide energy from waste.
	2.5 This data does not include figures from offices where waste management services are included within landlord service charges. This waste was similarly not included in our previously reported figures.
	2.6 Managed station data excludes Charing Cross and St Pancras Low Level railway stations as different waste management arrangements apply.
3. Infrastructure Recycling:	3.1 National Supply Chain (NSC) is the internal procurement and logistics function for Network Rail. NSC procures and transports key infrastructure materials.
	3.2 Data includes the management, by NSC, of inert ballast, hazardous ballast, rail, concrete, wooden sleepers and scrap metal.
	3.3 The data represents the percentage of ballast expected to be recovered from all the ballast removed from the infrastructure this year, based on known landfill and ballast recovery rates at contractor's depots. Note that a certain tonnage will be stockpiled at any one time.
	3.4 Changes in the asbestos testing regime reduced the recycling rate of used ballast whilst extensive sampling of samples was carried out.
4. Environmental Incidents:	4.1 This data relates to significant environmental incidents, which are classified as being either: a) major spill (typically in excess of 1,000 litres) b) any spill which either has affected or has significant potential to affect a sensitive receptor(s) including surface water or groundwater c) physical damage to a protected site or species d) an environmental incident which has resulted in or has significant potential for prosecution.
	4.2 The data does not include contractor and third party incidents on Network Rail sites.
5. Land Management:	5.1 In England, we own and manage 141 designated Sites of Special Scientific Interest (SSSIs). These areas are protected by law, as they are important to the nation's natural heritage for their habitats, plants, animals or geology.
	5.2 Our CP4 target was to bring 21 of these sites into favourable or recovering condition. This was in support of a Natural England Public Service Agreement target set in 2000.
	5.3 The project to improve the condition of these sites was completed in 2010 prior to an inspection by Natural England.

Commentary

Carbon

We achieved an 18 per cent reduction in CO_2 from our offices, stations and depots against a 2006/07 baseline. Whilst this was just outside of our target of 20 per cent it represents a significant improvement over the course of CP4. Drivers of this improvement included: moving staff to our new national centre at Milton Keynes (rated as Excellent using the Building Research Establishment Environmental Assessment Method) intensive metering of energy usage to improve our data; and taking a more proactive approach to energy management with the formation of a dedicated Energy Services team. In CP5 we intend to drive further improvements in our carbon and energy efficiency by developing and then implementing an organisation wide energy strategy.

Operational and Infrastructure Recycling

We just missed both of our targets for diversion for landfill, achieving 59 per cent diversion for our operational waste (against a target of 60 per cent) and 95 per cent (target of 97 per cent) for our infrastructure waste.

We have driven substantial improvements in our operational waste performance over the course of the control period through better segregation of waste, and national contracts that incentivise recycling and diversion from landfill. When this target was set our diversion from landfill rate was just 16 per cent.

Diverting our infrastructure waste from landfill over the control period was severely hampered by the discovery of trace levels of asbestos in some of our ballast – it is therefore a significant achievement that after two years of low performance (86 per cent) we have managed to address the problem and exit the control period having diverted 95 per cent of the waste our National Supply Chain manages.

In CP5 we will continue to focus on diverting waste from landfill, but also seek to drive improvements in what is done with the waste we divert (i.e. follow the waste hierarchy). We will also focus on opportunities to make the materials we use in the first place more sustainable.

Environmental Incidents

There was an increase in environmental incidents in the last year of CP4 and this was the only year in the control period when we exceeded our target of no more than six significant incidents. It should be noted that of the incidents in 2013/14, seven were specifically due to the spillage of silt into a water course in Scotland, at a work site experiencing challenging weather conditions over the winter, and appropriate remediation measures were put in place. Whilst these events met our current classification of ‘significant’, their actual environmental impact was relatively low. We are enhancing our approach to collecting and categorising environmental incidents, which will enable us to better monitor and manage pollution events in the coming years.

Land Management

We exceeded our target for SSSI condition early in the control period by undertaking a programme of works to improve the condition of 21 key sites. We will maintain our performance levels in this year by each route managing sites to the Site Management Statements that we have now agreed with Natural England. In addition we will implement a range of plans to improve the way we manage our broader land estate, as SSSIs, though important, only represent a small proportion of our overall land holdings.

We exit CP4 having achieved some but not all of our internal environmental targets. This result is reflective of the change that has occurred within the organisation on these issues over the last five years. In the last year of CP4, we formally approved our sustainable development strategy which we are now beginning to implement. This will involve taking a much more comprehensive approach to defining and delivering improvements across our sustainable development priorities including environmental performance (see ‘Performance improvement initiatives’ below).

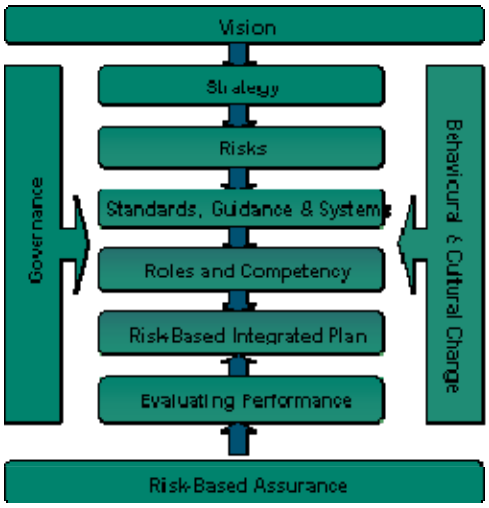
Performance improvement initiatives

This section sets out the initiatives we are taking to improve our safety, sustainable development, and health and wellness risk management arrangements.

Safety

In October 2011, the Safety and Sustainable Development Director outlined for the Safety, Health and Environment (SHE) Committee (a sub-committee of Network Rail's Board) the building blocks it was felt important to put in place to underpin an improvement in safety performance. These building blocks are shown in Figure 1.5 below. This section sets out the progress made in implementing these building blocks over the course of 2013/14.

Figure 1.5 - Building Blocks for Improving Safety



Vision

The vision of Everyone Home Safe, Every Day together with the underpinning commitments and the new brand has provided a common thread for all our interventions and communications around safety. It has also been adopted by many of our contractors, and has been at the core of the safety elements of our Strategic Business Plan (SBP) submission for CP5. Our new Chief Executive, Mark Carne, has emphasised the importance of our safety vision and the role that each person has in its achievement. Our vision, the belief that safety and business performance go hand in hand, and our underpinning personal commitments were rolled out from the Executive Committee across our organisation during March 2014.

Strategy

The Safety Strategy builds on the vision and provides a structured approach to improving the safety of passengers, the public and our workforce over the next decade. Its implementation commenced this year, having been welcomed publicly by the ORR, and it has helped shape the safety components of the SBP for CP5. The strategy together with the work being undertaken to understand our key risks has provided the context for our first Integrated Safety Plan.

Risks

Following the first deep dive review in to the role the signalling system plays in preventing the risk of a catastrophic train accident, which took place last year, we have undertaken further deep dives on track, earthworks, structures, level crossings, workforce safety and irregular working during the course of this year (the findings from the workforce safety and irregular working deep dives were presented to the SHE Committee in April 2014). Further deep dives on stations and objects on the line are being planned for next year. These risk reviews are based on the bow tie approach which has been implemented to obtain a greater insight into the pre-event controls.

We have continued work on harmonising the way we assess safety risk across the different asset classes and activities to provide a more coherent picture of the risks we need to manage.

Standards, Guidance and Systems

Following last year's development and launch of the 11 Life Saving Rules, an extensive model of the risks that face our business has been developed, using the 'bow tie' method, fatalities and weighted injuries data, structured interviews and comparison with both rail and other industry incidents. This work has identified the key risks in our business and the necessary controls in the form of a set of Business Critical Rules (BCRs). These rules provide the control framework for addressing our risks and are underpinned by relevant means of control and supporting role based manuals. The framework is being tested, using a national trial of the rules associated with the Plain Line Track System. Work is on-going to develop the rules to cover all of Network Rail's asset management risks and the associated implementation programme through the first 12 months of CP5.

Our safety management system (SMS) was originally developed to meet our obligations under the Railway and Other Guided Transport Systems (Safety) Regulations (more commonly known by the acronym ROGS). Following last year's gap analysis to determine the steps we needed to take to bring our SMS in line with the OHSAS18001 standard, during this year we completed the work necessary to enhance our SMS to bring it into conformance with the standard.

Roles and Competency

In addition to the role-based manuals being developed through the Business Critical Rules programme, substantial work continues to be undertaken to address the management of competency of those working on our infrastructure. During 2012/13, we developed a replacement for Sentinel (the system that monitors and records the competency of employees and contractors on our infrastructure). The New Sentinel system, based on smartcard technology, enables us to better verify that everyone who accesses the railway has the correct credentials to do so. For card carriers, the biggest change is that secure and encrypted information is stored on the smartcard's chip and updated through regular use, rather than printed on the card itself. The system has been live since 25 September 2013 for the rail industry and the transition period, to phase out of the old system cards, was completed on 6 January 2014. With clearer rules about sponsorship and significantly better data integrity, New Sentinel will transform competence management and control over the contingent labour force. There are already indications of much improved sponsor management of safety risk using New Sentinel. Work is now on-going to introduce improved functionality (e.g. site access control) as part of the next development stage of New Sentinel.

In addition to the technology being introduced we have also sought to rationalise the sponsorship arrangements to provide clearer accountability for providing training, PPE and medical assessments to our contracted workforce. Revised Sentinel Scheme Rules were launched in conjunction with the new database. This reduced the maximum number of Sponsors an individual can have (any person needing to work 'on or near the line' must be sponsored, prior to obtaining the necessary competency), and more importantly, identified a Primary Sponsor as the single accountable sponsor for an individual's health, safety and wellbeing. The Primary Sponsor's responsibility for collating and managing hours worked under Sentinel is a step forward in managing the fatigue risk to our workforce. Investigations into breaches of the Sentinel Scheme Rules are being reviewed under a new process which aligns with our Fair Culture principles.

Risk-Based Integrated Plan

Following approval of the safety strategy, a gap analysis was undertaken last year to determine what additional work needed to be undertaken to meet the commitments set out in the strategy, and where duplication of effort could be avoided. This has led to Network Rail's first Integrated Safety Plan covering both CP5 and CP6. The plan is underpinned by both function and route safety improvement plans, including initiatives developed with train operators and detailed in joint safety improvement plans. Work is on-going to develop an interactive communications web-based platform for the integrated plan, which will include the detailed underpinning workstreams and activities for safety, health and sustainability.

We have identified ten key areas where we need to speed up our approach to ensuring the safety of our workforce and contractors. The resultant Workforce Safety Ten Point Plan, which is intended to create a sense of urgency and momentum around improving workforce safety, is key to delivering our safety strategy, and achieving our target of eliminating all fatalities and major injuries by the end of CP5 or sooner. The delivery of the plan, each element of which is led by an Executive Director, commenced in April 2013 and significant progress has been made across all points of the plan. The following provides a summary update of progress with key elements of the plan not reported elsewhere in this paper (for an update on the Fair Culture and Safety Conversations elements of the plan, see the Behavioural and Culture Change headings of this section of the Annual Return).

Roles and Responsibilities

This will clarify and define those roles and responsibilities for ensuring the safety of staff engaged in safety critical activities. The principles have been endorsed by the Board and SHE committee. Four pilot routes have been identified and initial start up meetings have commenced. Required rule changes are being discussed with the RSSB and engagement with our contractors as to the potential impact is on-going.

Frontline Supervisor

Closely aligned to Roles and Responsibilities, this on-going element of the plan will: identify what we mean by front line supervisor; identify those currently fulfilling such roles; establish the skill set expected of this population; review current training programmes aimed at this population; review as appropriate our current training arrangements; re-train our front line supervisors. Current work is focussed on reviewing the capability framework and training requirement for this role.

Control of Work

This will deliver an electronic permit to work solution, with a built in risk assessment tool to support the consideration of task risk, and an interactive mapping tool that enables site hazards and the safe system of work to be plotted on track schematics. This gives the safe works leader suitable risk information and the tools to brief the site team effectively. An issuing conversation at the point of

work will ensure the plan is fit for the site conditions on the day.

A model office is now operational in Romford maintenance delivery unit and a proof of concept exercise was successfully completed in Barking maintenance delivery unit, testing e-Permitting software to support the Control of Work project. Designed to replace the existing safe system of work planning system (SSOWPS) by the end of the year, it will improve the rigour and provide greater clarity of how we plan and secure protection for safe access to the track.

Against a background of continuing workforce accidents and following the tragic fatality of John Wright, we are accelerating the delivery of these elements of the Workforce Safety Ten Point Plan. Accordingly, Roles and Responsibilities and Control of Work have been combined to form Planning and Delivering Safe Work, with a commitment to 'go-live' on or before 1 January 2015.

Technology Interventions

This will identify the activities we require our workforce to undertake with the highest safety risks, existing technology which can eliminate such risks, technology which can mechanise manual tasks, and produce a work programme to introduce such technology.

Road Risk

We are developing a new policy that will set the strategy. The policy, which will be supported by guidance, including a driver's handbook, will: address areas of risk related to vehicle, driver and journey whilst driving on Network Rail company business; emphasise that safety and business performance go hand in hand; be underpinned by the Fair Culture principles and process.

Safer Teams

This element of the plan has reviewed our current approach to the management of slips / trips / falls (STF), and is identifying, through a series of workshops and trials at delivery units and project sites, what more can be done to reduce STF risk. The output from the workshops and trails is being evaluated prior to roll out to the wider business.

Learning from Incidents

This will review the current process for communicating lessons in the immediate aftermath of an incident, identify technology solutions to reach the staff that need the information quickly, review the process for local investigation of incidents, and identify opportunities to increase out ability to roll out lessons and solutions quickly. Business change project briefs have been developed for the eight underpinning workstreams with associated delivery plans in the initial stages of implementation.

Safe Contractors

The procurement process for the next generation of contingent labour supply has started, with the issue of a pre-qualification questionnaire and a supporting workshop to be held to guide potential suppliers as to our expectations, which are articulated in our Code of Conduct. This code describes the minimum standards we expect on safety, health, travel, ethics etc. The new contracts, which will come into effect in the autumn of 2014, are key to the delivery of the Safe Contractors element of the Workforce Safety Ten Point Plan. They are also closely linked to the Roles and Responsibilities element of the plan.

Evaluating Performance

The SHEP report is the primary route by which the Board, SHE Committee and the Executive are kept abreast of performance. During the year, we have made a number of further changes to the SHEP report with the aim of providing more precursors and leading indicators of performance.

Work was completed with the Rail Safety & Standards Board (RSSB) in the year to upgrade the train accident Precursor Indicator Model (PIM) to provide a more accurate indication of the contribution Network Rail is making to the safety of passengers and the public. The revised PIM, which has become the primary measure of our ability to reduce risk, was implemented during the year and is now reported on a periodic basis in the SHEP report. We will continue to work with the RSSB to better define the profile of those PIM groups for which Network Rail has primary asset management accountability, and the results of the 'bow-tie' workshops and the deep dives will continue to inform the RSSB's Safety Risk Model, which forms the basis of the PIM.

Risk-Based Assurance

The 2013/14 S&SD corporate audit programme consisted of 19 audits, with one additional audit on Electrical Safety added to the original programme, and one audit on New Electrification Schemes rescheduled into the 2014/15 programme.

Of the 18 audits undertaken, a total of 14 reports from these were issued to management, with 12 of these going to the SHE Committee and two to the Audit Committee (for joint audits where Internal Audit were the lead) during 2013/14. Of the 12 reports issued to the SHE Committee, one was rated as 'Good', six were rated as 'Fair' and five were rated as 'Unsatisfactory'. The fieldwork for the remaining four audits has been completed and the reports will be issued during Quarter 1 of 2014/15.

The implementation of the programme continues to receive positive feedback from the ORR.

Behavioural and Culture Change

Six Life Saving Rules (LSR) short films were developed, depicting the human consequences of breaking these rules. Designed to be 'hard-hitting', they were aimed at all Network Rail employees, and made available from the end of January 2014 on the Safety Central website and on Network Rail's corporate YouTube channel.

Following agreement of the principles of a Fair Culture with the Trades Unions, these were launched across our business in May 2013. The principles are aimed at creating the environment in which close call reporting is supported and define how we will investigate potential breaches of the Life Saving Rules in a way which identifies the root cause, and moves away from a perceived culture of blame. Over the coming year there will be an increased focus on the consistent application of the Fair Culture principles across our contractors and supply chain.

Following on from the Fair Culture principles, approximately 1,000 staff involved in investigating potential breaches has now participated in Fair Culture workshops. Roles including investigators, line managers, HR representatives and Trade Union representatives have been involved in these events, which examine the behaviours needed to undertake non-judgemental investigations and identify true root-causes, while also building trust with those involved in the incident.

Safety Conversation training has been delivered to our 400 most senior leaders. The training is intended to give leaders the skills to have open discussions on safety with staff at all levels. The training helps to explain the role of effective safety conversations in identifying early indicators or 'weak signals' that would indicate potential system issues that could lead to safety events. The training has been well received by those who have attended and a variation is now intended to be rolled out for operational and functional managers during 2014/15.

The Executive's on-going ownership of the Workforce Safety Ten Point Plan, with each director leading on one area, continues to send an important message to the business about the priority being given to our safety agenda.

Governance

During the year we continued with the governance arrangements for safety that we had implemented in the previous year.

Network Rail's Board has received monthly reports on safety performance, has approved the annual corporate safety and sustainable development audit programme and taken reports from the chair of the SHE Committee on the relevant safety discussions.

The SHE Committee has considered in detail the key safety risks facing the business and the progress management is making in implementing controls to reduce or mitigate these risks.

The Executive has considered the critical strategic safety issues such as the Safety Strategy, the Business Critical Rules, the "deep dives" on catastrophic risk and the reports arising from the corporate safety audit programme.

The Safety and Sustainable Development (S&SD) Executive, comprising of senior leaders from across the business has considered factors affecting performance such as suicides, the safety of passengers and stations, safety of our structures and the output from our safety culture focus groups.

In support of the Safety and SD Executive, the Safety and SD Integration Group provides a forum for the leading safety professionals from across the business to coordinate efforts on key safety interventions, to avoid duplication of initiatives, as well as sharing information on the root cause of the more significant incidents.

Health & Wellness

We aim to optimise our employee's physical, mental and social wellbeing through a Board-approved ten-year strategy and underpinning implementation plan, which will be resourced at central and route level to enable its effective delivery. The way we communicate health to our employees has been considered and our vision of 'Everyone Fit For The Future' is now being communicated through the development of a range of educational resources, including podcasts, presentations and videos on topics such as general wellbeing, hand arm vibration syndrome, noise-induced hearing loss and workplace stress (these can be viewed at www.safety.networkrail.co.uk).

During the year we have:

- worked to reduce employee exposure to hand arm vibrations by addressing the type of tools our people use and embedding considerations for health into our small plant provision
- implemented an incidental asbestos exposure assessment (aligned to our asbestos management programme) with our external occupational health service provider so that we are better able to support and reassure any individuals accidentally exposed to asbestos
- signed up to the Department of Health's Responsibility Deals for Construction and Civil Engineering and written to our principal contractors to encourage them to do the same
- embedded health and wellbeing principles within

the pre-qualifying questionnaire process for our contingent labour supply so that the health of those individuals working in our wider industry is considered and supported
- run a series of awareness articles and events related to World Mental Health Day and Mental Health Awareness Week to raise awareness of mental health issues within our workforce
- embedded training related to workplace stress and resilience within our 'Tomorrow's Leaders' training programme
- expanded the health-related offers available to our people, including discounted memberships at 2,500 gyms nationwide, discounted health assessments and wellness vouchers, as well as promoting our Cycle-to-Work scheme
- signed up the Responsibility Deal for Healthy Staff Canteens and have mapped 11 of our largest sites, covering 30 per cent of our workforce, the required standards and developed a framework to support improvement
- improved the provision of data quality related to employee health and wellbeing
- piloted some specific initiatives with a view to them being developed and used more widely. 870 employees completed a six-month trial of a lifestyle health application to improve health behaviours, we trialled a series of two-day courses relating to Traumatic Incident Management (TRiM) in our Sussex Route, and we trialled the use of HAV monitors in parts of our Kent Route
- delivered courses on Mental Health First Aid and mental resilience to support a cultural change in the understanding of mental health conditions, as well as trialling TRiM training in our Southeast Route to improve the way traumatic incidents are managed and reduce the risk of post-traumatic stress conditions.

Following on from the above work, we have a series of planned actions for the coming year. These include:

- launching a health and wellbeing portal to provide greater access to information and resources for both employees and wider industry partners
- launching a free online wellbeing assessment for Network Rail employees
- completing the development of a robust health data system, allowing more accurate and transparent understanding of our organisational health and wellbeing status
- recruiting the seven Route-based Occupational Health and Wellbeing Managers, who will oversee the implementation of the health and wellbeing strategy within the separate Routes
- supporting the development of Route-specific time-bound health improvement plans relating to hand arm vibration syndrome (HAVS) and mental wellbeing, aligned to our strategic health aims
- updating our small plant purchasing and hiring policy to reduce use of potentially harmful vibrating equipment, visibly risk ranking vibrating small plant to improve employee awareness of risk, and piloting a wider trial of HAV monitors to prove the concept of near-to-real time vibration exposure monitoring
- implementing Automatic External Defibrillators (AEDs) into 240 of our largest buildings
- expanding availability and uptake of mental wellbeing courses to Trades Union health and safety representatives, line managers and individual employees
- beginning the process to retender several of our occupational health services
- developing and trialling an educational course designed to increase the health-specific competency of those of our employees in health-related roles
- trialling the provision of clinically triaged physiotherapy and psychological rehabilitation within specific business units to prove the concept and business benefits of a more proactive approach to absence management.

Sustainable Development

In the last year of CP4, the SHE Committee endorsed our sustainable development strategy which sets out how we intend to deliver our vision for 'a railway fit for the future'. The strategy, which seeks to balance environmental, economic and social factors, defines our strategic outcomes, outputs and objectives through to 2024. It also outlines the fundamental principles of a sustainable business and highlights where we will focus our efforts in the following priority areas:

- safety and wellbeing
- communities
- diversity and inclusion
- employees
- energy and carbon
- natural resources
- safety and wellbeing
- communities
- diversity and inclusion
- employees
- energy and carbon
- natural resources
- environmental protection
- climate change adaptation
- buildings and structures
- land
- value for money.

Following SHE Committee endorsement, we have been putting in place the key arrangements to deliver this strategy. We have developed an integrated plan for sustainable development, with supporting management and monitoring arrangements, which defines the actions we intend to deliver over the next five years. In addition, we have also developed an Environmental Management System (EMS) in conformance with the ISO 14001 standard, which covers all of Network Rail's activities. Over the next year the EMS will be implemented, providing the framework, processes and assurance activities to enable us to deliver our overall environmental aspirations, as set out in our environmental sustainability policy, and the integrated plan that supports this.

As described in the CP5 Delivery Plan a critical early element of our sustainable development activities is to further develop relevant metrics and goals, and publish these alongside our plan in the coming year.

Regulation

Ten health and safety enforcement notices were issued during the year, three of which were subsequently withdrawn making a total of seven notices for the year (one of which was a prohibition notice and six were improvement notices).

Network Rail was prosecuted twice during 2013/14 for breaches of health and safety legislation.

On 11 June 2008, three Network Rail employees were injured when a mobile elevated work platform on which they were working, during the repair of damaged overhead lines on an area of track near Margaretting in Essex, detached. They were thrown to the ground. One of the three, Malcolm Slater, later died from his injuries. Network Rail Infrastructure Limited (NRIL) pleaded guilty and was fined £125,000 at Chelmsford Crown Court on 10 September 2013.

On 3 July 2010, a 10-year-old boy sustained serious head injuries when the road vehicle he was a passenger in was hit by a train on an unmanned level crossing near Beccles, Suffolk. The ORR established that the crash was caused by poor visibility when people were crossing from the south side. Network Rail Infrastructure Limited (NRIL) pleaded guilty and was fined £500,000 at Ipswich Crown Court on 27 June 2013.

Section 2 - Operational performance and stakeholder relationships

Introduction

The primary cross-industry measure of operational performance for all passenger services is the Public Performance Measure (PPM). PPM is a measure of the overall punctuality and reliability of train services delivered to passengers. Network Rail is accountable for the reporting of industry train performance. PPM figures are shown in this section at national, sector and individual operator level.

For England & Wales we also measure passenger train performance using the Cancellations and Significant Lateness (CasL) measure. This measures the percentage of passenger trains (both franchised and open access) which are cancelled in part or full, or which arrive at their final destination 30 or more minutes later than the time shown in the public timetable.

Freight delay targets for CP4 are expressed in terms of Network Rail caused delay per 100 train kilometres. This removes the effect of fluctuations in traffic volumes. We also assess freight performance using the Freight Delivery Metric (FDM). This measure tracks the punctuality of all freight services at destination as well as taking into account cancellations (not planned) as a result of Network Rail performance. Punctuality failures are defined as those not arriving at destination within 15 minutes of plan and where Network Rail or a non commercial freight operator has caused more than 15 minutes of delay during the journey.

In order to quantify the effect of causes of disruption to both passenger and freight train services, delay minutes are a major operational performance measure which underpins PPM and the FDM. Delays experienced by passenger and freight train operators are broken down into two 'responsibility groups', Network Rail attributed delays and those attributed to train operators. Delays attributable to Network Rail typically relate to the performance of the railway infrastructure (such as track or signalling faults), timetabling and operation of the network. This category also includes external events which affect the operation of the railway such as cable theft or poor weather.

Delays which are attributable to train operators typically relate to matters such as train and station operations, fleet reliability or train crew resourcing.

The Annual Return provides data on Network Rail attributed delays only, with specific focus on infrastructure related delays. Figures are presented for 2013/14 in delay minutes and in delay minutes per 100 train kilometres and we include disaggregated results split by cause.

It should also be noted that all data has been refreshed for the past five years so that a final end of CP4 position can be provided. The refreshed numbers take into account the finalised position following disputes related to delay attribution. As a result many of the performance numbers reported in previous Annual Returns have been updated in this Annual Return to more accurately reflect the end of CP4 outturn.

In this section we also report on the management of our stakeholder relationships. We set out the results of both our customer satisfaction survey and the passenger satisfaction survey which is conducted by Passenger Focus bi-annually.

Overview of 2013/14 operational performance

At a national level we ended the year 2.5 percentage points behind our target of 92.5 per cent. Performance in the year has again been severely affected by weather (the fourth year in CP4 that this has occurred). The storms, gales and floods across much of Britain during the winter of 2013/14 demonstrated once again not only how our weather patterns are changing, but also the impact that has on the railway. Whether it has been the dramatic demolition of the seawall at Dawlish, coastal damage and land slips in Wales, rising groundwater in the Thames Valley, or falling trees in Scotland, there has hardly been a part of the network that has not been affected.

Severe weather has had the biggest impact on the performance of the railway with the impact of external delays (things that we do not have principal control over such as cable theft and suicides) significantly reduced as a result of industry focus in this area. We are working to better understand the impact not just of the recent storms, but of the extreme weather events over the past few years. In September 2014 we will complete a series of resilience studies and identify further weather resilience plans for action in the coming months.

Over the past few years demand for long distance services has continued to grow significantly ahead of initial expectations at the start of CP4. The growing demand has put pressure on train punctuality. The railway is busier than it ever has been and so when incidents happen more trains are delayed.

As reported in the regulatory and governance matters section of the Annual Return, the ORR concluded that we did not meet the CP4 operational performance targets which we were funded to deliver.

In the long distance sector, Network Rail missed the end of control period target by 5.1 percentage points and will be returning £53.1 million to funders, with the money being used to part-fund the improvement of wi-fi access on routes across England and Wales.

As Network Rail missed its performance target for the London and South East (LSE) sector by 3.4 percentage points, Network Rail has also committed to investing a further £25 million on special weather resilience projects in the south east of England, recognising the particular impact this sector has suffered from weather events in the past few years which was a major contributor to missing punctuality targets.

We recognise that this has not been satisfactory and accept our part in the performance shortfall. We know punctuality is extremely important to passengers. We are disappointed that we did not meet the targets we were set for CP4. The reasons why were complex but one thing we did not predict was the extent of growth in passengers/train services over the five years. We have carried out detailed analysis to explain these shortfalls against our CP4 targets focussing in particular on where train performance is affected by changes in journey times; capacity and other outputs; the assumptions which informed our planning for CP4; the impact of adverse weather to inform the recovery plans we put in place last year for the freight, long distance and LSE sectors; our plans for CP5.

We will use this analysis to inform our efforts on hitting the performance targets we have been set for the next five years. We expect the first two years of CP5 to be challenging but we are confident that with the initiatives we have underway we can meet the targets from year three in the remainder of CP5.

In 2013/14 the number of passenger miles increased by three per cent. However, operational performance in 2013/14 has been worse than expected and with the exception of the Regional CaSL target all the regulatory targets for train performance were missed.

At a network wide level delays caused by severe weather were six per cent worse than in 2012/13, itself a year badly affected by severe weather conditions, and more than 150 per cent worse than expected in the original CP4 plan.

The autumn / winter of 2013/14 was relatively mild compared to recent years, but was characterised by 28 October with St Jude's storm and extending into mid February. The storms were accompanied by tidal surges and flooding which in some areas (including Dawlish) caused extensive damage to the railway. Some parts of the railway were shut for extended periods whilst this damage was repaired. The period of severe weather caused indirect delay in other types of cause and led to a number of earthworks failures and temporary speed restrictions (TSRs). As a result the number of TSRs over the last year has increased.

The London and South East (LSE) sector was the most affected by the storms, with particular problems caused by high winds. Regional sector services were less affected and weather in Scotland was broadly normal.

A severe crisis management team was set up in February to integrate work responding to the severe weather and bring momentum to plans to improve the weather resilience of the railway.

The impact of the severe weather was the most visible problem for performance in 2013/14, but underlying performance was also not at the levels expected. Analysis indicates that a major cause of problems was responding to the challenge of growth whilst also driving efficiency in resource use. This drove an increase in reactionary delay (i.e. delays caused indirectly as a result of incidents) and delay per incident with service disruption becoming harder to control and tending to last longer for each event.

The number of infrastructure faults was worse than planned. The main cause was teething problems with introducing the new GSM-R telecoms system. Delivery was also partly affected by the severe weather with resources being deployed to recover services and keep the railway operational.

Other specific problems in 2013/14 included:

- autumn seasonal performance worse than plan due to prolonged harder operating conditions (in particular storm events)
- problems with possession overruns arising from the major increase in enhancements and renewals work in possessions
- increased asset related delays
- increased delays resulting from fatalities, albeit less than expected given the national upwards trend in suicides
- sub-threshold delay (delays of less than three minutes between monitoring points) continued to rise, to an extent adding another impact from growth, for example in slight extensions of station dwell times with increased passengers or junction margins with longer trains
- whilst TOC on self delay was broadly on plan for 2013/14, as TOCs experienced problems with managing their train crew during CP4, overall delay at the start of CP4 was worse than planned
- increased operator on operator delays.

We have undertaken detailed root cause analysis to understand the reasons behind the shortfall in operational performance and shared this analysis

with the ORR as part of the overall review of CP4 and link into CP5.

Although some of the reasons for our targets being missed are outside Network Rail's control, we are seeking to remedy the situation both by driving further improvements in our own business and by working collaboratively with train operators, governments and the ORR to address broader cross-industry issues.

This Annual Return outlines this analysis to explain the principal reasons for the performance shortfall at both a sector and operating route level.

Public Performance Measure

PPM measures the actual performance of individual trains against the planned timetable for the day, for all scheduled train services operated by franchised passenger train operators and four open access train operators and shows the percentage of trains that arrived 'on time' compared to the total number of trains planned. PPM for the year is expressed as a moving annual average (MAA).

A train is defined as 'on time' if it arrives at its planned destination station within five minutes (i.e. 4 minutes 59 seconds or less) of the planned arrival time. For Long Distance (LD) train services a criterion of arrivals within ten minutes (i.e. 9 minutes 59 seconds or less) is used. Where a train operator runs a mixed service (shorter and longer distance), an aggregation of within five minutes and within ten minutes is used for 'on time' (i.e. taking the number of trains that actually arrive within the five minutes (short distance) and adding this to the number of trains actually arriving within ten minutes (long distance) and then dividing by the total number of trains booked).

Results

The overall network PPM for franchised passenger and open access operators in 2013/14 was 90.0 per cent, down 0.9 percentage points from 90.9 per cent PPM in 2012/13.

In England & Wales PPM for 2013/14 was 89.8 per cent against an aggregated target of 92.6 per cent. In Scotland we missed our regulatory target 0.6 percentage points with 91.4 per cent of trains arriving on time.

In England & Wales regulatory performance targets are also set at a 'sector' level covering Long Distance. London & South East and Regional train performance. In 2013/14 we missed all of our sector level PPM targets.

Table 2.1 compares the overall network PPM for 2013/14 with previous years. Table 2.2 shows PPM by sector (including the aggregated England & Wales measure and Scotland) compared to the target and Table 2.3 shows the PPM by operator for 2013/14 compared to the previous year.

Table 2.1: Overall PPM for franchised passenger services (%)

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
PPM	91.4	90.8	91.6	90.9	90.0

Table 2.2: 2013/14 PPM by sector for England & Wales and Scotland (%)

By sector	*PPM Actual*	*PPM Target*
London & South East	89.6	93.0
Long Distance	86.9	92.0
Regional	91.0	92.0
England & Wales (total)	89.8	92.6
Scotland	91.4	92.0

Notes:
Scotland PPM is taken as First ScotRail PPM as this train operator primarily runs services in Scotland.

Table 2.3: 2013/14 PPM compared to 2012/13 PPM by Operator for England & Wales and Scotland (%)		
Operator	***2012/13 PPM***	***2013/14 PPM***
Abellio Greater Anglia	92.3	91.7
Arriva Trains Wales	93.3	93.1
c2c	97.5	96.7
Chiltern	94.9	94.9
CrossCountry	86.8	86.7
East Coast	83.9	84.2
East Midlands Trains	92.5	91.3
First Capital Connect	88.3	86.1
First Great Western	89.1	87.9
First Hull Trains	81.7	82.0
First ScotRail	93.0	91.4
First Transpennine Express	91.7	90.4
Grand Central	81.4	80.7
Heathrow Express	93.3	93.8
London Midland	86.0	85.9
LOROL	96.6	96.1
Merseyrail	95.4	95.8
Northern Rail	90.7	91.0
Southeastern	91.1	89.0
Southern	88.0	85.8
Stagecoach South Western Trains Ltd	91.4	89.7
Virgin Trains	83.6	85.8

Long distance train performance

PPM for LD sector services in 2013/14 ended 5.1 percentage points behind the regulatory target with 86.9 per cent of train services arriving on time. This was 0.1 percentage point worse than the result achieved in 2012/13 when 87.0 per cent of trains arrived on time.

During the course of the year we further developed, refined and implemented our performance recovery plan for this sector and substantially widened our investment in performance improvement. Many of the benefits that have been delivered have been offset by the continued severe weather conditions experienced during the autumn / winter and continued wider problems with delivery. Without the recovery plan LD sector performance would have been further behind target.

Specific reasons for missing the LD PPM target are:

- heavy rainfall and flooding, including the resulting increase in track faults and an increase in the number of Temporary Speed Restrictions (TSRs)
- difficult autumn delivery (as described above)
- fatality related delays (as described above)
- maintaining access to the network during times of service disruption (particularly poor weather) when capacity became the primary service objective, to the detriment of PPM performance (i.e. we continued to run trains whilst accepting that they would not run to timetable)
- delay increases around Birmingham New Street and Reading during enhancement work
- an increase in train crew related problems causing both increased delay and cancellations.

More detailed commentary concerning LD performance is provided at route level below.

London and South East train performance

PPM for LSE sector services in 2013/14 ended 3.4 percentage points behind the regulatory target with 89.6 per cent of LSE train services arriving on time. This was 1.4 percentage points worse than the result achieved in 2012/13 when 91.0 per cent of LSE trains arrived on time.

As with the LD sector, we further developed, refined and implemented our performance recovery plan for this sector and substantially widened our investment in performance improvement. The LSE recovery plan continued to seek to address the bigger causes of delay in the sector including the performance of the rail assets, seasonal and weather resilience, timetable conflicts, adopting a right time approach to daily delivery and reviewing how the rules of the railway are applied. Many of the benefits that have been delivered have been offset by the continued

severe weather conditions experienced during the autumn / winter and continued wider problems with delivery. Without the recovery plan the LSE sector would have been further behind target.

Specific reasons for missing the LSE PPM target are:

- severe storm events, especially very high winds resulting in line blockages. In extreme cases lines were blocked for a significant time due to the extent of fallen trees. Heavy rainfall also caused flooding and on a number of lines major earthworks failures causing line closures for weeks / months
- difficult autumn delivery (as described above)
- pressure of growth causing increased subthreshold delay and indirectly increasing delay from all causes
- possession overruns and the wider impact of possessions work on assets
- fatality related delays (as described above)
- operator on operator delays.

More detailed commentary concerning LSE performance is provided at route level below.

Regional train performance

PPM for Regional sector services in 2013/14 ended 1.0 percentage point behind the regulatory target with 91.0 per cent of train services arriving on time. This was 0.1 percentage point worse than the result achieved in 2012/13 when 91.1 per cent of trains arrived on time.

Regional sector performance was much closer to target than LD and LSE sector performance. This was in part due to reduced impact of severe weather on performance than in 2012/13, but also reflecting continued delivery of improvement plans including those shown in the Regional recovery plan.

Specific reasons for missing the Regional PPM target are:

- heavy rainfall and flooding, including the resulting increase in track faults and an increase in the number of Temporary Speed Restrictions (TSRs) and the need to take additional sometimes disruptive possessions to address these issues
- operator on operator delays
- difficult autumn delivery
- delay increases around Birmingham New Street and Reading during enhancement work
- an increase in train crew related problems causing both increased delay and cancellations.

Route level performance

This includes commentary on performance for the operators that principally run on these routes.

London North West (LNW) (Virgin, London Midland, Merseyrail, Chiltern)

Performance on LNW Route was worse than planned in 2013/14, with delay minutes ending the year 267,000 minutes higher than target. The main causes of delay were fatalities from suicides and signalling systems failures. The West Coast Main Line has a major programme of asset improvement and fatality avoidance works being undertaken. Disruption around Birmingham New Street with reduced platform availability as a result of the Birmingham Gateway project has also been focused upon. The impact of severe weather was material but less than in 2012/13 and there was an improving (reducing) trend in delay in the latter part of the year.

Virgin Trains performance showed some improvements as the year progressed driven by asset reliability improvements on the critical route section between London and Rugby. Virgin Trains PPM for 2013/14 is 85.8 per cent, 2.2 percentage points better than 2012/13.

London Midland performance suffered from a range of problems in 2013/14 including a difficult autumn, and the problems of operation around Birmingham New Street. Problems with train crew continued albeit with fewer problems than in 2012/13.

Merseyrail performance was close to target, with the major focus at year end on scope to further improve delivery in autumn.

Chiltern was the only train operator with PPM performance better than expected at the end of 2013/14, with good, improved performance across nearly all causes of delay.

London North East (LNE, including East Midlands) (Northern, First Capital Connect, East Midlands Trains, First Transpennine Express, East Coast)

Performance on LNE Route was worse than planned in 2013/14, with delay minutes ending the year 234,000 minutes higher than target. This was slightly worse than in 2012/13. The main causes of delay were track faults, fatalities, and timetable related delays. The reliability of overhead line equipment (OHL) is also a key issue because of the disruption each incident can cause.

In general LNE's performance has been affected by the design of its infrastructure which makes incident response harder. Performance of the south end of the East Coast Main Line (ECML) was a major challenge with significant focus on asset resilience improvements and fatality avoidance. Performance on the Midlands Main Line (MML) was also difficult, in part as a result of the major programmes of enhancements at Nottingham and to raise line speeds.

First Capital Connect train performance was also heavily impacted with further issues from managing services along the Brighton Main Line and little scope for improvements through the central London core during Thameslink project works.

East Midlands Trains performance was affected by performance on the Midland Main Line, with some additional disruption from the Nottingham station blockade in the summer of 2013.

First Transpennine Express performance was principally affected by infrastructure related delays together with relatively significant issues caused by a dispute with train crew over rest day working which drove cancellations problems in addition to delay.

East Coast train performance was affected by OHL problems at the south end of the East Coast Main Line which only improved later in the year.

Western (First Great Western)

Performance on Western Route was worse than planned in 2013/14, with delay minutes ending the year 279,000 minutes higher than target. This was worse than in 2012/13. The impact of the weather was the dominant cause of delay worse than target with the groundwater related flooding at Maidenhead causing 55,000 minutes of delay on its own.

The impact of the weather was also the dominant factor for First Great Western performance with significant service disruption across their operating network. With the enhancements at Reading nearing completion, the end of the year saw reductions in reactionary delays.

Wessex (Stagecoach South West Trains)

Performance on Wessex Route was worse than planned in 2013/14, with delay minutes ending the year 281,000 minutes higher than target. This was significantly worse than in 2012/13. The impact of the weather was the primary cause of delay worse than target with particular problems from trees falling across routes during the storms.

Stagecoach South West trains performance was significantly worse than target, principally due to large increases in passengers and the provision of fleet availability caused by damage from tree fall.

Sussex (Southern)

Performance on Sussex Route was worse than planned in 2013/14, with delay minutes ending the year 227,000 minutes higher than target. This was also worse than in 2012/13. The main causes of delay for both the route and Southern Trains were fatalities, weather, possessions overruns and the impact of operating a core route – the Brighton Main Line – very close to capacity with significant subthreshold delay and material challenge control service disruption. The delivery of the main part of the Thameslink programme also reduces scope for major improvements in Sussex delivery.

Kent (Southeastern)

Performance on Kent Route was worse than planned in 2013/14, with delay minutes ending the year 247,000 minutes higher than target. This was materially worse than in 2012/13. The main causes of delay for both the route and Southeastern were weather (including related earthworks failures), possession overruns, track circuits and track faults. The extended autumn was also a cause for increased delays. The delivery of the main part of the Thameslink programme also reduced scope for major improvements in Kent delivery.

Anglia (Abellio Greater Anglia, LOROL, c2c)

Performance on Anglia Route was better than planned in 2013/14, with delay minutes ending the year 37,000 minutes lower than target (albeit slightly worse than 2012/13). The main causes of delay were weather, track faults and fatalities. In overall terms, compared to other routes, Anglia route performance was broadly positive, close to maintaining the excellent performance achieved in 2012/13.

Performance for Abellio Greater Anglia, LOROL and c2c was close to target, all maintaining broadly good levels of PPM.

Wales (Arriva Trains Wales)

Performance on Wales Route was worse than planned in 2013/14, with delay minutes ending the year 36,000 minutes higher than target. The main delay causes were axle counter failures and other asset failures. The route also had some significant network closures due to the effects of the weather although these had little effect on performance.

Arriva Trains Wales was also affected by weather, overruns and other infrastructure failures, with some increasing challenges operating the core Cardiff Valleys routes.

CrossCountry

CrossCountry is a cross-route operator with the national team acting as their lead. Performance was again significantly affected by weather related delay and network closures, although this was less than in 2012/13. Other significant impacts came from fatalities, track faults, points failures and signalling system issues, these five causes making up 50 per cent of the PPM loss over the year.

Scotland

Scotland PPM was 0.6 percentage points worse than the regulatory target of 92.0 per cent. The delay minutes regulatory target was also missed by 18 per cent (86,000 minutes). Key problems compared to 2012/13 were signalling systems, points and fatalities with underlying problems caused by the construction of the timetable and coincident closure of Dalmarnock station for Commonwealth Games improvements. Resolution of these underlying problems later in the year resulted in performance in the last quarter being close to best ever levels.

Delay minutes

The delay minutes data presented in the remainder of this section are Network Rail attributed delays affecting the main scheduled passenger train services (including four open access operators) and freight operators. This is similar to data presented in previous years and excludes delays to other types of operator (such as London Underground Limited (LUL) services, NEXUS Metro and charter operations), which account for a further 0.7 per cent of the total Network Rail attributed delays.

Results

Table 2.4 shows delays for all train services for 2013/14 compared to previous years.

Commentary

Network Rail attributed delays increased by 0.7 million minutes to 9.6 million minutes from 2012/13 to 2013/14. With train kilometres run increasing this has led to an eight per cent increase in delay minutes per 100 train kilometres.

The increase in delay minutes compared to 2012/13 is principally due to the increase in delay caused by fatalities, and the repeated effect of severe weather including effects on track faults. For example, the effects of the autumn and winter storms essentially kept delay from severe weather at the same level as in 2012/13 and created similar levels of indirect knock on delay as was caused by the flooding and snow in 2012/13.

Delays to passenger train services

Total Network Rail attributed delays to passenger trains increased by nine per cent. This resulted in an increase in delay minutes per 100 train kilometres to 1.64 minutes from 1.51 in 2012/13. The trend since 2009/10 is summarised in Table 2.5 below.

England & Wales delays to passenger train services

Total Network Rail attributed delays to passenger trains in England & Wales increased in 2013/14 by eight per cent. This resulted in a combined impact of eight per cent increase in delay minutes per 100 train kilometres to 1.70 minutes. The delays to passenger services were 44 per cent worse than the regulatory target. The trend since 2009/10 is summarised in Table 2.6.

Table 2.4: Delays to all train services

Network Rail-attributed delays	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Total delay minutes (incl. minor operators)	8,197,572	8,980,387	8,418,938	8,876,041	9,581,446
Train km (millions)	513.4	521.5	536.2	536.4	538.4
Delay per 100 train km	1.60	1.72	1.57	1.65	1.78
Delay Minutes (millions) Above threshold	7.8	8.6	8.0	8.5	9.2

Notes:

1. It is the industry intention to report above threshold (3 minutes and above) delay only in CP5. At present some sub-threshold delay is reported but this is inconsistently applied. It is felt that this move will increase the attribution of sub-threshold delay which will be of value to our understanding of train performance. We have shown the line above to reflect the level of change this will generate.
2. Total delay minutes include delays to a number of minor operators and some unallocated minutes, which are excluded from the main measure of major operators (passenger and freight). They are nevertheless included in the total Network Rail delay minutes. These include delays caused to LUL Bakerloo line services, NEXUS, charter operations and miscellaneous services.
3. The number of train kilometres run excludes empty coaching stock movements, locomotive movements and engineering trains, and is as recorded in our systems.
4. The delay per 100 train km is based on total delay minutes, divided by the train kilometres run, multiplied by 100.

Table 2.5: Network-wide Network Rail-attributed delays to passenger train services

	2009/10	2010/11	2011/12	2012/13	2013/14
Delay minutes	6,711,044	7,429,631	7,019,856	7,447,415	8,090,834
Percentage of overall delay minutes	81.86%	82.72%	83.37%	83.89%	84.43%
Train km	470,318,420	479,809,575	492,317,818	492,537,511	493,307,273
Delay per 100 train km	1.43	1.55	1.43	1.51	1.64

Notes:
1. The delay minute totals are based on all PfPI (Process for Performance Improvement) delays, affecting applicable main scheduled passenger operators (franchised operators plus three open access operators Heathrow Express, Grand Central, and First Hull Trains). Wrexham & Shropshire figures are included until they ceased network operations during 2010/11.
2. Train km run are for trains of applicable operators, excluding empty coaching stock movements and locomotives running "light", as recorded in our systems.
3. Delays per 100 train km are based on all PfPI delay minutes, divided by the train kilometres run, multiplied by 100.

Table 2.6: England & Wales Network Rail-attributed delays to passenger train services

	2009/10	2010/11	2011/12	2012/13	2013/14
Delay minutes	6,174,012	6,898,298	6,536,746	7,065,845	7,643,630
Percentage of overall delay minutes	75.31%	76.81%	77.64%	79.60%	79.77%
Train km	430,898,974	439,547,809	449,704,866	448,755,501	448,971,484
Delay per 100 train km	1.43	1.57	1.45	1.57	1.70
Regulatory target (minutes)	6,270,000	5,790,000	5,430,000	5,190,000	4,980,000

Scotland delays to passenger train services

Total Network Rail attributed delays affecting Scotland passenger services (First ScotRail) increased in 2013/14 by 17 per cent. Traffic volumes increased by 1.2 per cent compared to 2012/13. This resulted in a combined impact of a 16 per cent increase to 1.01 delay minutes per 100 train kilometres. The delays to passenger services were 18 per cent worse than the regulatory target. The trend since 2009/10 is summarised in Table 2.7.

In 2012/13 delays were due to signalling systems failures, points failures, fatalities due to suicides and the coincident closure of Dalmarnock station for Commonwealth Games improvements. Resolution of these underlying causes later in the year resulted in performance in the last quarter being close to or at best ever levels. Weather related delay was broadly in line with expectations.

Table 2.7: Scotland Network Rail-attributed delays to passenger train services

	2009/10	2010/11	2011/12	2012/13	2013/14
Delay minutes	537,032	531,333	483,110	381,570	447,204
Percentage of overall delay minutes	6.55%	5.91%	5.73%	4.29%	4.66%
Train km	39,419,446	40,261,766	42,612,952	43,782,010	44,335,789
Delay per 100 train km	1.36	1.32	1.13	0.87	1.01
Regulatory target (minutes)	436,000	410,000	391,000	386,000	382,000

Notes:
1. Improved technology and analysis led to an amended commercial agreement being reached in early 2012/13 for delay minutes in Scotland. This agreement was backdated to include the year 2010/11 following publication of the Annual Return for that year. The figures shown in the table above have therefore been refreshed for year 2010/11 for purposes of accurate comparison.

Delays to freight train services

Network Rail delay to freight services increased by less than one per cent during the year to 3.70 minutes per 100 train kilometres, which was 26 per cent worse than the regulatory target. The trend since 2009/10 is summarised in Table 2.8 and Table 2.9 shows delays to freight operators in 2013/14.

Freight delivery metric

The Freight Delivery Metric has been recorded since 2010/11 and is shown in Table 2.10. The measure tracks the punctuality of all freight services at destination as well as taking into account the cancellations (not planned) as a result of Network Rail performance. Punctuality failures are defined as those not arriving at destination within 15 minutes of plan and where Network Rail has caused more than 15 minutes of delay during the journey.

Results

Table 2.8 shows that delay minutes to freight increased by four per cent over the year, with the delay per 100 train kilometres measure improving by eight per cent over the last five years. The comparison of freight operators is shown in Table 2.9. Table 2.10 shows that over the past two years the freight delivery metric has worsened by 0.3 per cent.

Commentary

The increase in delays to freight train services was principally due to delays caused by track faults, train planning, weather and fatalities.

During the year, there has continued to be an industry focus on reducing delays to freight services through the Freight Reform programme aligned to integrating Network Rail delivery within the overall rail freight supply chain. As part of reducing freight delays, we have developed more short term planning to optimise rail traffic to market conditions.

Table 2.8: Network-wide Network Rail-attributed delays to freight train services

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Delay minutes	1,424,851	1,499,382	1,345,131	1,369,903	1,428,098
Train km	35,838,164	35,042,580	37,276,094	37,163,438	38,560,649
Delay per 100 train km	3.98	4.28	3.61	3.69	3.70
Regulatory target (delay per 100 train km)	3.68	3.41	3.18	3.05	2.94

Notes:
1. The delay minutes totals are based on all PfPI delays affecting applicable freight operators (major scheduled operators).
2. Train km run are for trains of applicable operators, excluding locomotives running "light" and non-commercial traffic (such as engineering haulage trains).
3. Delay minutes per 100 train km are based on all PfPI delay minutes, divided by the train kilometres run, multiplied by 100.

Table 2.9: Delays to freight operators in 2013/14

	Delay minutes	*Train km (million)*	*Delay per 100 km*
Major Freight operators			
DBS	622,458	16,961,048	3.67
Freightliner Heavy Haul	236,229	6,284,917	3.76
Freightliner Intermodal	345,127	8,320,839	4.15
GB Rail Freight	169,517	4,350,599	3.90
DRS	54,768	2,643,246	2.07
Other Freight operators	24,219	672,700	3.60
Total	1,452,317	39,233,349	3.70

Table 2.10: Freight delivery metric at a national level (%)

	2010/11	*2011/12*	*2012/13*	*2013/14*
FDM	92.5	94.0	93.7	93.4

Notes:
FDM includes all freight operators, not just the five major operators.

Delay minutes by cause

The trends in Network Rail delay minutes by cause are described in this section.

Results

Tables 2.11 and 2.12 show Network Rail delays by category grouping for 2013/14 compared to previous years. Tables 2.13 to 2.15 show Network Rail delays by detailed cause category.

Commentary

Delays caused by Network Rail increased by eight per cent, and delays due to operator causes were slightly worse than in 2012/13.

The impact of severe weather worsened from 2012/13 but due to different weather conditions; storms (wind, rainfall, tidal surges) in 2013/14 flooding and cold / snow in 2012/13. Both caused increases in delays from track defects and earthworks failures. The improvement in TSRs early in 2013/14 towards historic best levels was reversed.

There were increased telecoms faults due to teething problems with the introduction of GSM-R. Delays due to possession overruns worsened reflecting an increase in the amount of engineering work in 2013/14.

Delays caused by external factors in 2013/14 worsened by ten per cent, mostly due to increased delays from fatalities, although this was less than expected given the national worsening trend in suicides.

Network management delays increased in 2013/14 partly as a result of the severe weather but also reflecting the impact of traffic growth in signaller errors and unexplained delay.

Table 2.11: Network delays to passenger and freight trains by summarised category groups (delay minutes)

Category group[1]	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Track defects and TSRs[2]	816,355	825,104	894,319	950,784	1,028,783
Other asset defects[3]	2,572,927	2,591,198	2,592,684	2,650,943	2,672,069
Network management/other[4]	2,020,759	2,505,378	2,371,738	2,429,715	2,704,023
Autumn leaf-fall and adhesion[5]	150,528	273,096	147,004	193,948	307,968
Severe weather/structures[6]	985,860	1,013,698	486,424	1,174,346	1,240,898
External factors[7]	1,577,225	1,707,664	1,872,818	1,417,581	1,565,192
Total minutes	**8,123,654**	**8,916,138**	**8,364,987**	**8,817,317**	**9,518,933**
Train kilometres (thousands)	**506,157**	**514,852**	**529,594**	**529,701**	**531,868**

Notes:

1. Delay totals are based on all delays recorded for attribution of responsibility to Network Rail.
2. Track defects and TSRs include broken rails, other track faults, speed restrictions for condition of track and rolling contact fatigue, and reactionary delay due to planned TSRs.
3. Other asset defects include points, track circuits, axle counters, signal and signalling system failures, overhead power/third rail supply etc.
4. Network management/other delays include possessions, signalling errors, timetabling, dispute resolution, unexplained, and un-investigated.
5. Autumn leaf fall and adhesion include leaf fall related delays and Network Rail's share of industry adhesion delays.
6. Severe weather/structures includes direct delays due to severe weather and all structures delays, which include weather related delays due to embankment instability risks and bridge scour. Heat-related speed restrictions are also shown within this category.
7. External factors include road-related incidents, fires, trespass and vandalism, cable theft, security alerts, suicides and other external events.

Table 2.12: Network delays to passenger and freight trains by summarised category groups (delay minutes per 100 train km)

Category group[1]	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Track defects and TSRs[2]	0.16	0.16	0.17	0.18	0.19
Other asset defects[3]	0.51	0.50	0.49	0.50	0.50
Network management/other[4]	0.40	0.49	0.45	0.46	0.51
Autumn leaf-fall and adhesion[5]	0.03	0.05	0.03	0.04	0.06
Severe weather/structures[6]	0.19	0.20	0.09	0.22	0.23
External factors[7]	0.31	0.33	0.35	0.27	0.29
Total	**1.60**	**1.73**	**1.58**	**1.67**	**1.78**

Notes:

1. Delay totals are based on all delays recorded for attribution of responsibility to Network Rail, divided by train kilometres run.
2. Track defects and TSRs include broken rails, other track faults, speed restrictions for condition of track and rolling contact fatigue, and reactionary delay to planned TSRs.
3. Other asset defects include points, track circuits, axle counters, signal and signalling system failures, overhead power/third rail supply etc.
4. Network management/other delays include possessions, signalling errors, timetabling, dispute resolution, unexplained, and un-investigated.
5. Autumn leaf fall and adhesion include leaf fall related delays and Network Rail's share of industry adhesion delays.
6. Severe weather/structures includes direct delays due to severe weather and all structures delays, which include weather related delays due to embankment instability risks and bridge scour. Heat-related speed restrictions are also shown within this category.
7. External factors include road-related incidents, fires, trespass and vandalism, cable theft, security alerts, suicides and other external events.

Table 2.13: Network wide delays to passenger and freight trains by detailed cause category 2013/14 (delay minutes)

		Passenger Trains		*Freight Trains*		*Combined Total*	
No	***Category***	***Delay Mins***	***Delay per 100tr km***	***Delay Mins***	***Delay per 100tr km***	***Delay Mins***	***Delay per 100tr km***
101	Points failures	433,400	0.09	78,065	0.20	511,465	0.10
102	Problems with trackside signs including TSR boards	20,116	0.00	2,079	0.01	22,195	0.00
103	Level crossing failures	86,060	0.02	15,704	0.04	101,764	0.02
104A	TSRs Due to Condition of Track	51,979	0.01	47,337	0.12	99,316	0.02
104B	Track faults (including broken rails)	672,271	0.14	154,872	0.40	827,143	0.16
104D	Reactionary delay to planned TSRs	85,985	0.02	16,331	0.04	102,316	0.02
105	Civil Engineering structures, earthworks & buildings	170,331	0.03	22,563	0.06	192,894	0.04
106	Other infrastructure	255,534	0.05	57,023	0.15	312,557	0.06
106A	Track Patrols & related possessions	25,633	0.01	7,617	0.02	33,250	0.01
107A	Possession over-run and related faults	202,989	0.04	47,093	0.12	250,082	0.05
107B	Other possession related delay	51,440	0.01	7,695	0.02	59,135	0.01
108	Mishap – infrastructure causes	195,792	0.04	31,350	0.08	227,142	0.04
110A	Severe weather	774,644	0.16	108,339	0.28	882,983	0.17
110B	Other weather	149,951	0.03	15,069	0.04	165,020	0.03
111A	Wheel slip due to leaf fall	92,340	0.02	12,158	0.03	104,498	0.02
111B	Vegetation Management failure	32,847	0.01	2,834	0.01	35,681	0.01
112	Fires starting on Network Rail infrastructure	52,975	0.01	3232	0.01	56,207	0.01
150	Low adhesion inc. Autumn (Network Rail)	170,628	0.03	9,221	0.02	179,849	0.03
201	Overhead line/third rail faults	264,600	0.05	35,357	0.09	299,957	0.06
301A	Signal failures	225,144	0.05	30,109	0.08	255,253	0.05
301B	Track Circuit failures	459,187	0.09	50,364	0.13	509,551	0.10
301C	Axle counter failures	100,959	0.02	12,970	0.03	113,929	0.02
302A	Signalling System & Power Supply failures	467,270	0.09	74,914	0.19	542,184	0.10
302B	Other signal equipment failures	48,793	0.01	10,526	0.03	59,319	0.01
303	Telecoms failures	82,312	0.02	10,272	0.03	92,584	0.02
304	Cable faults (signalling & comms)	147,269	0.03	38,795	0.10	186,064	0.03
305	Track circuit failures – leaf-fall	20,043	0.00	3,577	0.01	23,620	0.00
401	Bridge strikes	126,082	0.03	12,642	0.03	138,724	0.03
402	External infrastructure damage – Vandalism/Theft	128,653	0.03	32,816	0.09	161,469	0.03
403	External level crossing/road incidents (not bridges)	56,383	0.01	10,116	0.03	66,499	0.01
501A	Network Rail Operations – signalling	409,988	0.08	54,004	0.14	463,992	0.09
501B	Network Rail Operations – control	40,121	0.01	19,200	0.05	59,321	0.01
501C	Network Rail Operations – railhead conditioning trains	30,417	0.01	2,465	0.01	32,882	0.01
501D	Network Rail Operations – other	100,862	0.02	24,676	0.06	125,538	0.02
502A	Timetable Planning	201,447	0.04	128,758	0.33	330,205	0.06
502C	Network Rail commercial takeback/other	141,637	0.03	44,283	0.11	185,920	0.03
503	External fatalities and trespass	735,182	0.15	85,203	0.22	820,385	0.15
504	External police on line/security alerts	10,820	0.00	484	0.00	11,304	0.00
505	External fires	27,904	0.01	10,046	0.03	37,950	0.01
506	External other	235,068	0.05	37,586	0.10	272,654	0.05
601	Unexplained	366,227	0.07	34,379	0.09	400,606	0.08
602	Un-investigated delay	139,541	0.03	25,977	0.07	165,518	0.03
Total minutes		**8,090,824**	**1.65**	**1,428,101**	**3.70**	**9,518,925**	**1.80**
Train kilometres (millions)		**493.3**	**-**	**38.6**	**-**	**531.9**	**-**

Table 2.14: Network total delays to passenger and freight trains by detailed cause category (delay minutes)

No	*Category*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
101	Points failures	657,353	640,635	593,500	573,934	511,464
102	Problems with trackside signs including TSR boards	17,534	28,116	22,321	23,009	22,195
103	Level crossing failures	95,148	100,617	93,261	98,536	101,764
104A	TSRs Due to Condition of Track	145,838	106,985	77,539	70,623	99,316
104B	Track faults (including broken rails)	613,752	652,820	722,124	771,512	827,143
104D	Reactionary delay to planned TSRs	56,765	65,216	94,656	108,649	102,316
105	Civil Engineering structures, earthworks & buildings	78,236	61,829	58,616	160,253	192,894
106	Other infrastructure	201,561	211,713	251,328	291,226	312,557
106A	Track Patrols & related possessions	33,689	33,036	30,132	33,574	33,249
107A	Possession over-run and related faults	134,272	162,025	169,524	178,551	250,083
107B	Other possession related delay	37,492	41,565	49,945	60,426	59,135
108	Mishap – infrastructure causes	107,561	132,465	144,524	145,914	227,142
110A	Severe weather (beyond design capability of infrastructure)	816,308	871,707	348,436	832,363	882,983
110B	Other weather (impact on infrastructure or network operation)	91,316	80,162	79,372	181,730	165,021
111A	Wheel slip due to leaf fall	44,483	128,561	29,494	65,149	104,498
111B	Vegetation Management failure	28,913	19,268	20,358	29,022	35,681
112	Fires starting on Network Rail infrastructure	32,282	33,707	21,875	12,652	56,207
150	Low adhesion inc. Autumn (Network Rail)	92,149	129,233	110,153	123,714	179,850
201	Overhead line/third rail faults	242,817	249,121	224,859	320,595	299,957
301A	Signal failures	252,479	213,301	237,778	231,498	255,253
301B	Track Circuit failures	512,696	546,719	600,978	527,337	509,551
301C	Axle counter failures	105,221	66,221	72,260	85,806	113,929
302A	Signalling System & Power Supply failures	415,758	513,374	484,566	515,326	542,184
302B	Other signal equipment failures	55,143	59,399	58,785	53,214	59,320
303	Telecoms failures	69,654	52,796	55,360	72,189	92,584
304	Cable faults (signalling & comms)	166,658	149,015	171,337	172,509	186,063
305	Track circuit failures – leaf fall	13,896	15,302	7,357	5,085	23,620
401	Bridge strikes	143,110	162,338	143,270	143,467	138,724
402	External infrastructure damage– Vandalism/Theft	471,683	529,380	530,366	262,773	161,470
403	External level crossing/road incidents (not bridges)	70,301	83,083	86,406	66,261	66,498
501A	Network Rail Operations – signalling	361,768	377,899	387,391	396,645	463,992
501B	Network Rail Operations – control	64,880	70,592	53,710	55,656	59,320
501C	Network Rail Operations – railhead conditioning trains	28,621	30,867	38,376	36,331	32,882
501D	Network Rail Operations – other	113,814	105,931	117,320	110,783	125,538
502A	Timetable Planning	241,564	409,064	317,239	316,774	330,205
502C	Network Rail commercial takeback/other	321,880	418,072	306,834	269,509	185,920
503	External fatalities and trespass	598,449	632,644	767,359	668,097	820,385
504	External police on line/security alerts	24,321	15,727	11,842	10,549	11,304
505	External fires	47,692	55,315	45,267	18,469	37,950
506	External other	189,388	195,470	266,433	235,314	272,654
601	Unexplained	327,198	346,689	404,326	449,001	400,606
602	Un-investigated delay	4	116,472	58,410	33,295	165,517
Total minutes		**8,123,647**	**8,914,451**	**8,364,987**	**8,817,320**	**9,518,924**
Train kilometres (thousands)		**506,157**	**514,852**	**529,594**	**529,701**	**531,868**

Notes:

1. It has been agreed not to use Category 104C anymore as of CP5, therefore the delays have been remapped to Category 104A. Category 104C represented only 0.05% of the total national delay.

Table 2.15: Network total delays to passenger and freight trains by detailed cause category (delay minutes per 100 train kms)

No	*Category*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
101	Points failures	0.13	0.12	0.11	0.11	0.10
102	Problems with trackside signs including TSR boards	0.00	0.01	0.00	0.00	0.00
103	Level crossing failures	0.02	0.02	0.02	0.02	0.02
104A	TSRs Due to Condition of Track	0.03	0.02	0.01	0.01	0.02
104B	Track faults (including broken rails)	0.12	0.13	0.14	0.15	0.16
104D	Reactionary delay to planned TSRs	0.01	0.01	0.02	0.02	0.02
105	Civil Engineering structures, earthworks & buildings	0.02	0.01	0.01	0.03	0.04
106	Other infrastructure	0.04	0.04	0.05	0.05	0.06
106A	Track Patrols & related possessions	0.01	0.01	0.01	0.01	0.01
107A	Possession over-run and related faults	0.03	0.03	0.03	0.03	0.05
107B	Other possession related delay	0.01	0.01	0.01	0.01	0.01
108	Mishap – infrastructure causes	0.02	0.03	0.03	0.03	0.04
110A	Severe weather	0.16	0.17	0.07	0.16	0.17
110B	Other weather	0.02	0.02	0.01	0.03	0.03
111A	Wheel slip due to leaf fall	0.01	0.02	0.01	0.01	0.02
111B	Vegetation Management failure	0.01	0.00	0.00	0.01	0.01
112	Fires starting on Network Rail infrastructure	0.01	0.01	0.00	0.00	0.01
150	Low adhesion inc. Autumn (Network Rail)	0.02	0.03	0.02	0.02	0.03
201	Overhead line/third rail faults	0.05	0.05	0.04	0.06	0.06
301A	Signal failures	0.05	0.04	0.04	0.04	0.05
301B	Track Circuit failures	0.10	0.11	0.11	0.10	0.10
301C	Axle counter failures	0.02	0.01	0.01	0.02	0.02
302A	Signalling System & Power Supply failures	0.08	0.10	0.09	0.10	0.10
302B	Other signal equipment failures	0.01	0.01	0.01	0.01	0.01
303	Telecoms failures	0.01	0.01	0.01	0.01	0.02
304	Cable faults (signalling & comms)	0.03	0.03	0.03	0.03	0.03
305	Track circuit failures – leaf-fall	0.00	0.00	0.00	0.00	0.00
401	Bridge strikes	0.03	0.03	0.03	0.03	0.03
402	External infrastructure damage– Vandalism/Theft	0.09	0.10	0.10	0.05	0.03
403	External level crossing/road incidents (not bridges)	0.01	0.02	0.02	0.01	0.01
501A	Network Rail Operations – signalling	0.07	0.07	0.07	0.07	0.09
501B	Network Rail Operations – control	0.01	0.01	0.01	0.01	0.01
501C	Network Rail Operations – railhead conditioning trains	0.01	0.01	0.01	0.01	0.01
501D	Network Rail Operations – other	0.02	0.02	0.02	0.02	0.02
502A	Timetable Planning	0.05	0.08	0.06	0.06	0.06
502C	Network Rail commercial takeback / other	0.06	0.08	0.06	0.05	0.03
503	External fatalities and trespass	0.12	0.12	0.14	0.13	0.15
504	External police on line/security alerts	0.00	0.00	0.00	0.00	0.00
505	External fires	0.01	0.01	0.01	0.00	0.01
506	External other	0.04	0.04	0.05	0.04	0.05
601	Unexplained	0.06	0.07	0.08	0.08	0.08
602	Un-investigated delay	0.00	0.02	0.01	0.01	0.03
Total minutes		**1.60**	**1.73**	**1.56**	**1.64**	**1.80**

Asset failures

Infrastructure incidents causing delay

The number of performance incidents for various asset categories is shown in this section. These incidents are recorded for the purpose of identifying the cause of delays and cancellations. This information also assists with focusing management decisions on where to maintain or renew assets. These records do not seek to represent a catalogue of every single physical component or system failure occurring on the network. Table 2.16 shows the number of infrastructure incidents (including category numbers) with delays attributed to them. In a small number of cases more than one incident will be attributed to the same physical incident to reflect different phases of an incident or responsibilities for contractual delay attribution purposes.

Commentary

In 2013/14 there was an increase of six per cent in total asset failures compared to 2012/13, although there has been a nine per cent improvement from the start of CP4. In 2013/14 there has been a reduction in the number of incidents across five of the 18 categories shown in Table 2.16. Importantly, the number of points failures (which is one of the biggest delay causing categories) has reduced by 38 per cent over CP4 from 7,118 in 2009/10 to 4,387 in 2013/14. This reflects our focus on improved maintenance practices together with the increasingly positive impact of remote condition monitoring. More equipment is now fitted and alert levels are set to capture worsening component delivery in advance of failure. The biggest decline was in telecoms failures caused by teething problems bringing the GSM-R system into full use. Many of the categories that have not improved during 2013/14 relate to asset failures which have occurred as a result of the impact of the weather (e.g. earthworks failures and some OLE failures).

Table 2.16: Network infrastructure incidents recorded for delay attribution (number)

No	*Category*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
101	Points failures	7,118	5,803	5,162	5,022	4,381
103	Level crossing failures	2,162	2,003	1,932	1,858	1,935
104A	TSRs due to condition of track	1,278	932	717	685	747
104B	Track faults (including broken rails)	5,387	4,948	4,804	4,660	5,246
105	Civil Engineering structures, earthworks & buildings	436	385	279	444	564
106	Other infrastructure	3,772	3,458	3,774	3,611	4,709
106A	Track patrols & related possessions	2,565	2,269	1,949	2,213	2,074
108	Mishap – infrastructure causes	1,184	1,496	1,838	1,836	2,007
112	Fires starting on Network Rail infrastructure	221	250	257	115	217
201	Overhead line/third rail faults	1,241	1,281	1,276	1,264	1,250
301A	Signal failures	6,202	5,117	5,017	4,449	4,282
301B	Track Circuit failures	5,145	4,567	4,243	3,901	3,729
301C	Axle counter failures	913	648	683	706	799
302A	Signalling system & power supply failures	4,016	4,422	4,202	4,495	4,685
302B	Other signal equipment failures	1,430	1,514	1,505	1,297	1,332
303	Telecoms failures	1,352	1,252	1,177	1,505	2,364
304	Cable faults (signalling & comms)	530	552	570	614	686
401	Bridge strikes	1,126	1,232	1,115	1,068	1,137
Total		**46,078**	**42,129**	**40,500**	**39,743**	**42,144**

Cancellations & Significant Lateness (CaSL)

Definition

CaSL is defined as the percentage of passenger trains (franchised and open access operators) which are cancelled in part or full, or which arrive at their final destination 30 or more minutes later than the time shown in the public timetable.

Commentary

Table 2.17 shows that in 2013/14 3.0 per cent of trains were cancelled or significantly late in England & Wales. This was worse than the 2.72 per cent achieved in 2012/13.

CaSL in the LD sector finished 1.0 percentage point worse than the regulatory target of 3.9 per cent. In the LSE sector CaSL was 1.1 percentage points worse than the regulatory target of 2.0 per cent. The Regional sector CaSL was 2.3 per cent which is on target.

The LD and LSE targets were missed primarily due to the severe weather and the impact of increased network traffic, with some other impact from worse than planned asset reliability and operator train crew related problems.

Whilst not a regulatory output 2.1 per cent of trains in Scotland were cancelled or significantly late. Table 2.18 shows CaSL from 2009/10 to 2013/14 and Table 2.19 shows CaSL for each train operator in 2013/14.

Table 2.17: Cancellations and significant lateness (% and number)

Full year results 2013/14 (franchised passenger and open access operators)		
	CaSL (%)	***Number***
London & South East	3.1	124,543
Long Distance	4.9	27,074
Regional	2.3	44,880
England & Wales	3.0	196,497
Scotland	2.1	15,433
Network Total	**2.9**	**211,930**

Table 2.18: Cancellations and significant lateness (%)

	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
London & South East	2.5	2.6	2.4	2.5	3.1
Long Distance	4.6	5.0	4.0	4.9	4.9
Regional	2.1	2.4	2.0	2.5	2.3
England & Wales	2.6	2.8	2.4	2.7	3.0
Scotland[1]	2.4	2.7	2.7	1.5	2.1
Network Total	**2.6**	**2.8**	**2.4**	**2.6**	**2.9**

Notes:

1. CaSL in Scotland is not a regulatory output specified by the ORR.

Table 2.19: Cancellations and significant lateness (%)			
Full year results 2013/14 (franchised passenger and open access operators)			
	Number of Trains Planned	***Number of CaSL Trains***	***CaSL %***
Abellio Greater Anglia	634,175	14,448	2.3
Arriva Trains Wales	320,929	8,447	2.6
c2c	114,104	1,660	1.5
Chiltern	131,858	2,085	1.6
CrossCountry	104,104	5,368	5.2
East Coast	49,833	2,899	5.8
East Midlands Trains	155,975	3,984	2.6
First Capital Connect	378,395	15,161	4.0
First Great Western	512,818	17,482	3.4
First Hull Trains	4,605	333	7.2
First ScotRail	744,397	15,433	2.1
First Transpennine Express	104,933	4,846	4.6
Grand Central	5,722	430	7.5
Heathrow Express	52,264	621	1.2
London Midland	422,820	14,638	3.5
LOROL	373,036	7,007	1.9
Merseyrail	209,454	3,713	1.8
Northern Rail	827,972	14,700	1.8
Southeastern	678,776	22,443	3.3
Southern	750,692	34,701	4.6
Stagecoach South Western Trains Ltd	584,036	16,245	2.8
Virgin Trains	108,722	5,286	4.9
Notes: Discrepancies due to rounding of CaSL %			

Table 2.20: Passenger train punctuality at a national level (%)					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Right Time	70.2	69.6	69.8	68.1	66.3

Right time

Definition

Right Time is defined as the number and percentage of passenger trains (for both franchised and open access operators) which arrive at or before their final destination at or before the time shown in the public timetable.

Commentary

Table 2.20 shows that in 2013/14, 66.3 per cent of trains arrived at their final destination on time compared with 68.1 per cent in 2012/13. This was worse than the change in PPM reflecting the increase in sub-threshold delay and partly due to our response to the severe weather which was focussed on keeping the network operational during these times despite the impact on Right Time performance.

Table 2.21 shows that LD operators recorded the lowest sector right time score of 51.7 per cent, whereas Regional operators recorded a right time score of 68.9 per cent (although this was worse than in 2012/13).

Table 2.22 shows the right time scores for individual operators. The best performing operators such as Chiltern, Arriva Trains Wales, LOROL (London Overground) and c2c have embedded right time practices into all aspects of their operations with Chiltern showing the best improvement in 2013/14. Chiltern is the highest performing Right Time operator at 85.9 per cent, and CrossCountry is the lowest achieving right time operator at 41.7 per cent: a 4.5 percentage point reduction compared to 2012/13.

Table 2.21: Right time by sector for England & Wales and Scotland for 2013/14 (%)		
By sector	***RT Actual 2012/13***	***RT Actual 2013/14***
London & South East	68.4	66.5
Long Distance	54.8	51.7
Regional (incl. Scotland)	70.5	68.9
England & Wales (total)	69.1	67.2

Table 2.22: Right time by Operator for England & Wales and Scotland for 2013/14 (%)		
Operator	***RT Actual 2012/13***	***RT Actual 2013/14***
Abellio Greater Anglia	71.3	70.6
Arriva Trains Wales	85.5	84.4
c2c	84.6	83.4
Chiltern	86.3	85.9
CrossCountry	46.2	41.7
East Coast	61.1	54.9
East Midlands Trains	75.0	69.7
First Capital Connect	69.1	64.3
First Great Western	69.6	66.8
First Hull Trains	50.9	48.8
First ScotRail	60.0	58.0
First Transpennine Express	64.1	60.2
Grand Central	47.3	40.4
Heathrow Express	73.9	72.4
London Midland	62.7	60.9
LOROL	86.9	84.2
Merseyrail	74.7	72.0
Northern Rail	72.4	72.5
Southeastern	64.6	61.6
Southern	55.6	54.2
Stagecoach South Western Trains Ltd	67.8	65.7
Virgin Trains	49.4	52.0

Customer satisfaction

Network Rail's Customer Satisfaction survey (conducted by GfK) took place during October and November 2013. This is a survey of the senior managers from the train and freight operators in Great Britain, both franchised and open access. The key scores are summarised in Figure 2.1.

The survey includes a number of different questions from overall satisfaction to more specific questions about Network Rail activities or behaviours. Some minor amendments were made to the survey in light of feedback received from the 2012 survey and, as devolution plays an increasingly important part of the way Network Rail interacts with its customers, specific questions on individual route satisfaction were included in this year's survey for the first time.

Respondents were again offered the choice of an online or telephone interview, with online responses proving overwhelmingly more popular (97 per cent of respondents used the on line method). This helped maintain a highly satisfactory response rate of 77 per cent. A total of 273 responses to the survey were received nationally.

Overall satisfaction decreased from the all time high of 66 per cent in 2012 to 58 per cent in 2013. This score expresses the number of respondents either satisfied or very satisfied with Network Rail overall. Despite the decrease in satisfaction, this result represented the second highest score to date and a steady improvement throughout CP4. Using a scale of one to five (where one is very dissatisfied and five very satisfied) this equated to a score of 3.41, a decrease from the 2012 score of 3.55. The overall satisfaction scores are in Figure 2.2 and Table 2.23. Figure 2.1 provides the comparison of key scores and Table 2.24 compares satisfaction with train service performance.

Within the overall satisfaction figure, the score for TOCs was 3.44 (2012, 3.56) and for FOCs it was 3.10 (2012, 3.47). Train performance has deteriorated since 2012 and was cited as one of the principal causes for the drop in satisfaction.

Overall satisfaction is heavily reliant on train performance. Satisfaction with train service performance dropped to 2.84 from 3.22 in 2013. Actions to address train performance are considered elsewhere in the Annual Return but it is clear that a substantial and sustained improvement in train performance is required to drive overall satisfaction back to the 2012 highs.

Action plans have been developed at route level as part of the natural progression of alliances and other forms of collaborative working. A Pulse Check, which will provide more frequent feedback throughout the year, has been initiated as part of the Customer Service Maturity workstream committed within the CP5 Delivery Plan.

Figure 2.1: Customer satisfaction key scores

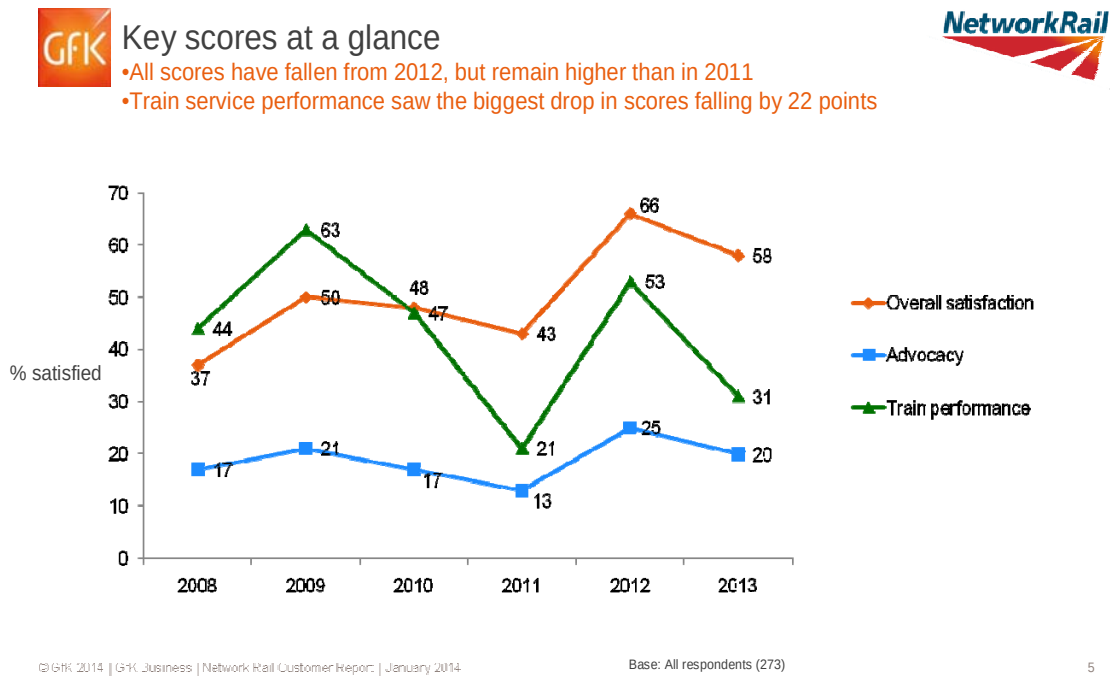


Table 2.23 Overall satisfaction with Network Rail

Satisfied with Network Rail	*2009*	*2010*	*2011*	*2012*	*2013*	*Change from 2012*
Satisfied or very satisfied (%)	50	48	43	66	58	(8)
Dissatisfied or very dissatisfied (%)	17	29	34	19	23	4
Neither (%)	33	22	23	15	19	4
Mean	3.32	3.15	3.12	3.55	3.41	(0.14)

Figure 2.2: Customer satisfaction overall scores

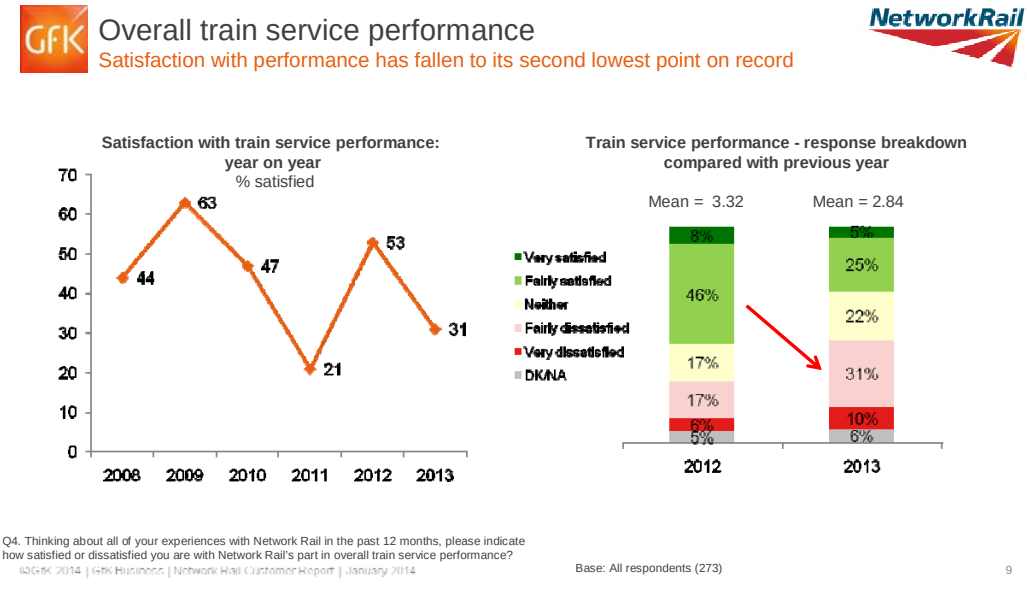
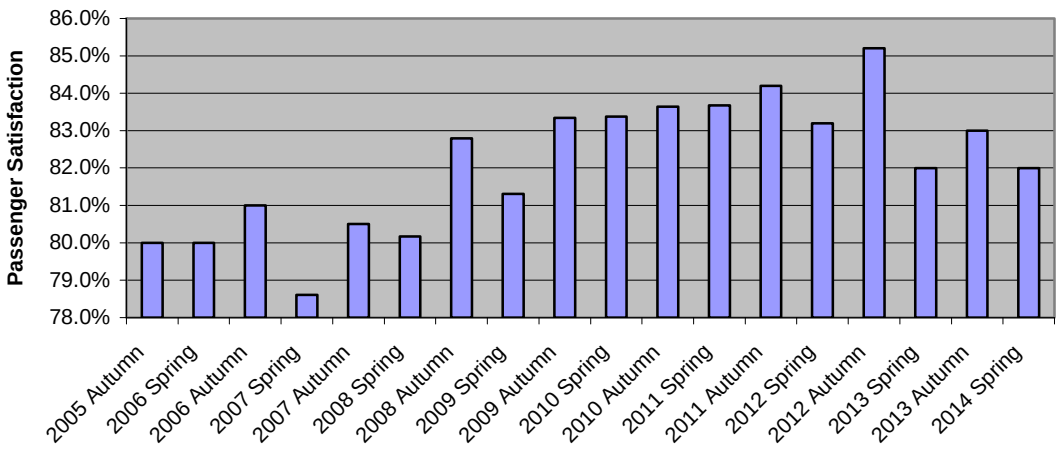


Table 2.24: Comparison of satisfaction with train service performance

Satisfied with Network Rail	*2009*	*2010*	*2011*	*2012*	*2013*	*Change from 2012*
Satisfied or very satisfied (%)	63	47	21	53	31	(22)
Dissatisfied or very dissatisfied (%)	10	30	52	23	41	18
Neither (%)	21	17	21	17	22	5
Mean	3.65	3.18	2.56	3.32	2.84	(0.48)

Figure 2.3: Passenger satisfaction survey results



Passenger satisfaction

The National Passenger Satisfaction (NPS) survey is commissioned by Passenger Focus, with two surveys each year in spring and autumn. The latest results reflect the spring 2014 survey, which took place between February and April. Data was gathered from nearly 30,000 respondents at stations all over the network.

The full result of the Passenger Focus spring 2014 survey can be downloaded at the following address:

http://www.passengerfocus.org.uk/research/publications/national-rail-passenger-survey-nrps-spring-2014-main-report

Nationally the percentage of passengers satisfied with their journey overall was 82 per cent. This is not significantly different to spring 2013 (when 82 per cent of passengers were also satisfied). 83 per cent of passengers were satisfied overall with their journey in autumn 2013. Figure 2.4 shows the NPS survey results over time.

In the London and the South East sector, 80 per cent of passengers were very or fairly satisfied overall, not significantly different to spring 2013 (when 81 per cent were satisfied).

In the long distance sector the proportion of passengers who were very or fairly satisfied overall was 86 per cent. This was not significantly different to spring 2013 (when 87 per cent were satisfied).

In the regional sector 86 per cent of passengers were very or fairly satisfied with their journey overall, not significantly different compared to spring 2013 when 84 per cent were satisfied.

Whilst the percentage of passengers overall satisfied remained fairly static those satisfied with train punctuality and reliability was 77 per cent, one percentage point lower than spring 2013 and three percentage points lower than autumn 2013. The principal driver for the drop in satisfaction is the impact that the autumn storms and the ensuing flooding that were still impacting some routes at the time of the survey.

A significant amount of effort has been put into targeting sites at risk of flooding and working with train and freight operating companies. Reducing delays back to previous levels remains a high priority.

Network Rail continues to work closely with train operators to improve Passenger Information During Disruption (PIDD). The survey category most closely reflecting this area (i.e. how well a train company deals with delays) remains a low scoring area with 35 per cent satisfied, which is three percentage points worse than the autumn 2013 survey.

Network Rail's devolved structure is designed to work in partnership with its customers to address local issues including those demonstrated through NPS and individual results by train operator will be supported by individual route teams.

Overall passenger satisfaction at Network Rail's Managed Stations was 84 per cent, a one percentage point improvement on the spring 2013 survey. Passenger satisfaction varied widely by station. 95 per cent passenger satisfaction was reported at Kings Cross (which was recently voted best station in the world for food and beverages) whilst passenger satisfaction at London Bridge stood at 64 per cent. Birmingham New Street station (which continues to undergo a significant refurbishment project) saw passenger satisfaction increase by 17 percentage points to 69 per cent.

Section 3 – Asset stewardship

Introduction

Asset management is about aligning the way we manage our assets with our corporate objectives. In the case of Network Rail our principle objective is the delivery of our outputs safely in a sustainable way for the lowest whole life, whole system cost.

This section reports on the condition and quality of our assets. It provides information regarding the stewardship of our assets and trends over time, as well as our performance compared to the Control Period 4 Delivery Plan update 2010 (DPu10) forecasts for 2013/14.

The following measures are reported in this section:

- Rail age / rail type
- Used asset lives
- Broken rails (M1)
- Rail defects (M2)
- Track geometry (M3)
- Track geometry faults (M5)
- Track buckles
- Track failures
- Condition of asset temporary speed restrictions (M4)
- Earthwork condition (M33)
- Earthwork failures (M6)
- Tunnel condition (M30)
- Bridge condition (M8)
- Structures visual and detailed examinations
- Bridge assessment of strength
- Signalling failures (M9)
- Signalling asset condition (M10)
- Points failures
- Train detection failures
- Telecoms condition
- Telecoms failures
- AC traction power incidents (M11)
- DC traction power incidents (M12)
- AC traction feeder station and track sectioning points condition (M13)
- DC traction substation condition (M14)
- AC traction contact systems condition (M15)
- DC traction contact systems condition (M16)
- Power incidents causing train delays of more than 300 minutes
- Station stewardship measure (M17)
- Light maintenance depot stewardship measure (M19).

Reference to 'M' numbers in this Annual Return is coding which aligns with our internal Asset Reporting Manual. This provides the definitions and reporting methods that we include in the Annual Return.

In this section a confidence grade has been included for measures which have been assigned one by either the current or previous independent reporter. Where no confidence grade has been assigned to a measure by the independent reporter we state this. This is the case for most of the new measures. It should also be noted that for six of our electrification measures the confidence grades are obtained from the last Reporter review of electrification measures which was conducted in 2009/10. These confidence grades do not therefore take into account the improvements that have been made in subsequent years and we do not believe that they are reflective of the current position. However, these confidence grades are reported for completeness.

Table 3.1 provides a summary comparison of our overall network asset measures for the last five years, where available. Table 3.2 provides a comparison of 2013/14 asset measure results compared to the condition and reliability forecasts that were included in Appendix three of the Delivery Plan 2010 update.

Table 3.1: Comparison of network asset measures with previous years

Measure	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Good track geometry	137.7	137.0	136.5	138.1	137.7
Poor track geometry	2.38	2.48	2.58	2.38	2.32
Intervention / immediate action geometry faults per 100km	40.3	39.7	41.3	40.3	36.5
Broken rails (no.)	152	171	127	178	126
Rail breaks and immediate action defects per 100km	5.80	4.49	3.82	4.14	4.00
Immediate action rail defects per 100 km	5.31	3.94	3.39	3.48	3.55
Condition of asset TSRs (no.)	1,729	1,348	1,864	1,958	2,268
Civils – Assets subject to additional inspections (no.)	844	810	789	801	711
Earthworks failures (no.)	57	42	28	144	127
Tunnel condition	Bore 88 Portal 92	Bore 89 Portal 92	Bore 88 Portal 89	See page 115	See page 115
Bridge condition score	2.24	2.22	2.22	2.26	2.28
Signalling failures causing delays of more than ten minutes (no.)	18,324	16,506	15,647	15,010	14,962
Signalling asset condition	2.37	2.41	2.38	2.37	2.33
AC power incidents causing >500 minute train delays (no.)	46	61	50	52	61
DC power incidents causing >500 minute train delays (no.)	14	14	16	8	16
AC traction feeder stations and track sectioning points condition	2.70	2.56	2.57	2.29	2.35
DC traction feeder stations and track sectioning points condition	2.32	2.36	2.45	2.38	2.34
AC contact systems condition	1.6	1.6	1.6	1.4	1.3
DC contact systems condition	1.9	1.9	2.0	2.0	2.0
Telecoms condition	0.92	0.94	0.95	0.97	0.98
Points failures	7,118	5,803	5,162	5,022	4,387
Detection failures	6,058	5,215	4,926	4,607	4,536
Track failures	6,685	5,880	5,521	5,345	5,984
Power incidents causing train delays of more than 300 minutes	75	100	71	65	84
Telecom failures causing train delays of more than ten minutes	770	689	698	697	1,310
Station Stewardship Measure					
Category A	2.38	2.30	2.26	2.21	2.16
Category B	2.46	2.40	2.37	2.34	2.32
Category C	2.52	2.47	2.43	2.40	2.36
Category D	2.54	2.47	2.41	2.39	2.35
Category E	2.58	2.50	2.43	2.39	2.36
Category F	2.56	2.50	2.47	2.47	2.44
Scotland (all categories)	2.39	2.33	2.28	2.33	2.23
Light maintenance depot stewardship measure (network)	2.50	2.48	2.43	2.39	2.37
Asset reliability (no. of infrastructure incidents causing delay)	46,078	42,129	40,500	39,743	42,144

Notes:
For all measures in this table, except Good track geometry and telecoms condition, a lower figure indicates improvement. Some historical data has been restated due to refinement in the reporting systems.
*The process for calculating the condition of asset TSRs changed for CP4 which is why the results vary significantly from 2008/09 to 2009/10.

Table 3.2: Comparison of 2013/14 asset condition results with DPu10		
Measure	***2013/14 Plan (DPu10)***	***2013/14***
Track		
Good track geometry (%)	137.6	137.7
Poor track geometry (%)	2.34	2.32
Intervention / immediate action geometry faults per 100km	35.9	36.5
Rail breaks and immediate action defects per 100km	5.6	4.00
Civils		
Civils – Assets subject to additional inspections (no.)	809	711
Operational Property		
Station stewardship measure		
Category A	2.48	2.16
Category B	2.60	2.32
Category C	2.65	2.36
Category D	2.69	2.35
Category E	2.74	2.36
Category F	2.71	2.44
Scotland (all categories)	2.39	2.23
Light maintenance depot stewardship measure	2.52	2.37
Signalling		
Signalling asset condition	2.39	2.33
Electrification		
AC traction feeder stations and track sectioning points condition	2.78	2.35
DC traction feeder stations and track sectioning points condition	2.53	2.34
AC contact systems condition	1.6	1.3
DC contact systems condition	1.9	2.0
Telecoms		
Telecoms condition	0.89	0.98
Reliability forecasts		
Signalling failures causing delays of more than ten minutes (no.)	13,614	14,962
Points failures	2,871	4,387
Detection failures	3,857	4,536
Track failures	6,238	5,984
Power incidents causing train delays of more than 300 minutes	77	84
Telecom failures causing train delays of more than ten minutes	644	1,310
Notes: For all measures in this table, except Good track geometry and telecoms condition, a lower figure indicates improvement.		

Excellence in asset management

We continue to work to achieve a highly developed approach to asset management. This includes making decisions based upon lowest whole life cycle costs, alignment of planning, installation and commissioning processes and the design of complementary and efficient inspection and maintenance regimes. Achievement of such alignment requires improvements to processes, decision support tools, asset information and development of our people.

We recognise that improvements to our asset management capability arise through long term concerted effort. We have set targets to guide our work over the next ten years:

- by 2019 we will provide a benchmark against which organisations throughout the world assess their own asset management capabilities. We will hold high quality asset information, which is available in real time and applicable system wide to support the operation of the network

- by 2024 we intend to extend our use of asset management to achieve best in class, cross rail industry systems and processes.

Evaluating our capability

The starting point for developing improvement is a good understanding of our current capability and an appreciation of what good and best practice looks like in other companies. Since 2006 in a bi-lateral arrangement with the ORR, the independent reporter for Asset Management, AMCL, has used their Asset Management Excellence Model (AMEM) to measure Network Rail's asset management capability. These assessments involve a review of 23 activities within six groups of capability, as summarised in Figure 3.1. AMEM is a questionnaire based model with a six point maturity scale that ranks the responses in a range from 'Innocent' to 'Excellent'. The assessment has been repeated in 2009, 2011, 2013 and 2014.

Capability level sought

During CP4 we set internal trajectories of improvement for each of the 23 activities, as published in our Asset Management Strategy in 2011. Progress against these is summarised in the next section.

During CP5 we aim demonstrably to attain levels of excellence within the model. We have adopted the models definition of excellence (as a score of 70 per cent for each group) plus an additional margin to reflect the known statistical accuracy of the model (at plus or minus two per cent at a statistical accuracy of 90 per cent). We have therefore set a target level of 72 per cent for each of the six group scores by 2018.

Results from March 2014 assessment

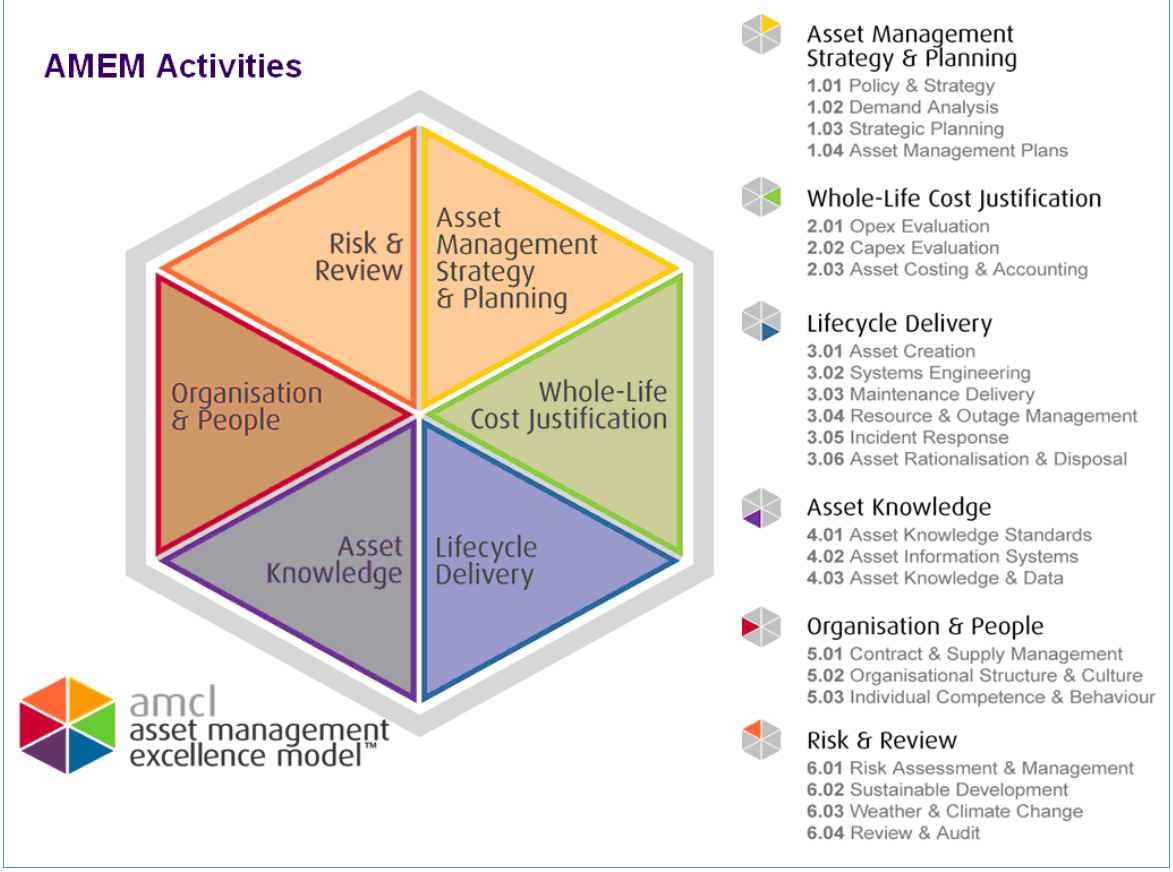
The findings of the assessment undertaken by AMCL at the end of CP4 are provided as interim results and are summarised in Figures 3.2 and 3.3 and Table 3.3.

Figure 3.3 provides the overall average rate of asset management capability improvement from 2006, compared with our internal stretch trajectory.

Figure 3.4 shows the relative achievement of internal stretch trajectory within each of the 23 AMEM activities at publication of the Initial Industry Plan (2011), the Strategic Business Plan (2013) and the end of Control Period 4 (2014).

Table 3.3 shows the asset management capability levels by the six groups.

Figure 3.1: Summary of the six groups and 23 activities contained within the AMEM model



Commentary

The interim results of the 2014 AMEM assessment show widespread improvement since previous assessments. The overall headline average score has achieved greater than 90 per cent of our internal stretch trajectory. The current rate of improvement places us in a reasonable position to achieve the intended further progress by 2018. Of the 23 activities, 12 achieved the planned trajectory, a further eight were within two per cent of the trajectory, with three being greater than two per cent behind. The relative achievements at the 2011, 2013 and 2014 assessments (shown in Figure 3.3) confirm a trend of improvement over the three assessments.

As a consequence of the progress made on each AMEM activity; the relative position of all six AMEM group scores has also positively improved, which is illustrated in Table 3.3, with four of the six groups now close to the excellence level. The remaining two groups (whole life cost justification and risk and review) remain some way short of the excellence level.

Achieving excellence requires that we continue to pursue improvement across every activity in the model with a particular focus on the two lower scoring groups. This approach is being led through our asset management strategic theme. Further information on how we intend to deliver this improvement during CP5 can be found within our updated Asset Management Strategy 2014.

The same AMEM tool is also used by a mixed array of 45 other infrastructure organisations around the world, and we are therefore able to understand our relative position against a variety of sectors. From this data we know we are within the upper quartile, but there are a select few organisations whose capability is above ours. We intend to explore the potential for further benchmarking / shared learning with them.

Figure 3.2: Overall average rate of asset management capability improvement from 2006 compared with our stretch trajectory

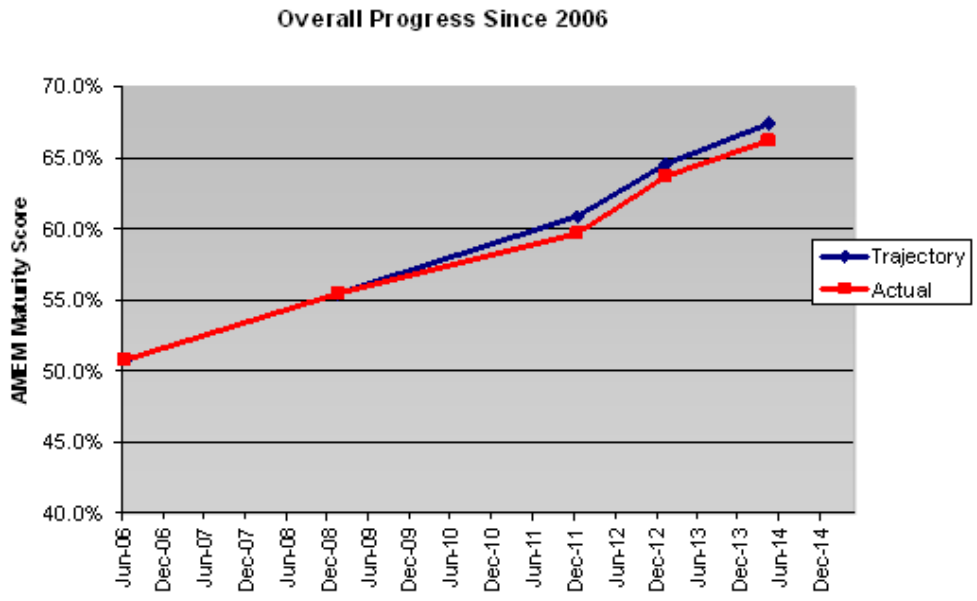
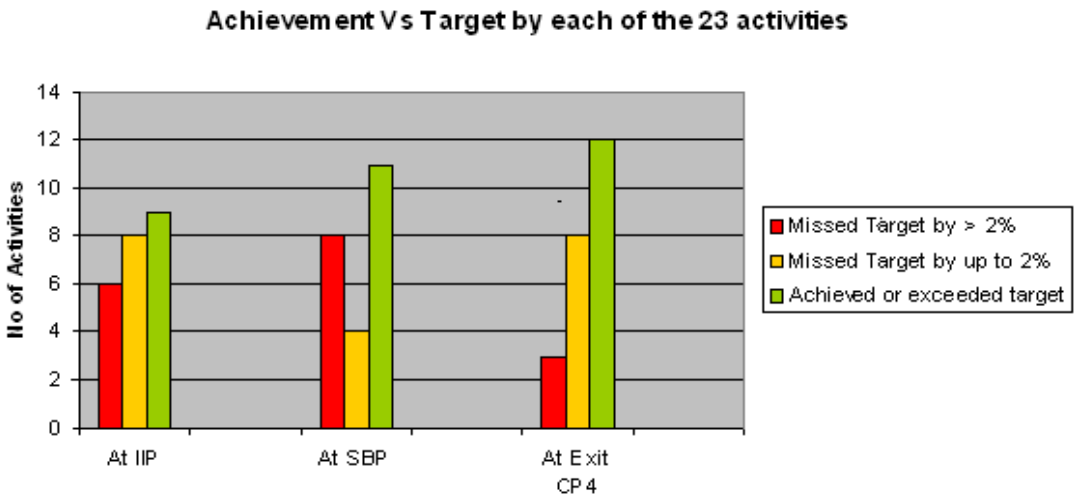


Table 3.3: Asset management capability levels by the six groups

Group	*2009 (%)*	*2011 Initial Industry Plan (%)*	*2013 Strategic Business Plan (%)*	*2014 Interim Exit of CP4 result (%)*	*2014 Target (%)*	*2018 Target (%)*
Strategy & planning	56.3	61.2	65.8	67.3	67.3	72
Whole life cost justification	47.3	51.9	58.7	60.4	63.5	72
Lifecycle delivery	64.8	66.3	69.2	71.4	72.3	72
Asset knowledge	51.7	55.0	60.0	66.9	67.2	72
Organisation & people	63.0	64.0	67.3	69.2	73.6	72
Risk & review	49.5	59.4	60.8	61.8	60.8	72

Figure 3.3: Relative achievement of internal stretch trajectory within each of the 23 AMEM activities at Initial Industry Plan (2011), Strategic Business Plan (2013) and at interim results for exit of Control Period 4 (2014)



Rail age / rail type

Definition

The type of rail installed on the track is categorised into five groups:

- CEN60 rail is the most modern rail design, used mostly on high category lines (i.e. high speed lines and heavy freight lines). It is a flatbottom design, weighing 60kg/m and has a deeper web and wider foot than the 113A rail, which enables it to carry higher speed trains with a lower bending stress
- 113lb flatbottom was the standard flatbottom rail design for many years, and is still installed on mid to lower category track (i.e. non-high speed passenger lines or lighter freight lines) and on the southern third rail routes. It is a flatbottom design, weighing 113lb/yard (56 kg/m)
- Other flatbottom rail collects all the flatbottom rails that are not CEN60 or 113 lb rail. Most of these will have been installed several decades ago. These miscellaneous flatbottom rails can weigh between 98 to 110 lb/yard
- Bullhead rail is between 85 to 95 lb/yard. It was mostly installed prior to flatbottom rail (pre-1960), and is seen mostly on lightly used rural routes, where rail fatigue and wear rates are very low. It is only replaced on a like for like basis, when the rail is expired but the sleepers' life can be extended
- Other rail is any rail that does not fit into one of the above four groups, or it is uncertain what type of rail has been installed. Overall it comprises less than 0.5 per cent of the current track on the network.

Reporting method

The rail designs for each part of track are held in a track database, GEOGIS (geography and infrastructure system), which is updated after any track renewal. The total rail length for plain line track and total numbers of S&C has been calculated for all currently designated running lines. For a very small amount of track, in earlier downloads of GEOGIS, the rail design was not available, and if the track has been subsequently renewed it is not possible to ascertain the design for the earlier years. In this case, the rail has been designated as other.

Reporting confidence

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, by route classification, for each year of CP4, is shown as follows:

- Table 3.4 shows the proportion of the rail type for plain line track (for running lines only)
- Table 3.6 shows the proportion of the rail type for S&C track (for running lines only)

Operating route results

Data for each operating route, for each year of CP4, is shown as follows:

- Table 3.5 shows the proportion of rail type for plain line track (for running lines only)
- Table 3.7 shows the proportion of the rail type for S&C track (running lines only)

Commentary

The percentage of plain line CEN60 rail has been gradually increasing, mostly on primary routes, where it has increased from 13 per cent to 19 per

cent over CP4. This has mostly been achieved through the use of high output track relaying trains, which can lay long strings of sleepers and rail in a single shift. Thus the largest increases can be seen in the routes that have benefitted most from the high output trains (Western in the first half of CP4, and London North Western and East Midlands in the second half of CP4).

The 113lb flatbottom rail length is still increasing on secondary, London & South East, freight and rural routes, where it is still the predominant design for renewed track (e.g. with steel sleepers used to upgrade track from jointed to the much better performing continuously welded track) and on third rail lines.

Older flatbottom design and bullhead rail yardage are slowly decreasing, although they still comprise about half of all freight only and rural routes.

CP4 overview

At the end of CP4, there is a now a third more high performing CEN60 rail on primary routes than at the start of the control period. In addition, where older track can no longer be maintained efficiently or the track has needed upgrading for heavier or faster trains, it has continued to be replaced by modern designs.

In future control periods the trends in rail design seen in CP4 are expected to continue. The replacement of 113A and older flatbottom rail with CEN60 rail on high criticality routes will accelerate in the first half of CP5, and this will be extended to third rail routes in the second half of CP5.

Table 3.4: Plain line rail types (%) for CP4

	Route classification	*Rail type*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Primary and key London & South East	60 kg rail (CEN60)	13	14	16	18	20
		56 kg rail (113lb flat bottom)	72	72	71	71	70
		Total other flat bottom rail	11	10	9	9	8
		Bullhead	2	2	2	1	1
		Other (including unknown)	2	2	2	1	1
	Secondary, other London & South East, and freight trunk	60 kg rail (CEN60)	2	2	2	3	3
		56 kg rail (113lb flat bottom)	72	74	75	76	78
		Total other flat bottom rail	19	19	18	17	16
		Bullhead	4	4	4	3	3
		Other (including unknown)	2	2	1	1	0
	Rural and freight only	60 kg rail (CEN60)	1	1	1	2	3
		56 kg rail (113lb flat bottom)	49	51	53	56	58
		Total other flat bottom rail	18	18	17	16	16
		Bullhead	25	25	24	24	23
		Other (including unknown)	6	5	3	1	0
	Total	60 kg rail (CEN60)	7	7	8	9	10
		56 kg rail (113lb flat bottom)	69	70	70	71	72
		Total other flat bottom rail	15	15	14	14	13
		Bullhead	6	6	6	5	5
		Other (including unknown)	3	2	2	1	0
Scotland	Primary and key London & South East	60 kg rail (CEN60)	13	14	15	16	16
		56 kg rail (113lb flat bottom)	68	68	68	68	68

Table 3.4 continued: Plain line rail types (%) for CP4

	Route classification	*Rail type*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Scotland	Primary and key London & South East	Total other flat bottom rail	18	17	16	16	15
		Bullhead	0	0	0	0	0
		Other (including unknown)	1	1	1	1	1
	Secondary, other London & South East, and freight trunk	60 kg rail (CEN60)	2	2	3	3	3
		56 kg rail (113lb flat bottom)	69	69	70	70	71
		Total other flat bottom rail	25	24	24	23	22
		Bullhead	4	4	3	3	3
		Other (including unknown)	1	1	0	0	0
	Rural and freight only	60 kg rail (CEN60)	0	0	0	0	0
		56 kg rail (113lb flat bottom)	15	16	17	17	19
		Total other flat bottom rail	17	16	16	16	15
		Bullhead	68	67	67	66	66
		Other (including unknown)	0	0	0	0	0
	Total	60 kg rail (CEN60)	4	4	5	5	5
		56 kg rail (113lb flat bottom)	57	58	58	59	60
		Total other flat bottom rail	22	21	21	20	19
		Bullhead	17	16	16	16	16
		Other (including unknown)	1	0	0	0	0
Network Total	Primary and key London & South East	60 kg rail (CEN60)	13	14	16	18	19
		56 kg rail (113lb flat bottom)	72	72	71	70	70
		Total other flat bottom rail	11	11	10	9	9
		Bullhead	2	2	1	1	1
		Other (including unknown)	2	2	2	1	1
	Secondary, other London & South East, and freight trunk	60 kg rail (CEN60)	2	2	3	3	3
		56 kg rail (113lb flat bottom)	72	73	74	75	76
		Total other flat bottom rail	20	20	19	18	17
		Bullhead	4	4	4	3	3
		Other (including unknown)	2	1	1	1	0
	Rural and freight only	60 kg rail (CEN60)	1	1	1	2	2
		56 kg rail (113lb flat bottom)	43	44	46	49	50
		Total other flat bottom rail	18	18	17	16	16
		Bullhead	33	33	33	32	31
		Other (including unknown)	5	4	3	1	0

Table 3.4 continued: Plain line rail types (%) for CP4							
	Route classification	***Rail type***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Network Total	**Total**	**60 kg rail(CEN60)**	**6**	**7**	**8**	**9**	**9**
		56 kg rail (113lb flat bottom)	**68**	**68**	**69**	**69**	**70**
		Total other flat bottom rail	**16**	**16**	**15**	**14**	**14**
		Bullhead	**7**	**7**	**7**	**7**	**7**
		Other (including unknown)	**2**	**2**	**2**	**1**	**0**
Notes: Previous year's data has been updated to reflect the latest track data available.							

Table 3.5: Plain line rail types (%) for CP4 by operating route						
	Rail type	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	60 kg rail (CEN60)	6	6	6	7	7
	56 kg rail (113lb flat bottom)	68	70	71	73	74
	Total other flat bottom rail	17	16	15	14	13
	Bullhead	6	6	6	6	5
	Other (including unknown)	4	3	2	1	0
East Midlands	60 kg rail (CEN60)	4	4	5	8	10
	56 kg rail (113lb flat bottom)	71	72	72	70	70
	Total other flat bottom rail	19	19	18	17	16
	Bullhead	4	4	4	4	3
	Other (including unknown)	1	1	1	1	1
Kent	60 kg rail (CEN60)	1	1	1	1	1
	56 kg rail (113lb flat bottom)	86	87	87	88	89
	Total other flat bottom rail	11	10	9	9	9
	Bullhead	2	2	2	1	1
	Other (including unknown)	1	1	1	0	0
London North Eastern	60 kg rail (CEN60)	3	4	4	5	6
	56 kg rail (113lb flat bottom)	74	74	75	77	78
	Total other flat bottom rail	13	13	13	12	12
	Bullhead	4	4	4	4	4
	Other (including unknown)	6	5	4	2	0
London North Western	60 kg rail (CEN60)	11	11	12	13	15
	56 kg rail (113lb flat bottom)	67	68	69	69	69
	Total other flat bottom rail	13	13	12	11	11
	Bullhead	5	5	5	5	4
	Other (including unknown)	3	2	2	1	1
Scotland	60 kg rail (CEN60)	4	4	5	5	5
	56 kg rail (113lb flat bottom)	57	58	58	59	60
	Total other flat bottom rail	22	21	21	20	19
	Bullhead	17	16	16	16	16
	Other (including unknown)	1	0	0	0	0
Sussex	60 kg rail (CEN60)	1	1	1	2	2
	56 kg rail (113lb flat bottom)	80	80	81	81	82
	Total other flat bottom rail	18	18	17	16	16
	Bullhead	1	1	1	1	1
	Other (including unknown)	0	0	0	0	0

Table 3.5 continued: Plain line rail types (%) for CP4 by operating route						
	Rail type	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Wales	60 kg rail (CEN60)	5	5	6	6	6
	56 kg rail (113lb flat bottom)	53	53	54	54	56
	Total other flat bottom rail	24	23	23	23	22
	Bullhead	16	16	16	16	16
	Other (including unknown)	2	2	2	1	0
Wessex	60 kg rail (CEN60)	2	2	2	2	2
	56 kg rail (113lb flat bottom)	77	79	80	81	83
	Total other flat bottom rail	17	16	15	14	12
	Bullhead	4	4	3	3	3
	Other (including unknown)	0	0	0	0	0
Western	60 kg rail (CEN60)	16	19	24	25	26
	56 kg rail (113lb flat bottom)	60	58	55	55	56
	Total other flat bottom rail	16	15	13	12	12
	Bullhead	8	7	7	7	6
	Other (including unknown)	0	0	0	1	0
Network Total	**60 kg rail (CEN60)**	**6**	**7**	**8**	**9**	**9**
	56 kg rail (113lb flat bottom)	**68**	**68**	**69**	**69**	**70**
	Total other flat bottom rail	**16**	**16**	**15**	**14**	**14**
	Bullhead	**7**	**7**	**7**	**7**	**7**
	Other (including unknown)	**2**	**2**	**2**	**1**	**0**
Notes: Previous year's data has been updated to reflect the latest track data available.						

Table 3.6: S&C rail types (%) for CP4							
	Route Classification	***Rail type***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	Primary and key London & South East	60 kg rail (CEN60)	12	13	13	13	14
		56 kg rail (113lb flat bottom)	77	77	78	78	78
		Total other flat bottom rail	6	6	6	5	5
		Bullhead	3	3	3	3	3
		Other (including unknown)	1	1	1	0	0
	Secondary, other London & South East, and freight trunk	60 kg rail (CEN60)	3	3	3	4	4
		56 kg rail (113lb flat bottom)	75	75	76	77	78
		Total other flat bottom rail	11	11	10	10	9
		Bullhead	9	9	9	9	9
		Other (including unknown)	2	1	1	0	0
	Rural and freight only	60 kg rail (CEN60)	1	1	1	1	1
		56 kg rail (113lb flat bottom)	57	58	59	61	62
		Total other flat bottom rail	12	12	12	11	11
		Bullhead	27	27	27	25	25
		Other (including unknown)	3	2	1	0	0

Table 3.6 continued: S&C rail types (%) for CP4

	Route Classification	*Rail type*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Total	60 kg rail (CEN60)	8	8	9	9	9
		56 kg rail (113lb flat bottom)	75	75	76	76	77
		Total other flat bottom rail	8	8	8	7	7
		Bullhead	7	7	7	7	7
		Other (including unknown)	2	1	1	0	0
Scotland	Primary and key London & South East	60 kg rail (CEN60)	17	17	17	18	19
		56 kg rail (113lb flat bottom)	76	75	76	76	77
		Total other flat bottom rail	5	5	5	5	4
		Bullhead	0	0	0	0	0
		Other (including unknown)	2	2	2	1	0
	Secondary, other London & South East, and freight trunk	60 kg rail (CEN60)	4	4	6	6	7
		56 kg rail (113lb flat bottom)	85	85	85	86	86
		Total other flat bottom rail	8	8	6	6	6
		Bullhead	2	2	2	2	2
		Other (including unknown)	2	2	1	0	0
	Rural and freight only	60 kg rail (CEN60)	2	2	2	2	2
		56 kg rail (113lb flat bottom)	60	60	60	60	60
		Total other flat bottom rail	6	6	6	6	6
		Bullhead	33	32	32	32	32
		Other (including unknown)	0	0	0	0	0
	Total	60 kg rail (CEN60)	7	7	9	9	10
		56 kg rail (113lb flat bottom)	79	79	79	80	80
		Total other flat bottom rail	7	7	6	6	5
		Bullhead	6	5	5	5	5
		Other (including unknown)	1	1	1	0	0
Network Total	Primary and key London & South East	60 kg rail (CEN60)	12	13	13	14	14
		56 kg rail (113lb flat bottom)	77	77	78	78	78
		Total other flat bottom rail	6	6	6	5	5
		Bullhead	3	3	3	3	3
		Other (including unknown)	1	1	1	1	0
	Secondary, other London & South East, and freight trunk	60 kg rail (CEN60)	3	3	4	4	4
		56 kg rail (113lb flat bottom)	76	77	77	78	79
		Total other flat bottom rail	10	10	10	9	9
		Bullhead	8	8	8	8	8
		Other (including unknown)	2	1	1	0	0

Table 3.6 continued: S&C rail types (%) for CP4

	Route Classification	Rail type	2009/10	2010/11	2011/12	2012/13	2013/14
Network Total	Rural and freight only	60 kg rail (CEN60)	1	1	1	2	2
		56 kg rail (113lb flat bottom)	57	58	59	61	62
		Total other flat bottom rail	11	11	11	10	10
		Bullhead	28	28	28	27	27
		Other (including unknown)	2	2	1	0	0
	Total	**60 kg rail(CEN60)**	**8**	**8**	**9**	**9**	**9**
		56 kg rail (113lb flat bottom)	**75**	**76**	**76**	**77**	**77**
		Total other flat bottom rail	**8**	**8**	**8**	**7**	**7**
		Bullhead	**7**	**7**	**7**	**7**	**7**
		Other (including unknown)	**2**	**1**	**1**	**0**	**0**

Notes:
Previous year's data has been updated to reflect the latest track data available.

Table 3.7: S&C rail types (%) for CP4 by operating route

	Rail type	2009/10	2010/11	2011/12	2012/13	2013/14
Anglia	60 kg rail (CEN60)	1	1	1	1	1
	56 kg rail (113lb flat bottom)	82	82	82	82	83
	Total other flat bottom rail	8	7	7	7	7
	Bullhead	9	9	9	9	9
	Other (including unknown)	1	1	0	0	0
East Midlands	60 kg rail (CEN60)	10	10	10	10	10
	56 kg rail (113lb flat bottom)	73	74	75	76	78
	Total other flat bottom rail	10	10	9	8	7
	Bullhead	5	5	5	5	5
	Other (including unknown)	2	1	1	1	0
Kent	60 kg rail (CEN60)	3	3	3	3	3
	56 kg rail (113lb flat bottom)	90	90	90	90	91
	Total other flat bottom rail	5	5	5	5	4
	Bullhead	2	2	2	2	2
	Other (including unknown)	0	0	0	0	0
London North Eastern	60 kg rail (CEN60)	5	5	5	5	5
	56 kg rail (113lb flat bottom)	83	84	85	85	86
	Total other flat bottom rail	4	4	4	3	3
	Bullhead	6	6	6	6	6
	Other (including unknown)	3	2	1	1	0
London North Western	60 kg rail (CEN60)	15	15	15	15	16
	56 kg rail (113lb flat bottom)	63	64	64	65	66
	Total other flat bottom rail	9	9	8	8	8
	Bullhead	11	11	11	10	10
	Other (including unknown)	3	2	2	1	0
Scotland	60 kg rail (CEN60)	7	7	9	9	10
	56 kg rail (113lb flat bottom)	79	79	79	80	80
	Total other flat bottom rail	7	7	6	6	5
	Bullhead	6	5	5	5	5
	Other (including unknown)	1	1	1	0	0

Table 3.7 continued: S&C rail types (%) for CP4 by operating route						
	Rail type	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Sussex	60 kg rail (CEN60)	1	1	1	1	1
	56 kg rail (113lb flat bottom)	91	91	91	92	92
	Total other flat bottom rail	6	6	5	5	5
	Bullhead	2	2	2	2	2
	Other (including unknown)	0	0	0	0	0
Wales	60 kg rail (CEN60)	5	6	6	6	6
	56 kg rail (113lb flat bottom)	74	74	74	74	74
	Total other flat bottom rail	12	12	12	12	11
	Bullhead	8	8	8	8	8
	Other (including unknown)	1	1	0	0	0
Wessex	60 kg rail (CEN60)	11	11	11	11	11
	56 kg rail (113lb flat bottom)	73	73	74	75	76
	Total other flat bottom rail	12	12	11	10	9
	Bullhead	4	4	4	4	4
	Other (including unknown)	0	0	0	0	0
Western	60 kg rail (CEN60)	12	12	13	15	15
	56 kg rail (113lb flat bottom)	65	65	65	65	65
	Total other flat bottom rail	15	15	14	13	13
	Bullhead	7	7	7	7	7
	Other (including unknown)	0	0	0	0	0
Network Total	**60 kg rail (CEN60)**	**8**	**8**	**9**	**9**	**9**
	56 kg rail (113lb flat bottom)	**75**	**76**	**76**	**77**	**77**
	Total other flat bottom rail	**8**	**8**	**8**	**7**	**7**
	Bullhead	**7**	**7**	**7**	**7**	**7**
	Other (including unknown)	**2**	**1**	**1**	**0**	**0**

Notes:
Previous year's data has been updated to reflect the latest track data available.

Used asset lives

Definition

The sustainability of the track condition is defined in terms of the percentage of the average service life that has been used up within each of the track assets. These track assets are plain line rails, sleepers and ballast and switches and crossings (S&C).

Reporting method

The calculation of the average service life for rails, sleepers and S&C is based on the annual tonnage seen through the asset's lifetime and the asset's characteristics (e.g. concrete or timber sleepers, jointed or continuously welded rail (CWR)), as these affect the rate of wear and fatigue on the asset. Thus, the used service life for each asset is accumulated year on year from its installation on the track, dependent on the traffic running over it in the year and the asset characteristics. Ballast life is defined in terms of the percentage of the ballast that has been filled (e.g. from erosion due to traffic), as this gives an indication of the quality of the ballast.

This measure is based on the typical service life for the track assets, given the aforementioned characteristics. In reality, there are other influences on track service life (such as the local environmental and geological conditions, track access for maintenance, train designs and wheel set conditions) that mean that the actual track service life can vary considerably, with some track surviving perfectly well for many years beyond its typical service life. In this case, renewing track while it is still in acceptable condition would not be the best whole lifecycle cost option. Therefore, there will be some assets on the track that are beyond their nominal service life.

The track is divided into five bands; four 25 per cent bands up to 100 per cent, and an additional band (older) for assets that have survived longer than the typical service life. The distribution across the bands is based on the percentage of total length across the network of that asset that falls within that band. As a rule, track with more used life is harder to maintain in good condition, although we would still expect assets that have survived longer than the typical service life to be maintainable.

The measure is based on the latest track data, which has been much improved in the last year, especially for recent S&C renewals. This has meant adjusting previous years' results to account for updates in renewal data for those years.

Reporting confidence

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, by route classification, for each year of CP4, is shown as follows:

- Table 3.8 shows the used assets lives distribution for plain line sleepers
- Table 3.10 shows the used assets lives distribution for plain line rail
- Table 3.12 shows the used assets lives distribution for plain line ballast
- Table 3.14 shows the used assets lives distribution for S&C.

Operating route results

Data for each operating route, for each year of CP4, is shown as follows:

- Table 3.9 shows the used assets lives distribution for plain line sleepers
- Table 3.11 shows the used assets lives distribution for plain line rail
- Table 3.13 shows the used assets lives distribution for plain line ballast
- Table 3.15 shows the used assets lives distribution for S&C.

Commentary

There has been an increase in CP4 of newer rail as a result of a combination of high output installation of CEN60 rail on primary track, upgrade of jointed track to CWR on lower class routes, and a targeted replacement on main lines of older (pre-1976) rail which is more susceptible to defects. The proportion of rail that has passed its expected service life stayed constant over the control period.

The sleeper used life proportion stayed fairly constant through CP4. Sleepers are rarely replaced by themselves, so did not have the additional boost in new rail length from rail only renewals.

The proportion of newer S&C used life has increased steadily through CP4, as a result of a combination of resignalling schemes (e.g. at Nottingham in 2013) changing the track layouts necessitating the installation of new S&C, an increase in S&C partial renewals which extend the expected service life, and abandonments of older redundant S&C.

CP4 overview

Track used life over the network has been maintained through CP4, in line with the CP4 track asset policy.

A small drop in the percentage of new assets (<25 per cent used life), as well as a shift from the percentage within the older band towards the middle bands (25-50 per cent, 50-75 per cent, 75-100 per cent used lives) is expected over the next control period, as more track is treated and the track asset policy moves towards more refurbishment and fewer complete renewals.

Table 3.8: Used asset lives (%) for plain line sleepers for CP4

	Route classification	*Used life*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Primary and key London & South East	0 – 25 %	28	28	28	28	28
		25 – 50 %	16	17	18	18	19
		50 – 75 %	24	22	20	19	18
		75 – 100 %	19	20	20	20	20
		Older	12	13	14	14	15
	Secondary, other London & South East, and freight trunk	0 – 25 %	23	23	23	23	22
		25 – 50 %	18	17	17	17	18
		50 – 75 %	31	31	30	29	28
		75 – 100 %	15	16	17	18	20
		Older	13	13	13	13	13
	Rural and freight only	0 – 25 %	25	26	27	30	31
		25 – 50 %	16	14	13	12	12
		50 – 75 %	17	18	20	19	19
		75 – 100 %	8	8	8	9	8
		Older	34	33	32	30	29

Table 3.8 continued: Used asset lives (%) for plain line sleepers for CP4

	Route classification	*Used life*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Total	0 – 25 %	25	26	26	26	26
		25 – 50 %	17	17	17	17	17
		50 – 75 %	26	25	24	23	23
		75 – 100 %	16	17	17	18	18
		Older	15	16	16	16	16
Scotland	Primary and key London & South East	0 – 25 %	28	27	26	24	23
		25 – 50 %	12	14	14	15	17
		50 – 75 %	29	27	26	24	21
		75 – 100 %	22	21	21	23	24
		Older	10	11	12	14	15
	Secondary, other London & South East, and freight trunk	0 – 25 %	18	20	20	20	20
		25 – 50 %	14	13	12	11	11
		50 – 75 %	35	34	34	33	31
		75 – 100 %	18	20	21	22	24
		Older	15	13	13	13	13
	Rural and freight only	0 – 25 %	8	9	10	11	12
		25 – 50 %	12	11	11	10	9
		50 – 75 %	10	10	10	9	10
		75 – 100 %	14	13	12	14	13
		Older	56	56	56	56	55
	Total	0 – 25 %	18	19	19	19	19
		25 – 50 %	13	13	12	12	12
		50 – 75 %	29	28	27	26	25
		75 – 100 %	18	19	19	21	22
		Older	23	22	22	23	22
Network Total	Primary and key London & South East	0 – 25 %	28	28	28	28	28
		25 – 50 %	16	17	18	18	19
		50 – 75 %	24	22	21	19	19
		75 – 100 %	20	20	20	20	20
		Older	12	13	14	14	15
	Secondary, other London & South East, and freight trunk	0 – 25 %	22	23	23	22	22
		25 – 50 %	17	16	16	16	16
		50 – 75 %	32	32	31	30	28
		75 – 100 %	16	17	18	19	21
		Older	13	13	13	13	13
	Rural and freight only	0 – 25 %	22	23	24	26	27
		25 – 50 %	15	14	12	12	12
		50 – 75 %	16	17	18	17	18
		75 – 100 %	9	9	9	10	9
		Older	38	38	37	35	34
	Total	**0 – 25 %**	**24**	**25**	**25**	**25**	**25**
		25 – 50 %	**16**	**16**	**16**	**16**	**17**
		50 – 75 %	**27**	**26**	**25**	**24**	**23**
		75 – 100 %	**16**	**17**	**17**	**18**	**19**
		Older	**16**	**17**	**17**	**17**	**17**

Notes:
Previous year's data has been updated to reflect the latest track data available.

Table 3.9: Used asset lives (%) for plain line sleepers for CP4 by operating route						
	Used life	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	0 – 25 %	30	30	30	30	29
	25 – 50 %	14	13	15	16	17
	50 – 75 %	22	22	20	19	18
	75 – 100 %	15	16	16	17	18
	Older	19	18	19	18	19
East Midlands	0 – 25 %	22	22	21	24	26
	25 – 50 %	20	19	18	17	18
	50 – 75 %	27	27	27	25	24
	75 – 100 %	16	17	17	18	17
	Older	15	16	17	16	15
Kent	0 – 25 %	15	14	13	12	12
	25 – 50 %	25	24	23	21	19
	50 – 75 %	30	30	30	32	31
	75 – 100 %	21	21	22	23	25
	Older	9	10	11	12	13
London North Eastern	0 – 25 %	17	17	18	19	19
	25 – 50 %	18	18	18	18	17
	50 – 75 %	32	30	29	28	27
	75 – 100 %	18	19	20	21	22
	Older	15	15	15	15	15
London North Western	0 – 25 %	36	36	35	34	32
	25 – 50 %	17	17	19	20	22
	50 – 75 %	22	22	21	20	19
	75 – 100 %	11	11	11	12	12
	Older	15	14	14	14	14
Scotland	0 – 25 %	18	19	19	19	19
	25 – 50 %	13	13	12	12	12
	50 – 75 %	29	28	27	26	25
	75 – 100 %	18	19	19	21	22
	Older	23	22	22	23	22
Sussex	0 – 25 %	15	15	15	14	14
	25 – 50 %	18	16	16	15	14
	50 – 75 %	28	28	28	27	27
	75 – 100 %	25	26	26	26	26
	Older	14	14	15	17	19
Wales	0 – 25 %	19	19	19	18	19
	25 – 50 %	16	13	12	12	12
	50 – 75 %	29	30	30	28	27
	75 – 100 %	16	16	18	20	20
	Older	21	22	22	22	22
Wessex	0 – 25 %	21	21	22	22	23
	25 – 50 %	13	13	13	13	13
	50 – 75 %	32	29	27	26	23
	75 – 100 %	20	23	24	25	26
	Older	13	13	13	14	14
Western	0 – 25 %	34	37	41	43	42
	25 – 50 %	14	14	15	15	16

Table 3.9 continued: Used asset lives (%) for plain line sleepers for CP4 by operating route						
	Used life	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Western	50 – 75 %	18	16	15	14	13
	75 – 100 %	16	15	13	13	13
	Older	18	18	17	16	16
Network Total	**0 – 25 %**	**24**	**25**	**25**	**25**	**25**
	25 – 50 %	**16**	**16**	**16**	**16**	**17**
	50 – 75 %	**27**	**26**	**25**	**24**	**23**
	75 – 100 %	**16**	**17**	**17**	**18**	**19**
	Older	**16**	**17**	**17**	**17**	**17**
Notes: Previous year's data has been updated to reflect the latest track data available.						

Table 3.10: Used asset lives (%) for plain line rail for CP4							
	Route classification	***Used life***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	Primary and key London & South East	0 – 25 %	33	33	34	34	35
		25 – 50 %	20	19	20	20	20
		50 – 75 %	22	22	21	21	19
		75 – 100 %	14	14	14	14	14
		Older	11	11	11	12	11
	Secondary, other London & South East, and freight trunk	0 – 25 %	31	31	32	33	34
		25 – 50 %	28	27	26	26	25
		50 – 75 %	19	19	19	18	18
		75 – 100 %	14	14	14	14	13
		Older	8	9	9	9	9
	Rural and freight only	0 – 25 %	28	30	32	36	38
		25 – 50 %	17	16	15	14	14
		50 – 75 %	14	14	14	14	13
		75 – 100 %	28	26	25	22	21
		Older	13	14	14	14	14
	Total	0 – 25 %	31	32	33	34	35
		25 – 50 %	23	22	22	22	21
		50 – 75 %	20	20	19	19	18
		75 – 100 %	16	16	15	15	14
		Older	10	10	11	11	11
Scotland	Primary and key London & South East	0 – 25 %	29	29	29	28	30
		25 – 50 %	26	23	21	21	20
		50 – 75 %	21	23	25	26	24
		75 – 100 %	14	14	14	15	15
		Older	10	10	10	11	11
	Secondary, other London & South East, and freight trunk	0 – 25 %	21	23	25	26	27
		25 – 50 %	28	27	25	24	23
		50 – 75 %	21	22	21	21	20
		75 – 100 %	17	15	15	15	16
		Older	13	13	13	14	14
	Rural and freight only	0 – 25 %	12	14	16	17	20
		25 – 50 %	11	11	10	10	9
		50 – 75 %	8	8	8	8	7
		75 – 100 %	30	29	27	25	23

Table 3.10 continued: Used asset lives (%) for plain line rail for CP4							
	Route classification	***Used life***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Scotland	Rural and freight only	Older	39	39	40	40	41
	Total	0 – 25 %	21	22	24	25	26
		25 – 50 %	24	23	21	20	20
		50 – 75 %	18	19	19	19	18
		75 – 100 %	19	18	17	17	17
		Older	18	18	18	19	19
Network Total	Primary and key London & South East	0 – 25 %	33	33	34	34	35
		25 – 50 %	20	20	20	20	20
		50 – 75 %	22	22	21	21	20
		75 – 100 %	14	14	14	14	14
		Older	11	11	11	12	11
	Secondary, other London & South East, and freight trunk	0 – 25 %	29	30	31	32	33
		25 – 50 %	28	27	26	25	25
		50 – 75 %	19	19	19	19	19
		75 – 100 %	15	14	14	14	14
		Older	9	9	10	10	10
	Rural and freight only	0 – 25 %	25	27	29	32	35
		25 – 50 %	16	15	14	13	13
		50 – 75 %	13	13	13	12	12
		75 – 100 %	28	27	25	23	21
		Older	18	19	19	19	20
	Total	**0 – 25 %**	**30**	**31**	**32**	**33**	**34**
		25 – 50 %	**23**	**22**	**22**	**21**	**21**
		50 – 75 %	**19**	**19**	**19**	**19**	**18**
		75 – 100 %	**17**	**16**	**16**	**15**	**15**
		Older	**11**	**11**	**12**	**12**	**12**
Notes: Previous year's data has been updated to reflect the latest track data available.							

Table 3.11: Used asset lives (%) for plain line rail for CP4 by operating route						
	Used life	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	0 – 25 %	38	40	40	40	41
	25 – 50 %	18	18	18	18	18
	50 – 75 %	15	14	14	14	13
	75 – 100 %	15	15	14	14	14
	Older	14	14	14	14	14
East Midlands	0 – 25 %	25	26	26	30	33
	25 – 50 %	24	23	21	19	19
	50 – 75 %	22	21	21	20	20
	75 – 100 %	19	19	19	18	17
	Older	10	11	12	12	12
Kent	0 – 25 %	28	29	28	28	27
	25 – 50 %	27	27	28	27	28
	50 – 75 %	18	18	18	18	18
	75 – 100 %	16	16	15	15	15
	Older	10	10	11	11	12

Table 3.11 continued: Used asset lives (%) for plain line rail for CP4 by operating route						
	Used life	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
London North Eastern	0 – 25 %	24	25	25	27	29
	25 – 50 %	23	22	22	21	20
	50 – 75 %	24	24	24	23	22
	75 – 100 %	18	17	17	17	17
	Older	11	12	12	12	12
London North Western	0 – 25 %	39	39	39	39	40
	25 – 50 %	24	24	24	25	25
	50 – 75 %	17	17	17	16	16
	75 – 100 %	15	14	14	13	13
	Older	6	6	6	7	7
Scotland	0 – 25 %	21	22	24	25	26
	25 – 50 %	24	23	21	20	20
	50 – 75 %	18	19	19	19	18
	75 – 100 %	19	18	17	17	17
	Older	18	18	18	19	19
Sussex	0 – 25 %	23	24	23	24	23
	25 – 50 %	24	23	23	22	23
	50 – 75 %	23	23	22	21	20
	75 – 100 %	16	16	17	18	18
	Older	14	14	15	15	15
Wales	0 – 25 %	24	24	25	25	27
	25 – 50 %	29	28	26	25	24
	50 – 75 %	19	20	20	21	21
	75 – 100 %	18	17	17	17	15
	Older	10	11	12	12	13
Wessex	0 – 25 %	30	32	34	35	37
	25 – 50 %	22	21	20	21	21
	50 – 75 %	23	23	22	21	19
	75 – 100 %	15	15	15	15	14
	Older	9	9	9	9	9
Western	0 – 25 %	39	41	46	47	49
	25 – 50 %	16	16	15	15	15
	50 – 75 %	18	16	15	14	14
	75 – 100 %	15	14	12	11	10
	Older	13	13	12	12	12
Network Total	**0 – 25 %**	**30**	**31**	**32**	**33**	**34**
	25 – 50 %	**23**	**22**	**22**	**21**	**21**
	50 – 75 %	**19**	**19**	**19**	**19**	**18**
	75 – 100 %	**17**	**16**	**16**	**15**	**15**
	Older	**11**	**11**	**12**	**12**	**12**
Notes: Previous year's data has been updated to reflect the latest track data available.						

Table 3.12: Used asset lives (%) for plain line ballast for CP4

	Route classification	*Used life*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Primary and key London & South East	0 – 25 %	33	33	33	33	33
		25 – 50 %	20	20	20	21	22
		50 – 75 %	22	21	20	19	18
		75 – 100 %	15	16	16	16	16
		Older	10	10	11	11	11
	Secondary, other London & South East, and freight trunk	0 – 25 %	29	30	30	30	30
		25 – 50 %	29	27	26	25	25
		50 – 75 %	25	25	26	26	26
		75 – 100 %	11	12	12	12	13
		Older	6	6	6	6	7
	Rural and freight only	0 – 25 %	29	30	32	35	36
		25 – 50 %	21	20	19	18	17
		50 – 75 %	26	25	24	23	22
		75 – 100 %	18	18	18	18	16
		Older	6	6	7	7	8
	Total	0 – 25 %	31	31	32	32	32
		25 – 50 %	24	23	23	22	22
		50 – 75 %	24	24	23	23	22
		75 – 100 %	14	15	14	15	14
		Older	8	8	8	9	9
Scotland	Primary and key London & South East	0 – 25 %	33	32	31	29	28
		25 – 50 %	19	18	20	20	20
		50 – 75 %	30	30	29	29	28
		75 – 100 %	15	14	15	15	17
		Older	4	5	6	7	7
	Secondary, other London & South East, and freight trunk	0 – 25 %	21	23	24	24	24
		25 – 50 %	29	27	26	25	23
		50 – 75 %	32	32	32	33	32
		75 – 100 %	11	12	13	13	15
		Older	7	5	5	6	6
	Rural and freight only	0 – 25 %	14	14	15	15	16
		25 – 50 %	18	18	19	19	18
		50 – 75 %	31	28	27	26	24
		75 – 100 %	26	27	26	26	27
		Older	11	12	13	15	16
	Total	0 – 25 %	22	23	23	23	23
		25 – 50 %	24	24	23	23	22
		50 – 75 %	31	31	31	31	30
		75 – 100 %	15	15	16	16	17
		Older	7	7	7	8	8
Network Total	Primary and key London & South East	0 – 25 %	33	33	33	33	33
		25 – 50 %	20	20	20	21	22
		50 – 75 %	22	22	21	20	19
		75 – 100 %	15	16	16	16	16
		Older	9	10	10	11	11

Table 3.12 continued: Used asset lives (%) for plain line ballast for CP4							
	Route classification	***Used life***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Network Total	Secondary, other London & South East, and freight trunk	0 – 25 %	28	28	29	29	29
		25 – 50 %	29	27	26	25	24
		50 – 75 %	26	27	27	27	27
		75 – 100 %	11	12	12	13	13
		Older	6	6	6	6	7
	Rural and freight only	0 – 25 %	26	27	29	31	32
		25 – 50 %	20	20	19	18	17
		50 – 75 %	27	26	25	23	22
		75 – 100 %	20	20	20	19	18
		Older	7	8	8	8	10
	Total	**0 – 25 %**	**30**	**30**	**30**	**30**	**31**
		25 – 50 %	**24**	**23**	**23**	**22**	**22**
		50 – 75 %	**25**	**25**	**24**	**24**	**23**
		75 – 100 %	**14**	**15**	**15**	**15**	**15**
		Older	**7**	**8**	**8**	**8**	**9**
Notes: Previous year's data has been updated to reflect the latest track data available.							

Table 3.13: Used asset lives (%) for plain line ballast for CP4 by operating route						
	Used life	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	0 – 25 %	34	35	34	34	32
	25 – 50 %	23	22	23	24	25
	50 – 75 %	20	19	19	18	18
	75 – 100 %	14	14	15	15	15
	Older	9	9	10	10	11
East Midlands	0 – 25 %	33	32	32	33	37
	25 – 50 %	25	24	23	22	20
	50 – 75 %	20	21	23	22	22
	75 – 100 %	14	14	14	14	12
	Older	7	8	8	9	9
Kent	0 – 25 %	25	23	22	20	19
	25 – 50 %	32	32	31	31	31
	50 – 75 %	26	26	27	27	28
	75 – 100 %	12	13	14	14	15
	Older	5	6	6	7	8
London North Eastern	0 – 25 %	26	27	28	30	31
	25 – 50 %	22	21	20	19	18
	50 – 75 %	23	22	22	21	20
	75 – 100 %	16	16	16	16	16
	Older	13	13	14	14	15
London North Western	0 – 25 %	40	40	40	39	38
	25 – 50 %	25	25	25	26	27
	50 – 75 %	21	21	20	20	20
	75 – 100 %	9	9	9	10	10
	Older	5	5	5	5	5

Table 3.13 continued: Used asset lives (%) for plain line ballast for CP4 by operating route						
	Used life	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Scotland	0 – 25 %	22	23	23	23	23
	25 – 50 %	24	24	23	23	22
	50 – 75 %	31	31	31	31	30
	75 – 100 %	15	15	16	16	17
	Older	7	7	7	8	8
Sussex	0 – 25 %	22	21	20	20	19
	25 – 50 %	23	21	21	20	19
	50 – 75 %	29	30	27	26	26
	75 – 100 %	18	20	23	24	25
	Older	8	9	9	10	11
Wales	0 – 25 %	23	22	22	22	24
	25 – 50 %	27	26	25	24	22
	50 – 75 %	29	29	29	29	29
	75 – 100 %	14	15	15	15	15
	Older	7	8	9	10	10
Wessex	0 – 25 %	26	25	26	27	26
	25 – 50 %	21	21	20	19	19
	50 – 75 %	34	33	32	31	29
	75 – 100 %	15	17	18	19	21
	Older	4	4	4	5	5
Western	0 – 25 %	32	34	38	40	41
	25 – 50 %	20	19	17	17	18
	50 – 75 %	22	21	21	20	19
	75 – 100 %	20	20	17	16	15
	Older	7	7	7	7	7
Network Total	**0 – 25 %**	**30**	**30**	**30**	**30**	**31**
	25 – 50 %	**24**	**23**	**23**	**22**	**22**
	50 – 75 %	**25**	**25**	**24**	**24**	**23**
	75 – 100 %	**14**	**15**	**15**	**15**	**15**
	Older	**7**	**8**	**8**	**8**	**9**
Notes: Previous year's data has been updated to reflect the latest track data available.						

Table 3.14: Used asset lives (%) for S&C for CP4							
	Route classification	***Used life***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	Primary and key London & South East	0 – 25 %	31	31	32	32	33
		25 – 50 %	20	20	19	19	19
		50 – 75 %	25	24	24	23	22
		75 – 100 %	16	16	16	16	16
		Older	7	9	10	10	11
	Secondary, other London & South East, and freight trunk	0 – 25 %	21	23	24	26	27
		25 – 50 %	26	23	22	20	19
		50 – 75 %	32	32	30	30	29
		75 – 100 %	13	14	15	16	17
		Older	7	7	8	7	7

Table 3.14 continued: Used asset lives (%) for S&C for CP4

	Route classification	*Used life*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Rural and freight only	0 – 25 %	16	19	20	22	23
		25 – 50 %	32	29	27	25	23
		50 – 75 %	32	31	32	32	32
		75 – 100 %	15	16	16	15	15
		Older	5	5	5	6	6
	Total	0 – 25 %	26	27	28	29	30
		25 – 50 %	23	22	21	20	19
		50 – 75 %	28	28	27	26	25
		75 – 100 %	15	15	16	16	16
		Older	7	8	9	9	9
Scotland	Primary and key London & South East	0 – 25 %	34	34	34	36	39
		25 – 50 %	20	20	19	19	17
		50 – 75 %	22	20	20	19	19
		75 – 100 %	18	18	17	15	14
		Older	6	8	10	11	11
	Secondary, other London & South East, and freight trunk	0 – 25 %	16	18	23	25	26
		25 – 50 %	29	25	22	19	17
		50 – 75 %	40	40	40	39	38
		75 – 100 %	12	13	12	14	15
		Older	3	4	3	3	3
	Rural and freight only	0 – 25 %	10	9	9	9	11
		25 – 50 %	58	58	58	54	51
		50 – 75 %	21	22	22	26	25
		75 – 100 %	9	8	7	6	11
		Older	3	3	3	4	4
	Total	0 – 25 %	20	21	24	26	28
		25 – 50 %	30	28	26	24	21
		50 – 75 %	32	32	32	32	31
		75 – 100 %	13	14	13	13	14
		Older	4	5	5	5	6
Network Total	Primary and key London & South East	0 – 25 %	31	31	32	33	33
		25 – 50 %	20	20	19	19	19
		50 – 75 %	25	24	23	23	21
		75 – 100 %	16	16	16	16	16
		Older	7	9	10	10	11
	Secondary, other London & South East, and freight trunk	0 – 25 %	21	22	24	26	27
		25 – 50 %	26	24	22	20	19
		50 – 75 %	34	34	32	31	31
		75 – 100 %	13	14	15	16	17
		Older	6	7	7	7	7
	Rural and freight only	0 – 25 %	15	17	18	20	21
		25 – 50 %	36	34	32	30	28
		50 – 75 %	30	30	30	31	31
		75 – 100 %	14	14	14	13	14
		Older	5	5	5	5	6

Table 3.14 continued: Used asset lives (%) for S&C for CP4							
	Route classification	***Used life***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Network Total	**Total**	**0 – 25 %**	**26**	**27**	**28**	**29**	**30**
		25 – 50 %	**24**	**23**	**21**	**20**	**20**
		50 – 75 %	**29**	**28**	**27**	**27**	**26**
		75 – 100 %	**15**	**15**	**15**	**16**	**16**
		Older	**7**	**8**	**8**	**8**	**9**
Notes: Previous year's data has been updated to reflect the latest track data available.							

Table 3.15: Used asset lives (%) for S&C for CP4 by operating route						
	Used life	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	0 – 25 %	20	19	20	20	20
	25 – 50 %	27	25	24	23	22
	50 – 75 %	33	33	32	31	30
	75 – 100 %	13	14	16	17	19
	Older	8	8	8	9	10
East Midlands	0 – 25 %	34	35	36	36	42
	25 – 50 %	20	21	20	19	19
	50 – 75 %	25	22	21	20	19
	75 – 100 %	14	14	15	16	14
	Older	8	8	8	8	6
Kent	0 – 25 %	17	17	19	19	19
	25 – 50 %	29	27	25	22	21
	50 – 75 %	28	28	27	29	30
	75 – 100 %	20	20	19	19	18
	Older	7	9	10	10	12
London North Eastern	0 – 25 %	19	19	20	22	23
	25 – 50 %	26	25	24	22	21
	50 – 75 %	32	32	31	30	28
	75 – 100 %	17	17	17	18	18
	Older	6	7	8	8	9
London North Western	0 – 25 %	38	39	40	40	40
	25 – 50 %	22	21	20	20	20
	50 – 75 %	21	22	21	21	20
	75 – 100 %	11	11	12	12	12
	Older	6	7	7	7	7
Scotland	0 – 25 %	20	21	24	26	28
	25 – 50 %	30	28	26	24	21
	50 – 75 %	32	32	32	32	31
	75 – 100 %	13	14	13	13	14
	Older	4	5	5	5	6
Sussex	0 – 25 %	15	17	16	17	17
	25 – 50 %	15	13	13	11	11
	50 – 75 %	37	35	33	31	30
	75 – 100 %	25	26	27	28	30
	Older	8	10	10	12	13

Table 3.15 continued: Used asset lives (%) for S&C for CP4 by operating route						
	Used life	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Wales	0 – 25 %	21	23	24	25	25
	25 – 50 %	24	22	22	20	19
	50 – 75 %	31	30	29	30	29
	75 – 100 %	15	15	14	14	15
	Older	9	10	11	11	12
Wessex	0 – 25 %	31	31	34	36	36
	25 – 50 %	14	13	13	13	14
	50 – 75 %	26	26	23	22	21
	75 – 100 %	19	19	17	17	16
	Older	10	11	12	12	13
Western	0 – 25 %	28	29	31	33	35
	25 – 50 %	23	22	21	19	18
	50 – 75 %	28	28	27	26	24
	75 – 100 %	13	13	13	13	14
	Older	7	8	9	8	8
Network Total	**0 – 25 %**	**26**	**27**	**28**	**29**	**30**
	25 – 50 %	**24**	**23**	**21**	**20**	**20**
	50 – 75 %	**29**	**28**	**27**	**27**	**26**
	75 – 100 %	**15**	**15**	**15**	**16**	**16**
	Older	**7**	**8**	**8**	**8**	**9**
Notes: Previous year's data has been updated to reflect the latest track data available.						

Broken rails (M1)

Definition

A broken rail is one which, before removal from the track, has a fracture through the full cross section, or a piece broken out of it, rendering it unserviceable. This also includes broken welds. Only broken rails occurring in running lines are included in this measure (sidings and depots are excluded).

Reporting method

The National Engineering Reporting Team issues a daily broken rail report based on data from the National Control Centre Daily Log. In parallel maintenance areas are responsible for reporting all broken rails in the Rail Defect Management System database which is used to produce period and annual reports. This data is checked against various information sources prior to reporting.

The Rail Defect Management System (RDMS) allows for standardised reports for the numbers and types of broken rail to be produced straight from RDMS. The procedure for collecting, confirming and collating the numbers of broken rails has been in place for eight years, and has been supported by RDMS since the start of CP4.

Reporting confidence

This measure was assigned a confidence grade of A1 by the previous independent reporter for output monitoring. This measure has not been reassessed in this control period.

Results

England & Wales, Scotland and overall network results

- Table 3.16 provides the annual number of broken rails for each year of CP4 for England & Wales, Scotland, and the whole network by route classification type.

Operating route results

- Table 3.17 provides the annual number of broken rails for each year of CP4 for each operating route.

Commentary

There were 126 broken rails this year compared to 178 last year. The relatively mild winter with higher than normal temperatures resulted in the lowest number of broken rails on record. This is in contrast to prolonged cold temperatures at the end of the previous year, particularly during February and March 2012 which resulted in a higher numbers of breaks at 178. This year's low numbers correspond

closely with the number we would expect given the temperatures over the winter.

Additional reductions in broken rails are starting to be realised with the roll out of train based ultrasonic inspection on track categories which carry lower speed and tonnage traffic and with a number of routes focussing on earlier intervention at dipped joints on higher speed, higher tonnage track. In the past the train based ultrasonic inspection has only covered higher speed and tonnage routes.

Most routes achieved a reduction in broken rails compared to last year with the exception of Kent, Wales and Wessex which showed small increases on what were relatively small numbers overall. The biggest reductions were seen in London North Eastern (LNE) and London North Western (LNW) which account for over a third of the national total. As well as showing significant reductions compared to last year these routes also showed a reduction on the totals for 2011/12 when the winter temperatures were similar. A number of factors are behind these reductions including targeted replacement of rail that has carried a higher cumulative tonnage, a focus on actioning geometry faults at an earlier level and the repair or replacement of dipped joints at smaller values. Similar approaches are being taken up on other routes (such as Sussex and East Midlands) which are starting to realise reductions although these programmes take time to show benefits.

LNW has also benefitted from an extensive renewal programme, and has sustained good track geometry, whilst LNE; which has similar traffic volumes, has a much older track asset profile and a higher proportion of higher axle load freight traffic.

The break down of broken rails by route classification in Table 3.16 shows the largest reductions this year occurred in Primary and key London and South East routes where the risk from a broken rail is higher due to the increased speeds and tonnages. These reductions are as expected with many of the initiatives focussed on higher speed, higher tonnage routes.

A number of initiatives have been introduced to target the risks from broken rails and a fourth new ultrasonic test train (UTU) is now operating to provide a higher frequency of ultrasonic inspection of the rail in lower track category routes. The UTU is planned to test at twice the previous pedestrian test frequency to potentially identify defects earlier and reduce the number of breaks. Lower category track requires less frequent inspection and takes longer for the UTU plan to cover all these routes, for suspect rails to be identified and defects actioned. Initial trials have been conducted with modified ultrasonic testing techniques that may enable very small defects in the foot of the rail to be identified to allow better prioritising of rail replacement with the potential to reduce the number of breaks from small transverse defects in the rail foot.

Table 3.16: Number of broken rails for each year of CP4 by route classification

	Route classification	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	Primary and key London & South East	71	87	65	97	59
	Secondary, other London & South East, and freight trunk	50	49	42	49	42
	Rural and freight only	11	13	3	7	6
	Total	132	149	110	153	107
Scotland	Primary and key London & South East	7	7	7	5	8
	Secondary, other London & South East, and freight trunk	13	15	8	17	11
	Rural and freight only	0	0	2	3	0
	Total	20	22	17	25	19
Network Total	Primary and key London & South East	78	94	72	102	67
	Secondary, other London & South East, and freight trunk	63	64	50	66	53
	Rural and freight only	11	13	5	10	6
	Total	**152**	**171**	**127**	**178**	**126**

Table 3.17: Number of broken rails for each year of CP4 by operating route					
Operating route	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	9	12	6	16	13
East Midlands	8	11	8	13	7
Kent	9	9	4	4	6
London North Eastern	43	38	47	54	33
London North Western	27	43	24	23	14
Scotland	20	22	17	25	19
Sussex	8	8	5	14	7
Wales	5	7	4	4	7
Wessex	10	12	3	6	8
Western	13	9	9	19	12
Network Total	**152**	**171**	**127**	**178**	**126**

CP4 overview

Broken rails have remained at a low level over CP4 with variations from year to year largely due to differing minimum temperatures during the winter months. The average annual number of broken rails on the network in CP4 is 151 which is a 53 per cent reduction on the average in CP3 of 322 and a 74 per cent reduction on the average in CP2 of 588.

These improvements have been achieved despite a significant increase in the volume of traffic running on the network.

Rail defects (M2)

Definition

A defective rail is one with any fault requiring remedial action (repair or replacement) to make it fit for purpose in accordance with Network Rail standards. This measure is reported as isolated defects (those defects with a length of less than one yard, such as squats, welds, isolated wheelburns) and continuous defects (those defects with a length of one yard or more, such as rolling contact fatigue (RCF), wheelburns, hydrogen shatter cracking, vertical longitudinal splits).

Reporting method

Maintenance areas are responsible for reporting all defective rails into the Rail Defect Management System (RDMS) database which is used to produce period and annual reports.

The RDMS allows for standardised reports for the numbers and types of defective rail to be produced straight from RDMS. The procedure for collecting, confirming and collating the numbers of defects has been in place for eight years, and has been supported by RDMS since the start of CP4.

Reporting confidence

The procedure for reporting defective rails is now well established and this data has a confidence grade of A2, as assigned by the Independent reporter. The procedure for collecting, confirming and collating the numbers of defective rails has now been in place for seven years. As with the reporting of broken rails (M1) the Rail Defect Management System (RDMS) allows for standardised reports for the numbers and types of defective rail to be produced straight from RDMS for the year.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, for each year of CP4, is shown as follows:

- Table 3.18 provides the number of isolated rail defects identified, removed or repaired and remaining
- Table 3.20 provides the number of immediate action isolated defects per 100 kilometres by route classification type
- Table 3.22 provides the length of continuous rail defects (excluding RCF) identified, removed or repaired and remaining
- Table 3.25 provides the length in yards of plain line track with RCF classified as heavy or severe
- Table 3.27 provides the number of components of S&C track with RCF classified as heavy or severe.

Operating route results

Data for each operating route, for each year of CP4, is shown as follows:

- Table 3.19 provides the number of isolated rail defects identified, removed or repaired and remaining

- Table 3.21 provides the number of immediate action isolated defects per 100 kilometres route classification type
- Table 3.23 provides the length of continuous rail defects (excluding RCF) identified, removed or repaired and remaining
- Table 3.26 provides the length in yards of plain line track with RCF classified as heavy or severe
- Table 3.28 provides the number of components of S&C track with RCF classified as heavy or severe.

Table 3.24 provides the network total length of continuous rail defects (excluding RCF) remaining in kilometres and yards for each year of CP4.

Commentary

Isolated rail defects

Tables 3.18 and 3.19 show that in general isolated defects identified have shown a small increase across the network in comparison with previous years. The number of defects remaining has increased due to changes to the standards relating to the minimum actions to be taken for small defects indentified and the inclusion of additional defects relating to wear in switches and crossings that were not previously reported in RDMS.

In the early years of CP4 very small surface defects were all scheduled for removal within 13 weeks, regardless of the size or growth rate. However, changes to the standard now allow smaller defects to be reclassified as 'defects below actionable limits' which are subject to a programme of retesting with no fixed timescale for removal. This allows for more flexible and efficient planning of their removal, allowing greater focus on the management of larger defects of an actionable size. The increase due to the reclassification of smaller defects this year is much less significant than previous years when the standards were originally revised. This is because many of these smaller defects, previously being monitored, have continued to grow becoming actionable and have then been removed. A number of routes have also carried out the removal of smaller defects to remove clusters ahead of them growing and becoming actionable.

In addition to the monitoring of small defects below actionable limits in RDMS, new standards have also been issued requiring all actionable defects in switches and crossings to be classified and entered into RDMS with set actions and timescales for their repair or removal. These defects are often associated with wear and have previously been managed through local databases and account for much of the change in numbers since last year. The inclusion of switchblade wear that requires grinding and wear in crossings has increased the population of defects entered into RDMS. At the same time as the number of defects found has increased due to reasons above, the number of defects removed or repaired has also increased over the year as a number of these newly recorded S&C defects are actioned in accordance with the new timescales in the standard.

Most routes show a fairly constant number of isolated defects remaining over the last year even though the numbers of new defects being indentified has generally increased. The number of defects being removed has increased by a similar amount with the exception of Anglia, Sussex, Wessex and Scotland that have shown increases in the defects remaining due to the numbers of new defects being found exceeding the number of defects being removed.

Immediate action isolated defects

Table 3.20 shows the number of immediate action defects identified per 100 kilometres of track by route classification and region. Immediate action defects are those defects which require the immediate imposition of an emergency speed restriction due to their severity. The underlying network total remains largely unchanged but has seen an increase from last year. This table shows significant increases occurred in rural and freight only routes in England and in particular in Scotland. The increase is predominately due to a better identification of rail end defects in jointed track partly due to the roll out of train based ultrasonic inspection to many of these rural and freight only routes over the last year.

Table 3.21 shows the number of immediate action defects identified per 100 kilometres of track by route classification and operating route. The most significant increases occurred in Anglia, London North Eastern (LNE) and Scotland due to additional defects being detected throughout the year. Whilst the numbers of immediate action defects per 100 kilometres in these routes show significant increases they are affected by relatively small increases in the number of defects as the overall totals are low with figures affected by specific test programmes on relatively small sections of track.

Continuous rail defects (excluding RCF)

Table 3.22, 3.23 and 3.24 show the lengths of continuous defects remaining in track (excluding (RCF)). These are rail defects greater than one yard long made up primarily of untestable rail, lipping, wheelburns and hydrogen shatter cracking. Overall the remaining length of continuous defects has remained largely the same compared to last year. Significant increases were seen in the length of continuous defects in Anglia, LNE and Sussex where greater volumes of defects have been identified. Some Routes have included lengths of rail in RDMS which are subject to enhanced inspections due to

conditions such as sidewear. A number of longer actionable defects in S&C, such as lipping, are now entered into RDMS but were previously managed outside the system.

Rolling Contact Fatigue (RCF) in plain line

Table 3.25 and 3.26 show the amount of heavy and severe rolling contact fatigue in plain line measured in yards. The introduction and national use of RDMS has enabled the lengths of RCF reported to be split by severity. Light and moderate RCF, which is managed through cyclic inspection and grinding and requires no additional actions, has been omitted. Only heavy and severe RCF, which requires enhanced inspections, has been reported.

The total lengths of heavy and severe RCF across the network have both shown an increase over the previous year's figures with heavy increasing by ten per cent and severe by 32 per cent. The amount of severe RCF has increased across all routes and a number of factors have contributed to the overall increase in heavy and severe RCF. Previous changes to standards has resulted in heavy and severe RCF remaining in track longer, increasing the overall length that is recorded in RDMS, as it allows longer timescales for planning the replacement. In addition to these changes, the delivery of plain line grinding has also resulted in lower volumes being delivered on certain routes that has led to an increase in the volumes of RCF reaching the heavy and severe category.

Eddy current non-destructive test equipment is being developed to provide new train based surface crack measuring technology to understand better the length and depth of RCF across the network. Once these systems have been validated and approved, the data will be used to improve the asset records using the new surface crack measuring equipment. In addition, a review is underway to seek to increase the effectiveness of our grinding on both plain line and S&C. The benefits of improved knowledge gained from the new eddy current surface crack measuring equipment will be used to improve our rail asset management policy.

New premium rail steels have been developed and approved with improved wear and RCF resistance. These new steels are now being installed routinely into plain line and S&C sites where RCF or wear has resulted in the premature replacement of the previous rail.

Rolling Contact Fatigue (RCF) in S&C

Tables 3.27 and 3.28 show the volume of heavy and severe RCF in S&C. This is reported as the number of components within the S&C (such as switch rails, stock rails, closure rails and crossings) that have a heavy or severe crack within the length of the component. The data shows an increase of six per cent in the number of components affected by heavy RCF and an increase of 19 per cent in the number of components affected by severe RCF. The most significant increases in severe RCF in S&C components were reported in Anglia (64 per cent), LNE (32 per cent), LNW (27 per cent), and Western (49 per cent).

Part of the increase in severe RCF might still be attributable to changes to the standards over the last three years which have relaxed the minimum actions for severe RCF allowing S&C severe components to remain in track longer under a retesting programme before they are required to be removed.

The development and approval of the use of premium rail steels for S&C has been completed and it is intended that premium steels will be more widely used to help reduce wear and RCF in S&C.

CP4 overview

Increases in isolated defects have occurred over CP4 due to changes in standards and the inclusion of smaller surface defects which are classified as below actionable limits and monitored through regular inspection with no set timescales for removal. In the last two years of CP4, standards have also been introduced to include condition based defects in S&C in RDMS with set timescales for their removal which were previously recorded and managed locally. Defect removal rates have now increased towards the end of CP4 in line with the increasing number of defects recorded in RDMS becoming actionable.

Overall immediate action defects have remained largely unchanged for the whole network for the last four years. The numbers would have shown a significant decrease over the last two years of CP4 except for the increase in immediate action defects detected on rural and freight routes particularly in Scotland where a major increase in the number of rail end defects has been reported.

The total lengths of heavy and severe RCF across the network have both increased during CP4. Standard changes have allowed heavy and severe RCF to remain in track longer increasing the overall length that is recorded in RDMS. In addition to these changes, the delivery of plain line grinding has also resulted in lower volumes being delivered on certain routes that has led to an increase in the volumes of RCF reaching the heavy and severe category.

Table 3.18: Isolated rail defects for each year of CP4						
		2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Defects identified	17,641	15,827	15,936	21,795	23,066
	Defects removed / repaired	19,668	14,460	14,001	17,586	22,202
	Defects remaining at 31 March	4,980	6,127	8,057	12,085	12,949
Scotland	Defects identified	2,848	3,603	4,710	3,579	3,953
	Defects removed / repaired	2,790	2,635	3,304	2,944	3,020
	Defects remaining at 31 March	1,409	2,307	3,706	4,310	5,243
Network Total	**Defects identified**	**20,489**	**19,430**	**20,646**	**25,374**	**27,019**
	Defects removed / repaired	**22,458**	**17,095**	**17,305**	**20,530**	**25,222**
	Defects remaining at 31 March	**6,389**	**8,434**	**11,763**	**16,395**	**18,192**

Table 3.19: Isolated rail defects for each year of CP4 by operating route						
		2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	Defects identified	1,667	1,533	1,447	1,873	2,768
	Defects removed / repaired	2,108	1,254	1,202	1,425	2,204
	Defects remaining at 31 March	332	607	852	1,294	1,858
East Midland	Defects identified	737	865	983	1,029	966
	Defects removed / repaired	896	552	670	1,063	1,104
	Defects remaining at 31 March	248	541	854	815	677
Kent	Defects identified	952	856	1,009	1,310	1,396
	Defects removed / repaired	918	828	773	982	1,449
	Defects remaining at 31 March	285	298	534	806	753
London North Eastern	Defects identified	2,928	2,517	2,605	3,743	3,510
	Defects removed / repaired	3,015	2,403	2,491	3,087	3,532
	Defects remaining at 31 March	773	847	957	1,590	1,568
London North Western	Defects identified	5,890	4,681	4,429	6,241	6,097
	Defects removed / repaired	6,899	4,532	3,843	4,951	6,088
	Defects remaining at 31 March	2,168	2,188	2,774	4,045	4,054
Scotland	Defects identified	2,848	3,603	4,710	3,579	3,953
	Defects removed / repaired	2,790	2,635	3,304	2,944	3,020
	Defects remaining at 31 March	1,409	2,307	3,706	4,310	5,243
Sussex	Defects identified	661	674	546	950	1,351
	Defects removed / repaired	640	592	450	758	988
	Defects remaining at 31 March	157	234	330	502	865
Wales	Defects identified	-	1,195	1,604	1,713	1,635
	Defects removed / repaired	-	1,032	1,475	1,597	1,795
	Defects remaining at 31 March	-	316	445	550	390
Wessex	Defects identified	1,068	1,197	1,505	1,611	2,419
	Defects removed / repaired	1,221	1,041	1,203	1,303	1,683
	Defects remaining at 31 March	198	345	647	951	1,687
Western	Defects identified	3,738	2,309	1,808	3,325	2,924
	Defects removed / repaired	3,971	2,226	1,894	2,420	3,359
	Defects remaining at 31 March	891	751	664	1,532	1,097
Network Total	**Defects identified**	**20,489**	**19,430**	**20,646**	**25,374**	**27,019**
	Defects removed / repaired	**22,458**	**17,095**	**17,305**	**20,530**	**25,222**
	Defects remaining at 31 March	**6,389**	**8,434**	**11,763**	**16,395**	**18,192**

Table 3.20: Immediate action isolated defects per 100km identified in each year of CP4 by route classification						
	Route classification	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	Primary and key London & South East	6.37	5.05	4.32	4.41	4.03
	Secondary, other London & South East, and freight trunk	4.5	3.48	2.92	2.91	2.62
	Rural and freight only	4.18	2.83	2.31	1.76	2.69
	Total	5.29	4.08	3.46	3.41	3.25
Scotland	Primary and key London & South East	5.33	3.8	4.2	2.03	1.14
	Secondary, other London & South East, and freight trunk	4.2	1.87	2.33	1.79	1.44
	Rural and freight only	9.27	5.84	3.59	11.8	21.14
	Total	5.47	3.05	2.94	3.89	5.47
Network Total	**Primary and key London & South East**	**6.3**	**4.97**	**4.31**	**4.26**	**3.85**
	Secondary, other London & South East, and freight trunk	**4.45**	**3.18**	**2.82**	**2.7**	**2.4**
	Rural and freight only	**5.17**	**3.41**	**2.56**	**3.71**	**6.32**
	Total	**5.31**	**3.94**	**3.39**	**3.48**	**3.55**

Table 3.21: Immediate action isolated defects per 100km identified in each year of CP4 by route classification and operating route						
		2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	Primary and key London & South East	4.83	4.64	3.16	3.62	6.13
	Secondary, other London & South East, and freight trunk	1.56	3	1.8	3.12	4.05
	Rural and freight only	2.77	3.33	1.11	2.23	5.03
East Midland	Primary and key London & South East	2.78	4.44	3.31	3.31	3.74
	Secondary, other London & South East, and freight trunk	5.01	3.62	3.06	2.5	3.62
	Rural and freight only	4.8	1.59	3.17	0	0
Kent	Primary and key London & South East	7.87	3.6	4.97	5.16	4.88
	Secondary, other London & South East, and freight trunk	2.64	1.72	2.66	3.29	2.18
	Rural and freight only	0	1.71	1.71	3.42	1.71
London North Eastern	Primary and key London & South East	3.72	4.41	3.08	2.53	4.38
	Secondary, other London & South East, and freight trunk	5.04	4.26	4.72	2.89	4.03
	Rural and freight only	5.09	2.46	2.66	1.62	2.75
London North Western	Primary and key London & South East	8.83	5.8	4.32	4.87	2.67
	Secondary, other London & South East, and freight trunk	6.19	4.64	3.39	3.83	2.41
	Rural and freight only	4.23	1.57	1.58	1.33	2.08
Scotland	Primary and key London & South East	5.33	3.8	4.2	2.03	1.14
	Secondary, other London & South East, and freight trunk	4.2	1.87	2.33	1.79	1.44
	Rural and freight only	9.27	5.84	3.59	11.8	21.14
Sussex	Primary and key London & South East	7.15	10.01	8.57	8.37	8.37
	Secondary, other London & South East, and freight trunk	0.75	1.32	0.57	1.51	1.7

Table 3.21 continued: Immediate action isolated defects per 100km identified in each year of CP4 by route classification and operating route						
		2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Sussex	Rural and freight only	0	1.88	0	0	0
Wales	Primary and key London & South East	4.31	2.3	0.87	3.78	0.58
	Secondary, other London & South East, and freight trunk	2.26	1.61	1.76	1.46	0.95
	Rural and freight only	4.59	3.89	2.71	1.9	2.57
Wessex	Primary and key London & South East	8.57	7.1	8.15	4.12	4.03
	Secondary, other London & South East, and freight trunk	4.26	3.02	0.72	2.54	2.17
	Rural and freight only	2.04	2.04	1.03	0	0
Western	Primary and key London & South East	6.63	4.05	3.8	5.72	3.54
	Secondary, other London & South East, and freight trunk	6.79	3.4	2.69	2.92	1.17
	Rural and freight only	4.44	5.44	4.78	3.76	4.41
Network Total	**Primary and key London & South East**	**6.3**	**4.97**	**4.31**	**4.26**	**3.85**
	Secondary, other London & South East, and freight trunk	**4.45**	**3.18**	**2.82**	**2.7**	**2.4**
	Rural and freight only	**5.17**	**3.41**	**2.56**	**3.71**	**6.32**

Table 3.22: Lengths of continuous rail defects (excluding RCF data) for each year of CP4						
		2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	Defects identified	95,151	71,937	76,585	127,022	153,587
	Defects removed / repaired	117,955	68,529	68,699	123,976	141,671
	Defects remaining at 31 March	54,601	58,009	65,858	76,996	88,912
Scotland	Defects identified	12,352	8,683	15,415	17,995	14,165
	Defects removed / repaired	23,544	9,273	14,451	7,280	23,907
	Defects remaining at 31 March	34,864	34,274	35,292	45,335	35,593
Network Total	**Defects identified**	**107,503**	**80,620**	**92,000**	**145,017**	**167,752**
	Defects removed / repaired	**141,499**	**77,802**	**83,150**	**131,256**	**165,578**
	Defects remaining at 31 March	**89,465**	**92,283**	**101,150**	**122,331**	**124,505**

Table 3.23: Lengths of continuous rail defects (excluding RCF data) for each year of CP4 by operating route						
		2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	Discovered	13,111	6,401	4,633	8,307	11,926
	Remaining	2,121	1,742	1,603	3,717	8,101
	Removed	16,520	6,780	4,772	6,141	7,542
East Midland	Discovered	1,528	1,640	2,571	3,967	5,858
	Remaining	684	1,004	2,006	1,240	3,787
	Removed	1,895	1,320	1,557	4,718	3,311
Kent	Discovered	9,338	4,716	2,665	22,810	19,465
	Remaining	875	2,046	1,445	20,168	12,307
	Removed	9,364	3,545	3,266	9,376	27,326
London North Eastern	Discovered	17,758	17,200	19,005	22,578	27,018
	Remaining	7,735	8,704	11,127	12,558	16,558
	Removed	22,487	16,231	16,557	20,159	23,018

Table 3.23 continued: Lengths of continuous rail defects (excluding RCF data) for each year of CP4 by operating route						
		2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
London North Western	Discovered	22,830	14,448	16,879	27,222	46,655
	Remaining	31,130	30,307	33,476	13,108	13,817
	Removed	29,311	15,271	13,710	47,536	45,946
Scotland	Discovered	12,352	8,683	15,415	17,995	14,165
	Remaining	34,864	34,274	35,292	45,335	35,593
	Removed	23,544	9,273	14,451	7,280	23,907
Sussex	Discovered	4,514	6,977	4,552	6,449	16,096
	Remaining	1,304	4,371	2,215	3,304	9,359
	Removed	4,620	3,910	6,708	5,404	10,041
Wales	Discovered	14,061	6,768	13,319	14,629	9,922
	Remaining	4,576	2,265	6,326	9,370	9,218
	Removed	23,125	9,079	9,258	11,737	10,074
Wessex	Discovered	3,599	5,037	4,511	5,326	7,068
	Remaining	1,938	2,435	2,697	4,009	5,062
	Removed	3,842	4,540	4,249	4,013	6,015
Western	Discovered	8,412	8,750	8,450	15,734	9,579
	Remaining	4,238	5,135	4,963	9,522	10,703
	Removed	6,791	7,853	8,622	14,892	8,398
Network Total	**Discovered**	**107,503**	**80,620**	**92,000**	**145,017**	**167,752**
	Remaining	**89,465**	**92,283**	**101,150**	**122,331**	**124,505**
	Removed	**141,499**	**77,802**	**83,150**	**131,256**	**165,578**

Table 3.24: Lengths of continuous rail defects remaining (excluding RCF data) for each year of CP4					
2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Network total length (yards)	89,465	92,283	101,150	122,331	124,505
Network total length (km)	82	84	92	112	114

Table 3.25: Rolling contact fatigue in plain line classified as heavy or severe (yards) for each year of CP4						
	Classification	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	heavy	303,627	300,331	338,697	375,767	399,252
	severe	132,719	137,499	161,482	214,371	281,545
Scotland	heavy	28,947	32,242	40,687	47,767	65,779
	severe	14,506	16,518	19,543	23,637	32,811
Network Total	**heavy**	**332,574**	**332,573**	**379,384**	**423,534**	**465,031**
	severe	**147,225**	**154,017**	**181,025**	**238,008**	**314,356**

Table 3.26: Rolling contact fatigue in plain line classified as heavy or severe (yards) for each year of CP4 by operating route						
	Classification	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	heavy	21,457	22,604	21,535	24,088	29,899
	severe	5,417	5,397	8,127	12,413	23,506
East Midlands	heavy	5,242	5,422	5,682	6,639	7,003
	severe	6,662	4,751	4,950	5,325	7,089
Kent	heavy	22,145	16,201	10,833	9,261	8,276
	severe	35,507	20,173	12,929	15,344	16,623
London North Eastern	heavy	98,320	92,874	99,760	109,472	112,266
	severe	35,480	41,111	48,918	65,862	85,492

Table 3.26 continued: Rolling contact fatigue in plain line classified as heavy or severe (yards) for each year of CP4 by operating route						
	Classification	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
London North Western	heavy	81,482	91,525	116,742	127,393	135,035
	severe	14,457	15,860	25,558	41,913	58,566
Scotland	heavy	28,947	32,242	40,687	47,767	65,779
	severe	14,506	16,518	19,543	23,637	32,811
Sussex	heavy	6,776	11,429	15,499	15,693	14,883
	severe	1,012	2,816	5,434	7,414	8,778
Wales	heavy	1,738	1,662	2,056	2,632	4,622
	severe	5,094	3,691	7,139	9,845	12,545
Wessex	heavy	30,724	27,962	34,985	41,687	47,143
	severe	17,795	31,356	35,832	43,374	52,190
Western	heavy	35,743	30,652	31,605	38,902	40,125
	severe	11,295	12,344	12,595	12,881	16,756
Network Total	**heavy**	**332,574**	**332,573**	**379,384**	**423,534**	**465,031**
	severe	**147,225**	**154,017**	**181,025**	**238,008**	**314,356**

Table 3.27: Rolling contact fatigue in S&C classified as heavy or severe (number of components) for each year of CP4						
	Classification	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	heavy	1,560	1,566	1,884	2,296	2,418
	severe	1,112	1,481	2,231	3,159	3,810
Scotland	heavy	247	271	280	323	350
	severe	151	187	220	252	262
Network Total	**heavy**	**1,807**	**1,837**	**2,164**	**2,619**	**2,768**
	severe	**1,263**	**1,668**	**2,451**	**3,411**	**4,072**

Table 3.28: Rolling contact fatigue in S&C classified as heavy or severe (number of components) for each year of CP4 by operating route						
	Classification	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	heavy	56	55	57	71	74
	severe	19	34	47	48	79
East Midlands	heavy	23	34	28	32	23
	severe	51	84	141	175	211
Kent	heavy	126	117	87	81	72
	severe	156	141	75	76	82
London North Eastern	heavy	515	458	552	734	889
	severe	218	341	580	797	1057
London North Western	heavy	491	580	763	969	951
	severe	199	330	606	1,035	1,318
Scotland	heavy	247	271	280	323	350
	severe	151	187	220	252	262
Sussex	heavy	51	44	54	42	36
	severe	7	17	57	83	67
Wales	heavy	15	17	14	13	19
	severe	49	45	76	101	101
Wessex	heavy	209	204	271	274	257
	severe	339	423	576	727	721
Western	heavy	74	57	58	80	97
	severe	74	66	73	117	174
Network Total	**heavy**	**1,807**	**1,837**	**2,164**	**2,619**	**2,768**
	severe	**1,263**	**1,668**	**2,451**	**3,411**	**4,072**

Track geometry quality – Good track geometry (M3)

Definition

The measure for Good Track Geometry (GTG) is based on the proportion of track where the lateral and vertical alignment is categorised as 'good' or 'satisfactory'. The alignment is measured by track geometry measurement and recording vehicles and the measurement used is standard deviation (in mm). The values of standard deviation that need to be achieved for alignment to be categorised as good or satisfactory vary with line speed. The threshold values are specified in Network Rail standards.

It is possible to have a value of over 100 per cent for GTG, as there is a weighting for track categorised as 'good'.

Reporting method

The principal purpose of track geometry measurement is to support track maintenance teams in the management of track condition. Track geometry measurement and recording is carried out on a cyclical basis, with the frequency of measurement being aligned to the type of traffic, tonnage and line speed.

The track geometry measures always lag behind the actual situation on the ground. They are calculated from the national dataset at the end of each four week period which holds the last measurement result for each section of track. As the dataset can only be updated when a recording run takes place, the dataset will lag behind the condition on the track, both going into any problem phase (when there has been deterioration on the ground that has not yet been detected and measured) and during the recovery phase (when geometry that has been restored to a good or satisfactory condition has yet to be remeasured).

With the highest frequency of recording, any indications of change will be first seen in the statistics for Primary track. The effects usually take longer to become apparent in Secondary and Rural track, because of less frequent measurement. With higher proportions of Secondary and Rural track, Scotland is particularly affected by this lagging effect.

Reporting confidence

The Good Track Geometry measure has been assigned a B2 confidence grade by Arup, the independent reporter for output monitoring.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, for each year of CP4, is shown as follows:

- Table 3.29 shows GTG for each of the main route classifications
- Figure 3.4 is a graphical representation of GTG.

Operating route results

- Table 3.30 shows GTG for each year of CP4 for each operating route. Increasing values indicate improvement.

Commentary

The first three years of CP4 saw a year on year overall deterioration in GTG. This has been mainly

Table 3.29: Good track geometry (%) by route classification in CP4

		2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Primary and key London & South East	137.70	137.00	137.00	138.90	138.40
	Secondary, other London & South East, and freight trunk	139.80	139.40	138.60	139.90	139.60
	Rural and freight only	130.70	130.00	127.80	133.40	132.70
	Total	137.80	137.20	136.70	138.80	138.33
Scotland	Primary and key London & South East	141.50	139.90	139.50	139.40	140.80
	Secondary, other London & South East, and freight trunk	143.40	141.70	142.0	140.80	139.90
	Rural and freight only	107.20	101.50	95.60	97.50	96.40
	Total	137.40	135.30	134.50	134.10	133.50
Network Total	Primary and key London & South East	138.00	137.20	137.20	138.90	138.60
	Secondary, other London & South East, and freight trunk	140.50	139.80	139.30	140.10	139.70
	Rural and freight only	126.30	124.60	121.70	126.40	125.40
	Total	**137.70**	**137.00**	**136.50**	**138.10**	**137.70**

attributed to elongated periods of drought combined with severe winters. This trend was reversed in 2012/13 and despite a small deterioration in 2013/14 GTG has recovered to a level very similar to the start of the control period

Figure 3.4 shows the trends in GTG for England & Wales, Scotland and the whole network. Network performance follows the same trend as England & Wales, due simply to the greater volume of track in England & Wales than Scotland. As the track in Scotland is less susceptible to the effects of ground shrinkage in hot weather, but more susceptible to extreme cold and high rainfall, the seasonal trends in GTG for Scotland are different from the rest of the network.

Scotland does not show the same recovery in GTG as England & Wales in 2012/13 and 2013/14 due to two key factors:

- under delivery of track geometry maintenance machine shifts, caused by prolonged, heavy snow cover
- a proportionally greater reduction in the use of track geometry maintenance machines than the rest of the network.

Although the drought conditions that have caused ground shrinkage in previous years were not seen in the last two years of the control period the overall improvement has been tempered by high levels of rainfall which have caused ground softness in places, with a negative impact on track geometry. The different issues raised by extremely dry and extremely wet weather conditions highlight the fact that further consideration is required to deal with the issues caused by increasing climate variability. These issues are shared by other infrastructure managers around the world.

Some operational factors have also adversely affected the situation since the start of the control period. Traffic volume has increased, with more trains operating on the network, for more hours per week. This has the two-fold effect of generating additional wear (including degrading track geometry), while reducing the time available for maintenance work. With time required to move people and equipment onto the track, and to restore the track to an operational condition at the end of intrusive work, actual work time can be disproportionally affected by extending train operating hours. Similarly, a higher frequency service disproportionally affects the time available for minor work between trains. Increases in traffic volumes and its affect on track geometry is an issue that we continue to manage carefully.

Increases in linespeeds have resulted in less track being categorised as good or satisfactory, as more stringent thresholds are applied to track with faster linespeeds. An assessment last year showed that roughly 20 per cent of the deterioration in GTG over the first four years of CP4 is due to increases in linespeed.

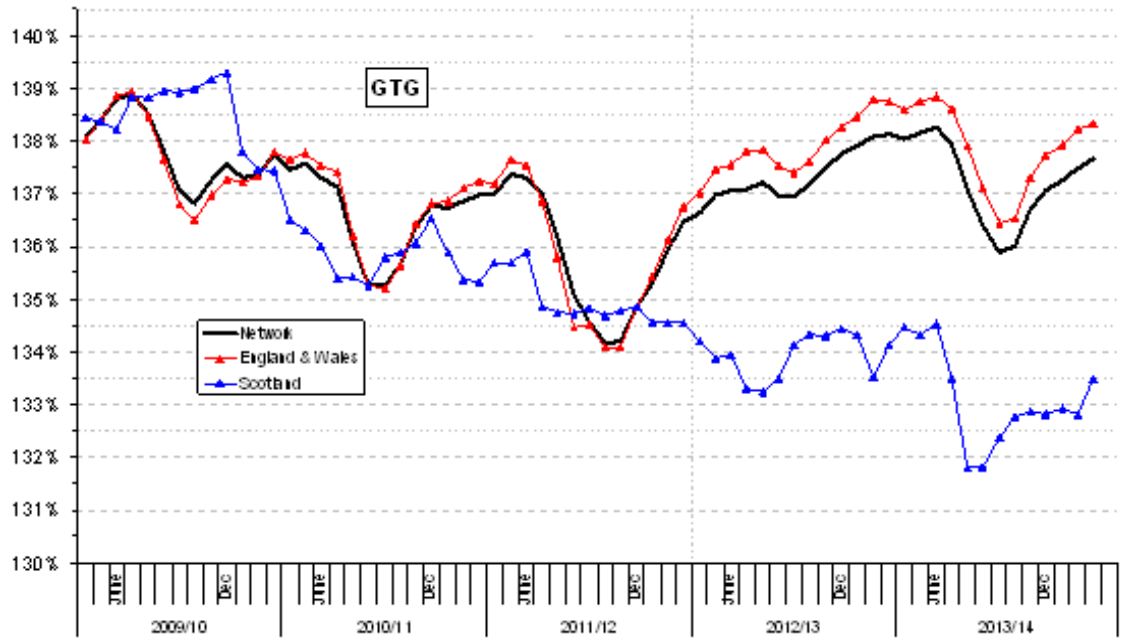
During Control Period 3 (April 2004 to March 2009) very substantial improvements were made to track geometry. Whereas the policy for CP4 was for GTG to remain virtually unchanged. The strategic plan for provision of track geometry maintenance machines was modified to meet this policy based on the experiences of previous years. In normal circumstances, these resources should have been appropriate, but the exceptional weather experienced over CP4 has affected this.

Increased machine allocation was made to rectify this situation. This resulted in the rates of track geometry recovery in autumn 2010, and spring, autumn and winter of 2011/12 being comparable with those achieved in 2005/06 and 2006/07. These actions combined with the absence of drought conditions in 2012/13 and 2013/14 have had a notable effect in overcoming the cumulative effect of the exceptional weather experienced over the previous four years.

Table 3.30: Good track geometry (%) in CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	132.50	134.30	130.90	137.47	136.10
East Midlands	132.80	132.40	132.80	135.78	135.50
Kent	126.20	126.50	124.70	128.20	128.60
London North Eastern	142.30	140.40	137.80	138.51	138.40
London North Western	139.20	139.40	140.40	142.14	141.60
Scotland	137.40	135.30	134.50	134.13	133.50
Sussex	127.60	125.70	123.30	127.41	127.60
Wales	145.50	142.70	142.60	143.14	141.70
Wessex	133.90	133.90	134.70	137.29	137.80
Western	141.00	140.10	141.40	141.91	141.20
Network Total	**137.70**	**137.00**	**136.50**	**138.13**	**137.70**

Figure 3.4: Network good track geometry (%) over CP4



CP4 Overview

Despite the challenges presented by the adverse effects of exceptional weather and the other factors described above, the CP4 success criteria of a GTG measure of 137.6 per cent has been exceeded. This has been achieved in line with the revised track policy for CP4 and the commitment to reduce maintenance costs, following the substantial improvement delivered in CP3.

Track geometry quality – Poor track geometry (M3)

Definition

The measure Poor Track Geometry (PTG) is based on the proportion of track where the lateral and vertical alignment is categorised as 'very poor'. The alignment is measured by track geometry measurement and recording vehicles and the measurement used is standard deviation (in mm). The threshold values of standard deviation at which track is categorised as very poor varies with linespeed. The threshold values are specified in Network Rail standards. The formula for the measure has additional weighting for extreme values of standard deviation.

PTG reflects combinations of aged track, poor track bed condition, and/or undesirable geometrical features such as severely constrained junction layouts, with tight curves, or curves with irregular radii. Rectification can often only be achieved by significant design alterations, treatment of underlying ground and other environmental conditions, and wholesale renewal. Affected track is often in the vicinity of major junctions and switches and crossings. This compounds the complexity and the cost of remediation work, which may then be disproportionate to the benefits of such work, especially on rural and freight routes.

Reporting method

The reporting method for poor track geometry is as described previously for good track geometry.

Reporting confidence

The Poor Track Geometry measure has been assigned an A1 confidence grade by Arup, the independent reporter for output monitoring. The track geometry measurement systems that provide the base data, and the data storage and processing systems used to calculate PTG are all well established and maintained.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, for each year of CP4, is shown as follows:

- Table 3.31 shows PTG for each of the main route classifications
- Figure 3.5 is a graphical representation of PTG.

Operating route results

- Table 3.32 shows PTG for each year of CP4 for each operating route. Decreasing values indicate improvement.

Commentary

Poor Track Geometry (PTG) has been affected by the exceptional weather conditions experienced over CP4 in a similar manner to Good Track Geometry. Despite substantial improvement over Control Period 3 (April 2004 to March 2009), the negative impact of seasonal events seen in 2009/10, 2010/11 and 2011/12 can be seen in Figure 3.5. The trend is virtually a mirror image of GTG, and clearly shows the effect of ground shrinkage from drought over several summers, and the strong level of improvement achieved over the last few months of 2011/12 with a milder winter. This recovery has been sustained throughout 2012/13 and 2013/14.

The requirement for additional provision of track geometry maintenance machines to sustain or improve the rate of recovery is under continuous assessment (recognising the uncertainty that is introduced by the influence of future weather conditions).

As with GTG, PTG has been adversely affected by the restrictions and wear incurred by increased traffic volume. Increases to linespeeds, with the associated application of more stringent thresholds, has resulted in more track being categorised as very poor. However, this has only had a small overall impact on PTG, accounting for less than five per cent of the deterioration over the first years of the control period.

More cross-overs, loops and other slow speed track has also been subject to measurement, utilising advancements in the measurement equipment. These lesser used sections have a high proportion of poor track. Including this track in the statistics therefore adversely affects PTG, accounting for another five per cent of the deterioration over the early part of the control period (for the whole network figure).

Table 3.31: Poor track geometry (%) by route classification in CP4

		2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Primary and key London & South East	2.43	2.49	2.48	2.27	2.29
	Secondary, other London & South East, and freight trunk	2.40	2.53	2.59	2.49	2.35
	Rural and freight only	2.77	2.83	3.51	2.69	2.63
	Total	2.45	2.54	2.62	2.39	2.35
Scotland	Primary and key London & South East	1.55	1.63	1.74	1.64	1.34
	Secondary, other London & South East, and freight trunk	1.88	2.01	2.16	2.20	2.11
	Rural and freight only	2.50	3.39	3.75	4.02	3.53
	Total	1.88	2.12	2.29	2.32	2.13
Network Total	Primary and key London & South East	2.37	2.43	2.43	2.22	2.23
	Secondary, other London & South East, and freight trunk	2.31	2.44	2.51	2.43	2.30
	Rural and freight only	2.71	2.95	3.56	2.95	2.81
	Total	**2.38**	**2.48**	**2.58**	**2.38**	**2.32**

Table 3.32: Poor track geometry (%) in CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	3.55	3.23	3.61	2.65	2.69
East Midlands	2.47	2.66	2.41	2.20	1.98
Kent	3.57	3.46	4.00	3.59	3.69
London North Eastern	2.10	2.31	2.62	2.60	2.58
London North Western	1.90	1.99	1.87	1.78	1.66
Scotland	1.88	2.12	2.29	2.32	2.13
Sussex	4.22	4.47	5.35	4.91	4.81
Wales	1.28	1.68	1.58	1.40	1.46
Wessex	3.15	3.25	3.47	2.97	3.04
Western	2.48	2.49	2.16	2.08	2.02
Network Total	**2.38**	**2.48**	**2.58**	**2.38**	**2.32**

Figure 3.5: Network poor track geometry (%) over CP4

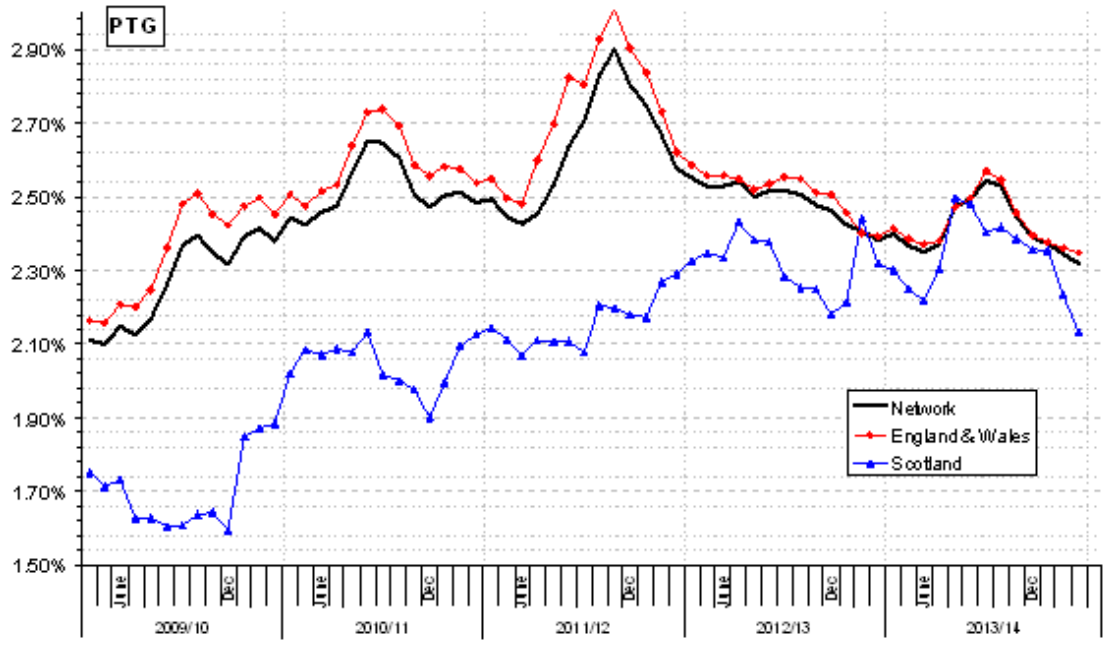


Figure 3.5 shows the recent seasonal trends for England & Wales, Scotland and the whole network. Overall, despite the deterioration of the last four years, Scotland has proportionately less 'very poor track' than England & Wales, but the level of year-on-year deterioration for the first four years of the control period was worse. The reasoning for this is similar to that described for GTG, including prolonged heavy snow coverage and a proportionally greater reduction in the use of track geometry maintenance machines. Scotland has also been adversely affected by the increases to linespeeds and increased measurement of cross-overs, loops and other slow speed track. This disproportionally affected PTG in Scotland Primary track, where the total increase in PTG over the course over the first four years of the current control period was matched by the increase arising from higher linespeed and additional measurement.

CP4 Overview

Despite the challenges presented by the adverse effects of exceptional weather and the other factors described above, the CP4 success criteria of a PTG measure of less than 2.34 per cent has been met. This has been achieved in line with the revised track policy for CP4 and the commitment to reduce maintenance costs, following the substantial improvement delivered in CP3.

Track geometry faults (M5)

Definition

This measure is based on discrete geometry faults identified against four principal parameters of vertical alignment, horizontal alignment, gauge (the distance between the rails) and twist (the relative vertical position across the opposite corners of a three metre bogie or vehicle). The presence of faults and their type and magnitude is given by the output of the track geometry measurement and recording vehicles. The full population of track geometry faults covers a wide range, from serious twist and gauge faults that require an immediate response (block the line or reduce speeds) to relatively minor alignment anomalies on low speed track that require only review and monitoring. This measure includes all those faults that require intervention and rectification actions to fixed timescales. Both the threshold values and the specified timescales are mandated in Network Rail standards.

The measure is normalised as faults per 100 track kilometres to provide comparison across different parts of the network.

Reporting method

The reporting method for track geometry faults is as described previously for good track geometry.

Reporting confidence

The measure for track geometry faults per 100 kilometres was assigned an A1 confidence grade by Halcrow, the previous independent reporter for output monitoring. It has not been reassessed in CP4.

The track geometry measurement systems that provide the base data, and the data storage and processing systems that are used to calculate the measure, are all well established and maintained.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, for each year of CP4, is shown as follows:

- Table 3.33 shows track geometry faults for each of the main route classifications
- Figure 3.6 is a graphical representation of track geometry faults.

Operating route results

- Table 3.34 shows track geometry faults for each year of CP4 for each operating route. Decreasing values indicate improvement.

Commentary

The last year and a half of CP4 has seen a marked overall improvement in the number of track geometry faults on the network, following variation in the early part of the control period.

There was a large increase in the number of recorded faults at the start of 2012/13. Root cause analysis has shown that a key cause of this increase was the fitment of new instrumentation equipment on the Track Recording Unit (TRU) measuring train. The new equipment is more reliable, capturing gauge faults which were previously recorded as below the threshold. As forecast, the numbers of gauge faults declined in the second half of the year as track maintenance staff fixed the faults recorded earlier in the year and the track was remeasured.

The same analysis also showed that 70 per cent of the overall increase was associated with twist. This was triggered by ground softening caused by the abnormally high rainfall in the spring and summer of 2012/13. The percentage of these twist faults that repeated also increased throughout the year as a result of a lack of sustainable treatment. Particular problems leading to this were identified as:

- difficulty in accurately locating the positions of recorded faults
- the high volume and concentration of faults leading to less time available to rectify each one (treating immediate symptoms but risking recurrence)
- higher skilled personnel needed to deliver more technically demanding tasks, so less skilled personnel assigned to apply simple treatments to fix top and twist faults.

As a result, action plans were implemented, covering technology, training and resourcing, which reversed the increasing total number of twist faults across the network.

The control period trend in geometry faults is shown in Figure 3.6. As for other geometry measures, there is a correlation of geometry faults with weather conditions, but it appears to be less pronounced than for GTG or PTG. One factor affecting this is that ground shrinkage mainly affects twist faults, with little impact on horizontal alignment and gauge faults. Additionally, the intervention faults covered by this measure are rectified as they are detected, thus moderating the extent of deterioration.

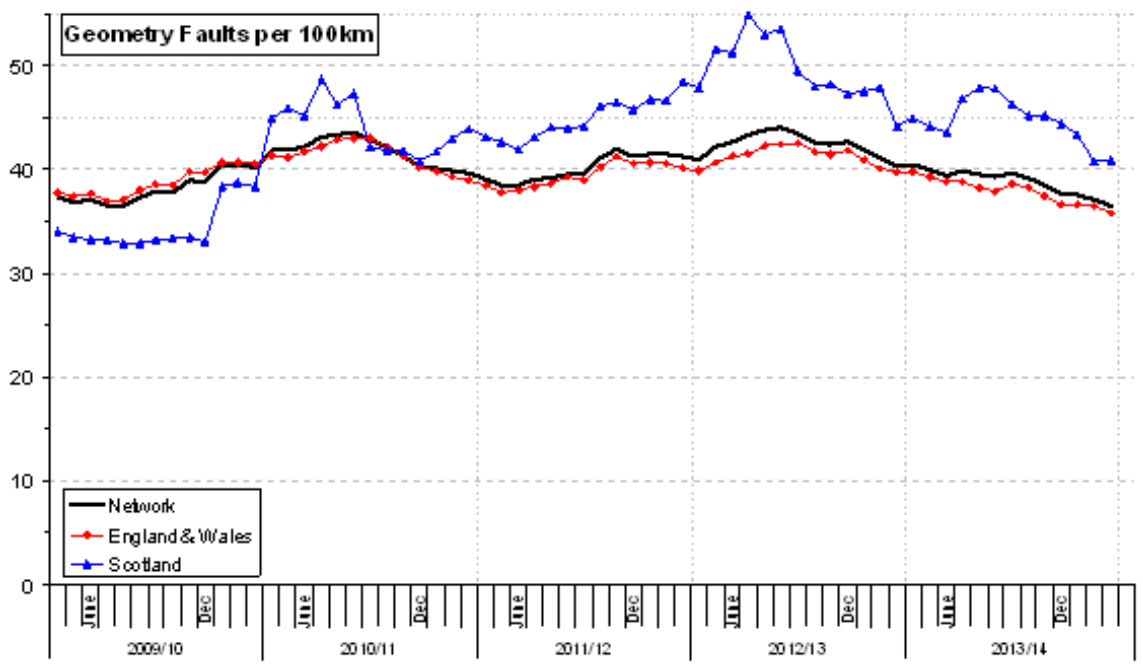
Table 3.33: Track geometry faults per 100 km by route classification in CP4

		2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	Primary and key London & South East	29.60	29.40	30.90	28.90	27.30
	Secondary, other London & South East, and freight trunk	43.30	40.90	42.00	42.80	37.40
	Rural and freight only	69.50	66.20	65.70	67.10	59.60
	Total	40.50	39.00	40.20	39.70	35.80
Scotland	Primary and key London & South East	22.90	25.60	20.50	17.50	15.20
	Secondary, other London & South East, and freight trunk	35.10	38.00	41.20	39.70	34.20
	Rural and freight only	62.00	78.30	96.30	82.60	83.80
	Total	38.40	44.00	48.50	44.20	40.99
Network Total	Primary and key London & South East	29.10	29.20	30.30	28.20	26.50
	Secondary, other London & South East, and freight trunk	41.90	40.40	41.90	42.20	36.80
	Rural and freight only	68.00	68.70	71.80	70.20	64.50
	Total	**40.30**	**39.70**	**41.30**	**40.30**	**36.50**

Table 3.34: Track geometry faults per 100 km by route classification in CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	53.60	40.20	46.30	43.30	40.90
East Midlands	33.30	24.50	26.80	24.20	21.80
Kent	39.40	49.10	44.80	49.70	46.80
London North Eastern	38.90	36.50	38.20	39.20	37.30
London North Western	36.10	32.60	35.50	34.80	29.40
Scotland	38.40	44.00	48.50	44.20	40.99
Sussex	57.60	64.10	67.10	61.90	57.40
Wales	31.80	40.00	39.30	39.40	31.60
Wessex	47.40	51.00	50.70	47.60	45.10
Western	39.70	40.40	37.90	38.40	33.70
Network Total	**40.30**	**39.70**	**41.30**	**40.30**	**36.50**

Figure 3.6: Network geometry faults per 100 km over CP4



The increase in track geometry faults across the network since the start of CP4 was affected by additional wear incurred by increased traffic volume and more cross-overs and loops being subjected to measurement. These lesser used sections have a high proportion of poor track, adversely affecting the statistics for track geometry faults in a similar manner to PTG. Overall, the effect of additional recording accounts for approximately 30 per cent of the increase in track geometry faults since the start of CP4.

In December 2009, the threshold values for different fault types were changed. Threshold values and action requirements for higher risk situations were made more stringent, but they were relaxed for low risk conditions. This was expected to have a broadly neutral effect on the total number of actionable faults, but has incurred some overall increase.

CP4 Overview

Despite the improvement in the overall number of track geometry faults on the network in the last year and a half of the control period, the CP4 success criteria of less than 35.9 faults per 100 kilometres has not been met. However, the marked improvement in recent years shows that good progress is being made. Further attention will be given to this throughout CP5, particularly with respect to reducing the number of repeat track geometry faults through risk based prioritisation of targets and closer management.

Track buckles

Definition

A track buckle is a track deformation, primarily caused by thermal expansion in the rail, which renders the line unfit for the passage of trains at line speed. The remedial work may consist of adjusting or cutting rails or slewing the track.

Reporting method

When discovered track buckles are reported according to a company standard, using a template form. Total numbers of buckles are normalised against the length of track (measured in hundreds of kilometres).

Reporting confidence

Track buckles are reported to A2 confidence limits, as assigned by the independent reporter. For every occurrence a track buckle report and a hazard report are produced.

Results

Table 3.35 provides the number of track buckles per 100 kilometres of track for each year of CP4 for England & Wales, Scotland and the whole network.

Commentary

The number of track buckles per 100 kilometres has reduced over the control period from 0.09 to 0.06. In 2013/14 however there was an increase in the number of track buckles per 100 kilometres following a significant reduction in 2011/12 and 2012/13.

There were two significant factors behind the improvements realised in 2011/12 and 2012/13, planned preventative action and mild summers. In a drive to reduce track buckles, an enhanced programme of preparation work was undertaken early in spring 2011. This was supported by the extensive briefing of a new guidance document for hot weather preparation and the management of track during hot weather. These actions were based on a detailed study into the underlying causes of the buckles that occurred in 2010/11 with further consolidation in 2012/13.

Despite the continuation of this work, the rate of buckles increased again in the last year of the control period. Analysis shows this rise can be attributed to the warmer summer in 2013.

Track buckles have been identified as high risk occurrences, and alongside the prior mentioned initiatives a number of further workstreams are in place to further reduce them:

- improving the reliability of rail stressing through competency
- improving the assurance of rail stress condition through new non-intrusive rail stress measurement techniques
- improved visibility of works with track stability risk through a single, consistent register and reporting process.

CP4 Overview

Due to a programme of preparation work for hot weather, the annual number of track buckles has reduced over CP4 from 0.09 per 100 kilometres to 0.06 per 100 kilometres. The annual increase in the last year of the control period when compared to the two previous years is due to the comparably warmer summer of 2013.

Track failures

Definition

This measure reports the total number of train delay incidents that were attributed to track failures on Network Rail owned infrastructure, using data from TRUST (a train running system which records details of train running as compared with schedule). Track failures for CP4 reporting are those incidents that have a TRUST reason code included within delay attribution categories of 104A (Temporary Speed Restrictions due to condition of track), 104B (track faults including broken rails), and 104C (rolling contact fatigue).

Reporting method

The data is compiled from TRUST (a train running system which records details of train running as compared with schedule) and PSS (Network Rail's Performance System) and shows the number of points failures recorded.

Reporting confidence

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Table 3.35: Track buckles per 100 km in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	0.09	0.10	0.05	0.04	0.05
Scotland	0.05	0.02	0.00	0.00	0.01
Network Total	**0.09**	**0.09**	**0.04**	**0.03**	**0.06**

Results

Table 3.36 provides the number of track failures for each year of CP4 for England & Wales, Scotland and the whole network total.

Commentary

For the categories covered by this measure, the majority of incidents of train delay minutes arise from implementing safety precautions where there is a known fault, or where a serious track fault is suspected. These safety precautions can include the imposition of speed restrictions or the closure of sections of track, which may result in diversions.

The principal faults involved are:

- broken rails and fishplates
- serious rail defects that could grow and result in a broken rail
- track alignment or twist faults that present a risk of a derailment
- 'rough rides' reported by train crew that are suspected of being a broken rail or geometry fault
- faults with track components associated with points
- sections of aged track where the overall condition means that it is no longer capable of carrying traffic at the standard line speed.

These faults are mostly caused by cumulative damage and fatigue over many years of service, or are the result of time-based processes such as corrosion or rotting. There are no quick fixes to reducing failures from such causes. The improvements over the first four years of CP4 were achieved through long-term investment in renewal and maintenance of the infrastructure, and from the extension of processes such as rail grinding and train mounted ultrasonic testing of the rail. Rail grinding removes shallow cracks and, more importantly, reprofiles the rail so that contact stresses from train wheels are spread more uniformly across the rail resulting in less cracking and the slower growth of any cracks that do form. Regular ultrasonic testing provides earlier detection of any cracks, enabling planned maintenance intervention before they grow to a size that requires safety precautions to be applied. We have been progressively increasing the extent of rail grinding and ultrasonic testing to reduce train delay and whole life cost.

In addition, studies into the rate of crack growth in rail defects have increased engineering knowledge, leading to changes in how defects are managed. During CP4 these changes have contributed to a reduction in the number of defects being classified as sufficiently serious to require speed restrictions. Part of the reduction has been brought about by requiring earlier intervention on certain types of defects to prevent them growing to a size that requires the imposition of a speed restriction. Furthermore, some defects with slower rates of crack growth have been recognised as posing a lower risk than previously assessed and here the rules given in Network Rail standards have been amended to avoid the premature introduction of a speed restriction.

Other controls on speed restrictions are the processes applied in the management of aged track, especially those sites where a renewal or major refurbishment is planned in the short to medium term. The timing of renewals is important; renewing too soon wastes useful life, but renewing too late may mean that a speed restriction becomes necessary.

All sites that are at risk of requiring a speed restriction are logged in registers and these registers kept under review and the sites concerned subject to regular assessment. This process supports planning for the renewal to take place at the optimum time, while sustaining the current line speed by carrying out the appropriate maintenance intervention before it becomes necessary to apply a speed restriction.

In 2013/14, there was a 12 per cent rise in the number of track failure incidents. This was primarily in England & Wales where there was a 13 per cent increase, whilst the number in Scotland increased by three per cent.

The year was characterised by a poor start with the ongoing impact of the previous wet and cold winter and the impact of the introduction of on-train ultrasonic (UTU) examination of lower category lines. This led to a bow-wave of faults being identified over a relatively shorter time-frame than would have previously occurred, leading to an increase in the imposition of short-term ESRs whilst faults were fixed. Many of these would have be in place for less

Table 3.36: Number of track failures for each year of CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	6,306	5,492	5,067	4,973	5,601
Scotland	359	388	454	372	383
Network Total	**6,665**	**5,880**	**5,521**	**5,345**	**5,984**

Notes:
Prior year figures have been updated marginally to reflect final attribution.

than seven days, resulting in a greater impact on the number of track failure incidents than on the count of TSR/ESRs (on more than seven days).

The level of failures improved during the middle part of the year, but increased sharply in the final three months, through the extreme wet winter period.

The routes worst affected were:

- Wessex, where there was an increase in track defects due to rolling contact fatigue, exacerbated by the hot weather in the summer
- London North Eastern and East Midlands due to the impact of the previous winter and UTU testing early in the year, and the impact of cyclic top speed restrictions on freight routes
- Kent and Anglia, which reflected issues with the prolonged impact of wet weather on wet beds, drainage issues, rough rides and UTU testing on secondary routes in Anglia.

By contrast London North Western (LNW) and Sussex achieved significant reductions in the numbers of track failure incidents. LNW was less affected by the wet weather and other impacts noted above, while the additional track maintenance resources deployed on Sussex helped reverse the deterioration in the previous year.

This measure of track failures includes both Track TSRs and Emergency Speed Restrictions (ESRs) (in place for more than seven days) and short-term ESRs and other restrictions. The causes of the increase in the former are covered in more detail in the next section on Condition of Asset Speed Restrictions.

CP4 overview

During CP4, there has been a ten per cent reduction in the overall number of incidents for track failures resulting from the cumulative effect of improvements to the infrastructure and the inspection and maintenance processes over the years.

Despite the pressures of additional traffic volumes, and the adverse effects that extreme weather has had on track geometry, steady reductions in the number of track failures were achieved throughout the first four years CP4. This was achieved through the application of the current asset management policies and the introduction of innovations for the inspection and maintenance of rail and track.

However, this improvement was reversed in 2013/14, with a 12 per cent rise in the number of track failure incidents, for reasons as described above.

Condition of asset temporary speed restriction sites (M4)

Definition

The measure provides an indication of the quality of the stewardship of track, structures and earthworks. It identifies the number of sites where asset condition has fallen sufficiently below that required for the route speed and traffic type of that section of track, to require the imposition of a temporary speed restriction (TSR) or an emergency speed restriction (ESR). The number of unplanned restrictions indicates the number of sites where an ESR or TSR has been imposed for seven days or more due to any degradation in the condition of the asset (track, structure or earthworks). TSRs may also be planned for safety and consolidation of works. Sites where an ESR or TSR has been imposed for less than seven days due to being part of the normal maintenance cycle are excluded.

Reporting method

Each TSR or ESR (imposed for seven days or more) is recorded on a weekly basis by operating route and cause, and split between primary and secondary route.

This report separates speed restrictions into 'unplanned' and 'planned' categories. An 'unplanned' TSR also includes an ESR which has been converted to a TSR, a TSR imposed within the 26 week confirmed period possession planned window, or speed restrictions with no removal plans. A 'planned' TSR refers to any speed restrictions that the train operators are formally aware of through the Rules of the Route (ROTR), the Confirmed Period Possession Plan (CPPP) or the Draft Period Possession Plan (DPPP). This means any speed restrictions imposed as part of the yearly renewals programme, all of which are discussed with train operators as part of ROTR discussions. This also means speed restrictions which have been imposed for a while and again which the train operator is aware (through the formal process above) but has dated plans to remove, even if they are in the

Table 3.37: Summary of national TSRs (unplanned and planned) in each year of CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Unplanned	724	450	738	781	1,126
Planned	1,005	898	1,126	1,177	1,142
Network Total	**1,729**	**1,348**	**1,864**	**1,958**	**2,268**

following year's renewal programme. This explains why some areas have condition speed restrictions shown as planned.

Reporting confidence

The data collection process was previously awarded a confidence grade of B2 in 2008/09 by the previous independent reporter for output monitoring and remains unchanged. This measure has not been reassessed by the independent reporter for output monitoring in this control period.

Results

Tables 3.37 to 3.43 summarise the unplanned and planned speed restrictions imposed across the network by type, cause and operating route. Figure 3.7 shows the actual number of unplanned temporary speed restrictions per period for the final three years of CP4.

Commentary

The total number of TSRs (planned and unplanned) in 2013/14 was 2,268. This represents a sixteen per cent increase compared with last year. Planned speed restrictions fell by three per cent, and unplanned speed restrictions increased by almost 44 per cent compared with last year.

In 2013/14 the split of speed restrictions was almost equal between planned and unplanned TSRs. Planned TSRs arise primarily through scheduled maintenance and renewals work and are necessary speed restrictions which are a reflection of good asset stewardship.

The very wet weather during 2012/13 and 2013/14 had a significant adverse impact on the number of TSRs on the network. The number of unplanned speed restrictions attributed to earthworks increased from 38 in 2011/12 to 67 in 2012/13 and then more than doubled to 141 in 2013/14. The number of condition of track TSRs was also adversely affected by the wet weather, which is described in more detail below.

Compared with last year the number of TSRs attributed to structures fell but remains higher than in 2011/12. Safety speed restrictions increased materially.

Track

The total number of track speed restrictions was virtually unchanged between 2011/12 and 2012/13, but increased by 14 per cent in 2013/14. The majority of this increase was on secondary routes, where the number of speed restrictions almost doubled from 197 to 376. These routes were impacted most directly by both the on-train ultra-sonic (UTU) testing and an increase in speed restrictions on freight routes to reduce the risk of freight train derailment due to cyclic top faults (a series of dips in the rail at regular intervals which can negatively affect vehicle suspension). This followed the freight train derailment in Gloucester in October 2013, which led to an increased focus on implementing more effective management of this type of track fault. This includes applying and maintaining a speed restriction for a longer period of time until effective, longer lasting and more permanent repairs have been delivered.

Table 3.38: TSRs summarised by cause in each year of CP4

		2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Track	England & Wales	1,345	1006	1,330	1,417	1,620
	Scotland	171	149	240	148	165
	Network Total	1,516	1155	1,570	1,565	1,785
Structures	England & Wales	66	57	51	90	86
	Scotland	55	36	16	44	31
	Network Total	121	93	67	134	117
Earthworks	England & Wales	42	45	64	80	156
	Scotland	4	11	6	9	8
	Network Total	46	56	70	89	164
Safety / other	England & Wales	34	41	149	158	191
	Scotland	12	3	8	12	11
	Network Total	46	44	157	170	202
Total	England & Wales	1,487	1149	1,594	1,745	2,053
	Scotland	242	199	270	213	215
	Network Total	**1,729**	**1,348**	**1,864**	**1,958**	**2,268**

Table 3.39: Summary of national TSRs (unplanned and planned) by operating route

		2011/12		2012/13		2013/14	
		Primary	***Secondary***	***Primary***	***Secondary***	***Primary***	***Secondary***
Anglia	Unplanned	59	20	52	4	62	56
	Planned	71	49	94	20	92	22
East Midlands	Unplanned	9	7	27	21	55	23
	Planned	48	15	58	17	92	11
Kent	Unplanned	58	15	73	4	109	3
	Planned	5	6	6	1	17	0
London North Eastern	Unplanned	73	4	45	0	139	10
	Planned	218	7	399	1	257	13
London North Western	Unplanned	154	7	155	12	112	28
	Planned	252	10	250	22	255	59
Scotland	Unplanned	13	67	8	63	11	70
	Planned	68	122	43	99	10	124
Sussex	Unplanned	50	4	60	0	50	1
	Planned	12	0	8	0	15	0
Wales	Unplanned	13	24	31	15	55	31
	Planned	50	11	32	6	35	18
Wessex	Unplanned	123	0	138	0	174	1
	Planned	32	0	27	0	29	0
Western	Unplanned	27	11	61	12	129	7
	Planned	144	6	89	5	87	6
Network Total	Unplanned	579	159	650	131	896	230
	Planned	900	226	1006	171	889	253
	Grand Total	**1,479**	**385**	**1,656**	**302**	**1,785**	**483**

By contrast, the number of speed restrictions on primary routes increased by only three per cent, despite the impact of wet weather in southern England.

Planned track TSRs are often applied to support track renewals. These speed restrictions are required to allow the track to consolidate after work has taken place or for track worker safety. Typically the duration of these is short in nature with defined end dates.

Unplanned track TSRs reflect issues with the condition of track. The increase in these during the 2013/14 reflected the causes noted above, including the increase in UTU testing, cyclic top management, and the wider impact of winter weather such as wetbeds (a deterioration of the sleepers and ballast caused by saturation) and poor drainage. The high levels of rainfall over the last two years have also resulted in the need to divert resources from planned work to attend to service disrupting incidents recovery work and contributing to increases in overall speed restrictions due to an inability to remove wet beds or repair poor drainage.

Track TSRs include speed restrictions due to rolling contact fatigue affecting the rail.

Structures

Total TSRs related to structures fell slightly in 2013/14 (to 117) after the sharp increase seen in the previous year. The increase in 2012/13 followed an increase in bridge inspections, together with some impact from damage caused by the unusually wet weather conditions. The total number of speed restrictions peaked during the winter of 2012/13, falling sharply early in 2013/14.

Earthworks

The extraordinarily high levels of rainfall over the last two winters have affected embankment stability across many routes. This in turn has resulted in an increase in unplanned speed restrictions being imposed. The total number of speed restrictions rose by 84 per cent in 2013/14 alone to 164. This compares with 70 two years earlier. Whilst routes took appropriate steps to ensure the operational safety of train services as a result of the wet weather, causing a rise in infrastructure failures, recovery works were undertaken on many parts of the network to return affected lines to linespeed. This focus has seen a good level of reduction in the number of embankment related TSRs following repairs to these. A comprehensive review of at risk

locations is being undertaken as part of the Strategic Crisis Management Team (SCMT) action plans to provide a strategic list of critical at risk locations which could be affected by future wet weather and storms. This follows on from the programme of earthworks inspections to identify at risk locations due to flooding or water saturation implemented following the wet winter of 2012/13.

Routes are also increasing drainage maintenance at key locations which have been affected by the wet weather to repair any damaged or affected water courses and drainage outlets.

Safety

Total safety speed restrictions have increased in the latter half of CP4, rising from just over 40 in the first two years of CP4 to 151 in 2011/12 to 158 in 2012/13, and 186 in 2013/14. The majority of these are related to level crossing issues, including sighting. Network Rail has continued to review safety at level crossings with a programme of work being developed to identify and rectify sites where the time available for pedestrians was below the recommended level. At sites where immediate remedial work could not be undertaken, speed restrictions have been imposed to increase the crossing time available. The main programme to identify level crossings with insufficient sighting is now complete along with an ongoing risk review. The remaining speed restrictions are in place to protect those crossings with insufficient sighting and will be progressively removed when corrective actions have taken place.

Signalling Power & Communications (SP&C)

Speed restrictions attributed to SP&C are rare (e.g. speed restrictions imposed due to poor signalling design or equipment awaiting renewal) only thirteen occurred throughout the year. This was an increase of one compared to the previous year. During 2013/14 these were mainly related to renewals of under track crossings (carrying cables), while during 2012/13 the largest single cause was speed restrictions introduced as part of the ongoing implementation of European Rail Traffic Management System (ERTMS), a programme to replace traditional line side railway signals with a computer display within the train cab.

CP4 overview

The number of network TSRs continued to fall during the first two years of the control period, but then increased again from 2011/12 onwards. Following an initial reduction in 2010/11 unplanned TSRs have since seen a year on year increase, these increases can be attributed to increased UTU testing (which is providing better track condition information), cyclic top faults being reported from the Track Recording Vehicles and wet weather as previously described. Network Rail is currently undertaking various workstreams to address these TSR numbers, as well as working in partnership with the Train Operating Companies and the Rail Safety and Standards Board, with a focus on working together to reduce the TSR numbers overall, as well as looking at improving the impact TSRs have on performance generally.

Since 2009/10, track TSRs have increased by 18 per cent whereas structures TSRs are largely unchanged. By contrast, earthworks and safety speeds have increased substantially.

This reflects an increase in planned renewals work during the control period, and the specific issues arising in the latter part of the control period affecting track, embankments and level crossings discussed in more detail above.

Table 3.40: Summary of total national unplanned TSRs in 2013/14

	Classification	*Track*	*Structures*	*Earthworks*	*Safety*	*SP&C*	*Total*
England & Wales	Primary	649	41	117	76	2	885
	Secondary	113	7	18	21	1	160
Scotland	Primary	5	1	5	0	0	11
	Secondary	67	0	1	2	0	70
Network Total	Primary	654	42	122	76	2	896
	Secondary	180	7	19	23	1	230
	Grand Total	**834**	**49**	**141**	**99**	**3**	**1,126**

Table 3.41: Summary of total national unplanned TSRs by operating route

		2011/12		2012/13		2013/14	
		Primary	*Secondary*	*Primary*	*Secondary*	*Primary*	*Secondary*
Anglia	Track	41	10	37	4	40	48
	Structures	0	0	1	0	2	0
	Earthworks	6	0	5	0	1	3
	Safety	12	10	9	0	19	5
	SP&C	0	0	0	0	0	0
East Midlands	Track	5	7	26	17	48	20
	Structures	0	0	0	0	0	0
	Earthworks	0	0	0	0	4	2
	Safety	4	0	1	4	1	1
	SP&C	0	0	0	0	2	0
Kent	Track	46	12	56	4	68	3
	Structures	0	3	10	0	5	0
	Earthworks	11	0	7	0	36	0
	Safety	1	0	0	0	0	0
	SP&C	0	0	0	0	0	0
London North Eastern	Track	66	4	35	0	121	8
	Structures	3	0	1	0	4	0
	Earthworks	1	0	2	0	3	0
	Safety	3	0	7	0	11	2
	SP&C	0	0	0	0	0	0
London North Western	Track	133	7	131	12	83	21
	Structures	2	0	11	0	5	3
	Earthworks	4	0	11	0	22	3
	Safety	15	0	2	0	2	1
	SP&C	0	0	0	0	0	0
Scotland	Track	12	54	7	47	5	67
	Structures	0	4	0	2	1	0
	Earthworks	0	5	0	7	5	1
	Safety	1	4	1	7	0	2
	SP&C	0	0	0	0	0	0
Sussex	Track	45	2	38	0	26	0
	Structures	3	2	10	0	4	0
	Earthworks	0	0	6	0	6	1
	Safety	2	0	6	0	14	0
	SP&C	0	0	0	0	0	0
Wales	Track	7	14	12	2	34	8
	Structures	0	0	5	2	10	2
	Earthworks	0	2	0	7	6	8
	Safety	6	7	11	4	5	12
	SP&C	0	1	3	0	0	1
Wessex	Track	106	0	133	0	149	1
	Structures	3	0	1	0	5	0
	Earthworks	4	0	2	0	4	0
	Safety	10	0	2	0	16	0
	SP&C	0	0	0	0	0	0

Table 3.41 continued: Summary of total national unplanned TSRs by operating route							
		2011/12		***2012/13***		***2013/14***	
		Primary	***Secondary***	***Primary***	***Secondary***	***Primary***	***Secondary***
Western	Track	24	6	31	8	80	4
	Structures	0	0	4	1	6	2
	Earthworks	2	3	20	0	35	1
	Safety	1	2	5	3	8	0
	SP&C	0	0	1	0	0	0
Network Total	Track	485	116	506	94	654	180
	Structures	11	9	43	5	42	7
	Earthworks	28	10	53	14	122	19
	Safety	55	23	44	18	76	23
	SP&C	0	1	4	0	2	1
	Grand Total	**579**	**159**	**650**	**131**	**896**	**230**

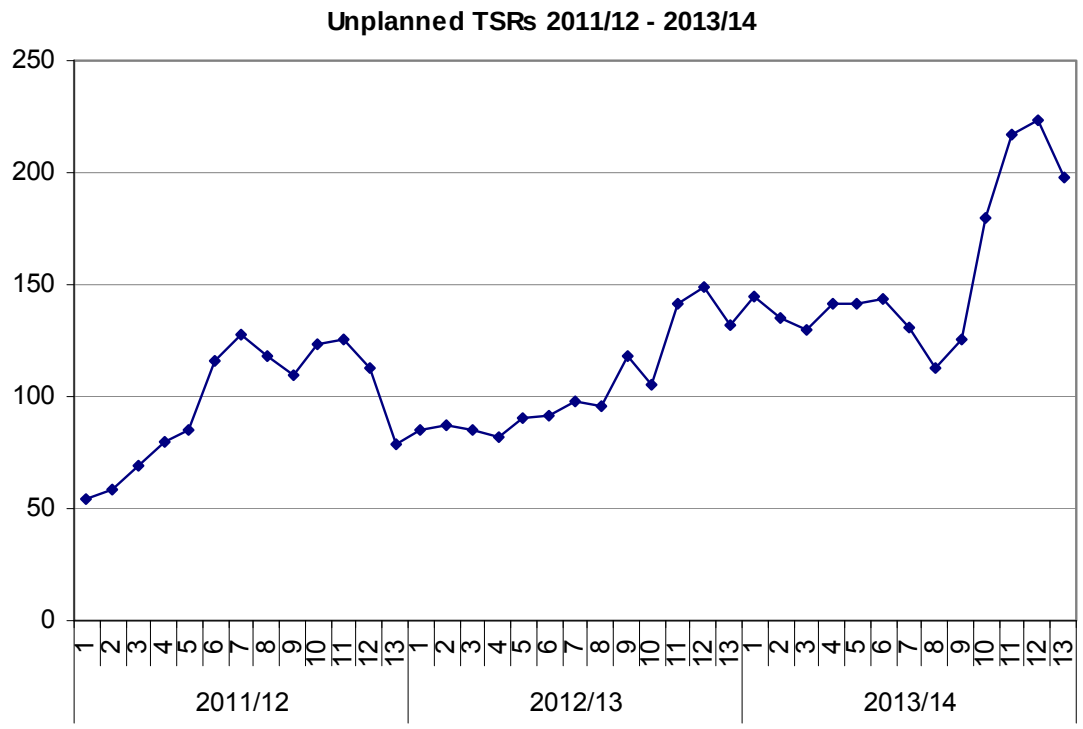
Table 3.42: Summary of total national planned TSRs in 2013/14							
	Classification	***Track***	***Structures***	***Earthworks***	***Safety***	***SP&C***	***Total***
England & Wales	Primary	747	29	17	82	4	879
	Secondary	111	9	4	5	0	129
Scotland	Primary	8	2	0	0	0	10
	Secondary	85	28	2	3	6	124
Network Total	Primary	755	31	17	82	4	889
	Secondary	196	37	6	8	6	253
	Grand Total	**951**	**68**	**23**	**90**	**10**	**1,142**

Table 3.43: Summary of total national planned TSRs by operating route							
		2011/12		***2012/13***		***2013/14***	
		Primary	***Secondary***	***Primary***	***Secondary***	***Primary***	***Secondary***
Anglia	Track	48	24	65	8	49	15
	Structures	0	4	1	0	1	0
	Earthworks	2	0	5	0	8	3
	Safety	21	21	23	12	34	4
	SP&C	0	0	0	0	0	0
East Midlands	Track	46	13	54	11	92	9
	Structures	2	0	0	0	0	1
	Earthworks	0	1	0	1	0	1
	Safety	0	1	4	5	0	0
	SP&C	0	0	0	0	0	0
Kent	Track	2	0	3	0	14	0
	Structures	0	4	0	1	0	0
	Earthworks	0	0	0	0	0	0
	Safety	3	2	3	0	3	0
	SP&C	0	0	0	0	0	0
London North Eastern	Track	198	7	381	1	237	13
	Structures	12	0	9	0	13	0
	Earthworks	6	0	5	0	0	0
	Safety	1	0	0	0	3	0
	SP&C	1	0	4	0	4	0

Table 3.43 continued: Summary of total national planned TSRs by operating route

		2011/12		2012/13		2013/14	
		Primary	*Secondary*	*Primary*	*Secondary*	*Primary*	*Secondary*
London North Western	Track	212	9	179	19	210	54
	Structures	9	0	26	0	8	4
	Earthworks	9	0	3	2	3	0
	Safety	20	1	42	1	34	1
	SP&C	2	0	0	0	0	0
Scotland	Track	60	114	39	55	8	85
	Structures	6	6	4	38	2	28
	Earthworks	0	1	0	2	0	2
	Safety	0	1	0	2	0	3
	SP&C	2	0	0	2	0	6
Sussex	Track	10	0	8	0	10	0
	Structures	2	0	0	0	3	0
	Earthworks	0	0	0	0	0	0
	Safety	0	0	0	0	2	0
	SP&C	0	0	0	0	0	0
Wales	Track	48	10	24	4	33	14
	Structures	2	0	5	2	2	4
	Earthworks	0	0	0	0	0	0
	Safety	0	1	1	0	0	0
	SP&C	0	0	2	0	0	0
Wessex	Track	29	0	22	0	21	0
	Structures	0	0	0	0	1	0
	Earthworks	2	0	2	0	2	0
	Safety	1	0	3	0	5	0
	SP&C	0	0	0	0	0	0
Western	Track	133	6	87	5	81	6
	Structures	0	0	0	0	1	0
	Earthworks	11	0	2	0	4	0
	Safety	0	0	0	0	1	0
	SP&C	0	0	0	0	0	0
Network Total	Track	786	183	862	103	755	196
	Structures	33	14	45	41	31	37
	Earthworks	30	2	17	5	17	6
	Safety	46	27	76	20	82	8
	SP&C	5	0	6	2	4	6
	Grand Total	**900**	**226**	**1006**	**171**	**889**	**253**

Figure 3.7: Number per period of national unplanned TSRs



Earthwork condition (M33)

Definition

The definition of an individual earthworks asset has been enhanced for CP5 and set at a more granular level. The plans for CP5 have been developed on asset five chain lengths as explained in Figure 3.8. For the purposes of reporting continuity asset counts and condition bands are reported for both the CP4 and CP5 definitions.

Reporting method

In CP4 earthwork condition was reported by examination five chain lengths for poor, marginal and serviceable condition rating split geographically. In CP5 earthwork condition will be reported by asset five chain lengths for top poor, poor, marginal and serviceable condition rating split geographically.

In CP5 reporting, assets that do not yet have an initial examination and earthworks that have not yet been examined to the current examination scoring system (quantitative system) are also reported as 'not examined' or 'unscored' respectively.

Earthwork condition is the state defined by a soil slope hazard index (SSHI), or a rock slope hazard index (RSHI) defined in Table 3.44. Examinations are carried out in accordance with the requirements of the Network Rail company standard for the examination of earthworks. An algorithm is used to produce the SSHI or RSHI scores from the field data gathered as part of the examination.

Reporting confidence

The confidence rating for earthworks condition measure is B2 by the independent reporter.

Results

Figure 3.8 provides an explanation of 'examination five chain lengths' used for reporting earthwork condition.

Table 3.44 shows the earthwork condition scoring methods for CP4 and CP5.

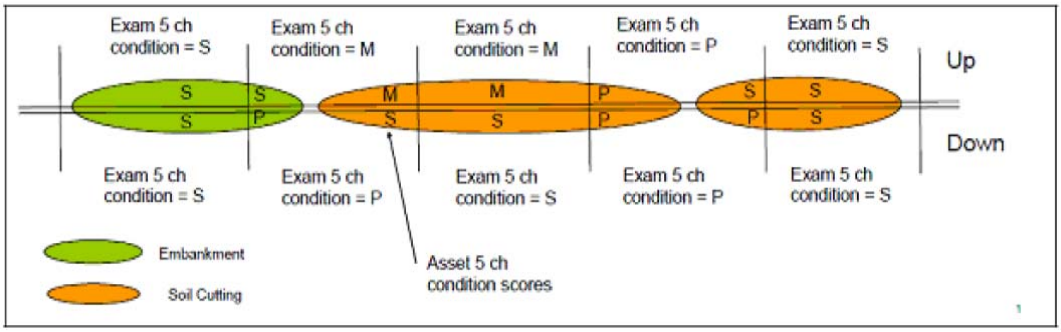
England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network is shown as follows:

- Table 3.45 provides the number of embankments, soil cuttings and rock cuttings by condition per five chains by operational route boundaries for 2011/12, 2012/13 and 2013/14 using the CP4 reporting method
- Table 3.47 provides the number of embankments, soil cuttings and rock cuttings by condition per five chains by operational route boundaries for 2013/14 using the CP5 reporting method.

Figure 3.8: Explanation of 'examination 5 chain lengths' used in reporting earthwork condition

For the purposes of earthworks asset management the railway is divided into "examination 5 chain lengths". In any "examination 5 chain length" there may be one or more "asset 5 chain lengths".



Definition of earthwork examination and asset 5 chain lengths in schematic plan view.

Operating route results

Data for each operating route, for 2011/12, 2012/13 and 2013/14, is shown as follows:

- Table 3.46 provides the number of embankments, soil cuttings and rock cuttings by condition per five chains for 2011/12, 2012/13 and 2013/14 using the CP4 reporting method
- Table 3.48 provides the number of embankments, soil cuttings and rock cuttings by condition per five chains for 2013/14 using the CP5 reporting method.

Commentary

This report is a snapshot measure of earthwork condition at the end of April 2014/15 so as to report the latest asset condition following completion of the annual examination cycle. The current examination standard, which prescribes an objective process to determine the condition grade of earthwork, has not yet been applied to all earthwork assets. This will be achieved by April 2015, in accordance with the timescales set out in the company standard.

The number of assets and the condition profile are sensitive to improvements in data management and collection processes. This year, the fourth year of M33 earthwork condition reporting, there has once again been considerable data cleansing/correction to improve the robustness of the asset inventory. This has covered removal of duplicate asset records and the addition of new assets following asset inventory verification activities by the routes building on earlier use of Light Detection and Ranging (LiDAR) remote sensing surveys gathered by aircraft.

The number of earthwork five chain lengths listed in the examination database has increased from 167,809 in 2013 to 173,346 in 2014. This net increase in the earthwork asset number is due to the inclusion of assets/examinations in the central database from the asset inventory verification exercise which were previously not recorded and from a change in the examination standard which requires the registration and condition of both rock and soil elements of mixed cuttings now to be recorded where previously only the predominant material was recorded has led to their inclusion.

As a result of the latter the number of rock cutting assets has increased by 5,012 nationally with the majority of this change being in London North Eastern (LNE) and East Midlands routes with increases of 3,383 and 1,105 respectively. The number of earthwork five chain lengths increased in seven routes and reduced in three. The largest reduction of assets occurred in Scotland with a reduction of 1,190 examination five chain lengths due to data cleansing and the removal of duplicate assets. Asset inventory verification is continuing in a number of routes, which are presently conducting route wide reviews, to establish positive confirmation of presence or absence of earthwork assets on a line of route basis.

There has been a slight increase (worsening) in the percentage of poor condition earthworks to 5.5 per cent from 5.2 per cent in 2013 and 4.9 per cent in 2012. This follows a decrease (improvement) in the percentage of poor condition earthworks from 5.4 per cent in 2011 to 4.9 per cent in 2012.

There has also been also been an increase in the percentage of marginal condition earthwork to 47.9 per cent in 2014 from 44.7 per cent in 2013 and 40.4 per cent in 2012.

In Scotland there has been large movement from serviceable condition asset to marginal condition asset in embankments and soil cuttings. This condition state change is mainly due to first time asset examination with the '065 examination standard', compared to the previous examination which was undertaken using the Scotland 'stereo oblique aerial photography method'.

CP4 overview

This measure was first reported in shadow form at the start of year two of CP4 and is now reported for the fourth consecutive year. Since it was first reported in the Annual Return in 2011/12 the asset count nationally has risen by 5.6 per cent, embankment asset count has risen by 1.5 per cent soil cuttings by 2.6 per cent and rock cuttings by 79 per cent. The large increase in the latter is due to a change in the examination standard in 2012 which required rock cutting elements of soil cuttings to be listed in the asset register and also examined separately.

Over the last four years the volume of poor condition assets has remained fairly constant and is now at 5.5 per cent compared to 5.3 per cent at the start of CP4 year two. The volume of marginal condition assets has increased and there has been a four per cent drift per annum of serviceable condition assets to marginal condition assets and there is now 47.9 per cent marginal condition assets compared to 40 per cent at the start of 2010/11.

Physical work is predominately focussed on renewal activity to address poor and marginal condition and highest risk slopes. This approach will be maintained going forward with the introduction of lower cost refurbishment work to treat a larger volume of assets. Also, in CP5 the earthworks and drainage policies and delivery plans will introduce planned maintenance work to serviceable assets. This will help to stabilise the asset in better condition and reduce the drift from serviceable to marginal condition.

The Buildings and Civils Asset Management (BCAM) transformation programme is ongoing and the development of the Civil Strategic Asset Management Solution (CSAMS) asset management database has now reached the detailed design phase. This will deliver significant improvements in data management, data quality and reporting and also improve the efficiency in the asset management process. Phase one deployment is currently planned for April 2015 and this will provide the routes with an enhanced tool to manage earthworks asset portfolios, monitor trends and direct investment to achieve planned outcomes.

Table 3.44: Earthwork condition scoring reporting methods by control period

Control period	*Asset*	*Top Poor*	*Poor*	*Marginal*	*Serviceable*
Control period 4	Embankment (SSHI)	n/a	≥ 10	> 6 and < 10	≤ 6
	Soil cutting (SSHI)	n/a	≥ 10	> 6 and < 10	≤ 6
	Rock Cutting (RSHI)	n/a	≥ 100	> 10 and < 100	≤ 10
Control period 5	Embankment (SSHI)	> 14.5	≥ 10 and ≤ 14.5	> 6 and < 10	≤ 6
	Soil cutting (SSHI)	> 14.5	≥ 10 and ≤ 14.5	> 6 and < 10	≤ 6
	Rock Cutting (RSHI)	> 200	≥ 100 and ≤ 200	> 10 and < 100	≤ 10

Table 3.45: Earthwork condition results per five chains by operational boundaries and CP4 reporting method, 2011/12 to 2013/14

			Poor	*Marginal*	*Serviceable*	*Total*
England & Wales	Embankment (SSHI)	2011/12	4,418	33,489	36,644	74,551
		2012/13	4,570	35,788	35,364	75,722
		2013/14	4,809	36,167	36,085	77,061
	Soil cutting (SSHI)	2011/12	2,064	22,813	26,387	51,264
		2012/13	2,208	25,137	25,400	52,745
		2013/14	2,325	25,691	25,324	53,340
	Rock Cutting (RSHI)	2011/12	538	2,673	2,556	5,767
		2012/13	548	3,246	2,937	6,477
		2013/14	734	5,964	4,572	11,270
	Total	2011/12	7,020	58,975	65,587	131,582
		2012/13	7,326	64,171	63,701	134,944
		2013/14	7,868	67,822	65,981	141,671
Scotland	Embankment (SSHI)	2011/12	641	3,188	13,404	17,233
		2012/13	728	4,965	11,265	16,958
		2013/14	877	7,613	7,579	16,069

Table 3.45 continued: Earthwork condition results per five chains by operational boundaries and CP4 reporting method, 2011/12 to 2013/14

			Poor	*Marginal*	*Serviceable*	*Total*
Scotland	Soil cutting (SSHI)	2011/12	296	3,012	10,112	13,420
		2012/13	427	4,435	8,685	13,547
		2013/14	456	5,974	6,597	13,027
	Rock Cutting (RSHI)	2011/12	160	1,221	583	1,964
		2012/13	195	1,523	652	2,360
		2013/14	255	1,591	733	2,579
	Total	2011/12	1,097	7,421	24,099	32,617
		2012/13	1,350	10,923	20,602	32,865
		2013/14	1,588	15,178	14,909	31,675
Network Total	Embankment (SSHI)	2011/12	5059	36,677	50,048	91,784
		2012/13	5,298	40,753	46,629	92,680
		2013/14	5,686	43,780	43,664	93,130
	Soil cutting (SSHI)	2011/12	2,360	25,825	36,499	64,684
		2012/13	2,635	29,572	34,085	66,292
		2013/14	2,781	31,665	31,921	66,367
	Rock Cutting (RSHI)	2011/12	698	3,894	3,139	7,731
		2012/13	743	4,769	3,589	8,837
		2013/14	989	7,555	5,305	13,849
	Total	**2011/12**	**8,117**	**66,396**	**89,686**	**164,199**
		2012/13	**8,676**	**75,094**	**84,303**	**167,809**
		2013/14	**9,456**	**83,000**	**80,890**	**173,346**

Table 3.46: Earthwork condition results per five chains by operational route and CP4 reporting method, 2011/12 to 2013/14

			Poor	*Marginal*	*Serviceable*	*Total*
Anglia	Embankment (SSHI)	2011/12	240	2,704	3,353	6,297
		2012/13	319	2,511	3,519	6,349
		2013/14	395	2,124	3,740	6,259
	Soil cutting (SSHI)	2011/12	85	2,050	2,007	4,142
		2012/13	105	1,860	2,155	4,120
		2013/14	122	1,666	2,312	4,100
	Rock Cutting (RSHI)	2011/12	1	5	13	19
		2012/13	4	5	14	23
		2013/14	4	8	16	28
	Total	2011/12	326	4,759	5,373	10,458
		2012/13	428	4,376	5,688	10,492
		2013/14	521	3,798	6,068	10,387
East Midlands	Embankment (SSHI)	2011/12	285	2,047	3,394	5,726
		2012/13	295	2,269	2,970	5,534
		2013/14	307	2,368	2,748	5,423
	Soil cutting (SSHI)	2011/12	88	1,302	1,844	3,234
		2012/13	106	1,435	1,593	3,134
		2013/14	105	1,534	1,420	3,059
	Rock Cutting (RSHI)	2011/12	7	77	106	190
		2012/13	21	93	83	197
		2013/14	65	720	560	1,345

Table 3.46 continued: Earthwork condition results per five chains by operational route and CP4 reporting method, 2011/12 to 2013/14

			Poor	*Marginal*	*Serviceable*	*Total*
East Midlands	Total	2011/12	380	3,426	5,344	9,150
		2012/13	422	3,797	4,646	8,865
		2013/14	477	4,622	4,728	9,827
Kent	Embankment (SSHI)	2011/12	231	1,411	2,361	4,003
		2012/13	231	1,345	2,428	4,004
		2013/14	235	1,354	2,421	4,010
	Soil cutting (SSHI)	2011/12	124	1,367	1,414	2,905
		2012/13	160	1,312	1,450	2,922
		2013/14	174	1,323	1,457	2,954
	Rock Cutting (RSHI)	2011/12	123	305	344	772
		2012/13	89	340	351	780
		2013/14	74	307	420	801
	Total	2011/12	478	3,083	4,119	7,680
		2012/13	480	2,997	4,229	7,706
		2013/14	483	2,984	4,298	7,765
London North Eastern	Embankment (SSHI)	2011/12	674	9,224	10,416	20,314
		2012/13	806	9,823	8,847	19,476
		2013/14	977	9,684	8,721	19,382
	Soil cutting (SSHI)	2011/12	195	4,898	6,808	11,901
		2012/13	228	5,381	5,868	11,477
		2013/14	414	5,378	5,502	11,294
	Rock Cutting (RSHI)	2011/12	29	638	647	1,314
		2012/13	77	809	669	1,555
		2013/14	236	2,677	1,952	4,865
	Total	2011/12	898	14,760	17,871	33,529
		2012/13	1,111	16,013	15,384	32,508
		2013/14	1,683	17,739	16,175	35,541
London North Western	Embankment (SSHI)	2011/12	919	6,523	6,833	14,275
		2012/13	986	7,326	6,835	15,147
		2013/14	888	7,513	7,250	15,651
	Soil cutting (SSHI)	2011/12	765	5,334	6,506	12,605
		2012/13	825	6,572	6,435	13,832
		2013/14	717	6,839	6,692	14,248
	Rock Cutting (RSHI)	2011/12	89	527	650	1,266
		2012/13	96	638	652	1,386
		2013/14	78	660	680	1,418
	Total	2011/12	1,773	12,384	13,989	28,146
		2012/13	1,907	14,536	13,922	30,365
		2013/14	1,683	15,012	14,622	31,317
Scotland	Embankment (SSHI)	2011/12	641	3,188	13,404	17,233
		2012/13	728	4,965	11,265	16,958
		2013/14	877	7,613	7,579	16,069
	Soil cutting (SSHI)	2011/12	296	3,012	10,112	13,420
		2012/13	427	4,435	8,685	13,547
		2013/14	456	5,974	6,597	13,027

Table 3.46 continued: Earthwork condition results per five chains by operational route and CP4 reporting method, 2011/12 to 2013/14

			Poor	*Marginal*	*Serviceable*	*Total*
Scotland	Rock Cutting (RSHI)	2011/12	160	1,221	583	1,964
		2012/13	195	1,513	652	2,360
		2013/14	255	1,591	733	2,579
	Total	2011/12	1,097	7,421	24,099	32,617
		2012/13	1,350	10,913	20,602	32,865
		2013/14	1,588	15,178	14,909	31,675
Sussex	Embankment (SSHI)	2011/12	209	1,226	1,659	3,094
		2012/13	205	1,167	1,712	3,084
		2013/14	106	1,284	1,680	3,070
	Soil cutting (SSHI)	2011/12	84	848	864	1,796
		2012/13	83	787	891	1,761
		2013/14	60	896	848	1,804
	Rock Cutting (RSHI)	2011/12	40	149	164	353
		2012/13	34	177	169	380
		2013/14	32	211	167	410
	Total	2011/12	333	2,223	2,687	5,243
		2012/13	322	2,131	2,772	5,225
		2013/14	198	2,391	2,695	5,284
Wales	Embankment (SSHI)	2011/12	797	3,759	1,994	6,550
		2012/13	660	4,324	2,131	7,115
		2013/14	777	4,685	2,546	8,008
	Soil cutting (SSHI)	2011/12	215	2,408	1,951	4,574
		2012/13	179	2,885	2,012	5,076
		2013/14	205	3,153	2,026	5,384
	Rock Cutting (RSHI)	2011/12	93	446	371	910
		2012/13	77	527	398	1,002
		2013/14	85	574	396	1,055
	Total	2011/12	1,105	6,613	4,316	12,034
		2012/13	916	7,736	4,541	13,193
		2013/14	1,067	8,412	4,968	14,447
Wessex	Embankment (SSHI)	2011/12	337	2,490	3,631	6,458
		2012/13	346	2,629	3,620	6,595
		2013/14	339	2,755	3,369	6,463
	Soil cutting (SSHI)	2011/12	131	1,977	2,599	4,707
		2012/13	128	2,029	2,525	4,682
		2013/14	133	2,053	2,488	4,674
	Rock Cutting (RSHI)	2011/12	36	62	65	163
		2012/13	10	83	81	174
		2013/14	12	150	90	252
	Total	2011/12	504	4,529	6,295	11,328
		2012/13	484	4,741	6,226	11,451
		2013/14	484	4,958	5,947	11,389
Western	Embankment (SSHI)	2011/12	726	4,105	3,003	7,834
		2012/13	722	4,394	3,302	8,418
		2013/14	785	4,400	3,610	8,795

Table 3.46 continued: Earthwork condition results per five chains by operational route and CP4 reporting method, 2011/12 to 2013/14

			Poor	*Marginal*	*Serviceable*	*Total*
Western	Soil cutting (SSHI)	2011/12	377	2,629	2,394	5,400
		2012/13	394	2,876	2,471	5,741
		2013/14	395	2,849	2,579	5,823
	Rock Cutting (RSHI)	2011/12	120	464	196	780
		2012/13	140	574	266	980
		2013/14	148	657	291	1,096
	Total	2011/12	1,223	7,198	5,593	14,014
		2012/13	1,256	7,844	6,039	15,139
		2013/14	1,328	7,906	6,480	15,714
Network Total	Embankment (SSHI)	2011/12	5,059	36,677	50,048	91,784
		2012/13	5,298	40,753	46,629	92,680
		2013/14	5,686	43,780	43,664	93,130
	Soil cutting (SSHI)	2011/12	2,360	25,825	36,499	64,684
		2012/13	2,635	29,572	34,085	66,292
		2013/14	2,781	31,665	31,921	66,367
	Rock Cutting (RSHI)	2011/12	698	3,894	3,139	7,731
		2012/13	743	4,759	3,335	8,837
		2013/14	989	7,555	5,305	13,849
	Total	**2011/12**	**8,117**	**66,396**	**89,686**	**164,199**
		2012/13	**8,676**	**75,084**	**84,049**	**167,809**
		2013/14	**9,456**	**83,000**	**80,890**	**173,346**

Table 3.47: Earthwork condition results per five chains by operational route boundaries and CP5 reporting method for 2013/14

		Not examined	*Unscored*	*Top Poor*	*Poor*	*Marginal*	*Serviceable*	*Total*
England & Wales	Embankment (SSHI)	1,094	197	176	4,790	37,284	39,130	82,671
	Soil cutting (SSHI)	608	187	282	1,992	26,047	27,354	56,470
	Rock Cutting (RSHI)	33	115	123	234	3,169	8,661	12,335
	Total	1,735	499	581	7,016	66,500	75,145	151,476
Scotland	Embankment (SSHI)	480	7	42	814	7,508	7,797	16,658
	Soil cutting (SSHI)	566	25	31	321	5,677	7,059	13,679
	Rock Cutting (RSHI)	75	2	64	109	1,354	1,133	2,737
	Total	1,131	34	137	1,244	14,539	15,989	33,074
Network Total	Embankment (SSHI)	1,584	204	218	5,604	44,792	46,927	99,329
	Soil cutting (SSHI)	1,174	212	313	2,313	31,724	34,413	70,149
	Rock Cutting (RSHI)	108	117	187	343	4,523	9,794	15,072
	Total	**2,866**	**533**	**718**	**8,260**	**81,039**	**91,134**	**184,550**

Table 3.48: Earthwork condition results per five chains by operational route and CP5 reporting method for 2013/14

		Not examined	*Unscored*	*Top Poor*	*Poor*	*Marginal*	*Serviceable*	*Total*
Anglia	Embankment (SSHI)	0	3	13	398	2,184	3,961	6,559
	Soil cutting (SSHI)	0	4	3	116	1,666	2,935	4,184
	Rock Cutting (RSHI)	0	2	0	0	7	22	31
	Total	0	9	16	514	3,857	6,738	10,774
East Midlands	Embankment (SSHI)	0	3	4	311	2,469	3,033	5,820
	Soil cutting (SSHI)	0	10	8	108	1,593	1,582	3,299
	Rock Cutting (RSHI)	0	5	2	11	84	1,299	1,394
	Total	0	18	14	170	4,146	5,914	10,513
Kent	Embankment (SSHI)	0	4	9	230	1,371	2,524	4,138
	Soil cutting (SSHI)	0	1	9	157	1,347	1,492	3,006
	Rock Cutting (RSHI)	0	23	13	53	283	474	846
	Total	0	28	31	440	2,001	4,490	7,990
London North Eastern	Embankment (SSHI)	268	83	31	1,009	10,255	10,246	21,892
	Soil cutting (SSHI)	74	76	28	345	5,497	6,510	12,530
	Rock Cutting (RSHI)	3	34	6	35	805	4,301	5,184
	Total	345	193	65	1,389	16,557	21,057	39,606
London North Western	Embankment (SSHI)	689	27	53	855	7,592	7,318	16,534
	Soil cutting (SSHI)	468	30	106	631	6,911	6,974	15,120
	Rock Cutting (RSHI)	12	8	11	21	564	1,071	1,687
	Total	1,169	65	170	1,507	15,067	15,363	33,341
Scotland	Embankment (SSHI)	490	7	42	814	7,508	7,797	16,658
	Soil cutting (SSHI)	566	25	31	321	5,677	7,059	13,679
	Rock Cutting (RSHI)	75	2	64	109	1,354	1,133	2,737
	Total	1,131	34	137	1,244	14,539	15,989	33,074
Sussex	Embankment (SSHI)	0	2	0	108	1,286	1,789	3,185
	Soil cutting (SSHI)	0	2	4	54	890	897	1,847
	Rock Cutting (RSHI)	0	12	6	7	158	256	439
	Total	0	16	10	169	2,334	2,942	5,471

Table 3.48 continued: Earthwork condition results per five chains by operational route and CP5 reporting method for 2013/14

		Not examined	*Unscored*	*Top Poor*	*Poor*	*Marginal*	*Serviceable*	*Total*
Wales	Embankment (SSHI)	126	34	27	748	4,741	2,670	8,346
	Soil cutting (SSHI)	65	22	23	144	3,105	2,170	5,529
	Rock Cutting (RSHI)	17	10	30	39	490	567	1,153
	Total	208	66	80	931	8,336	5,407	15,028
Wessex	Embankment (SSHI)	0	6	5	343	2,857	3,641	6,852
	Soil cutting (SSHI)	0	11	37	97	2,071	2,569	4,785
	Rock Cutting (RSHI)	0	13	3	7	97	156	276
	Total	0	30	45	447	5,025	6,366	11,913
Western	Embankment (SSHI)	11	35	34	788	4,529	3,948	9,345
	Soil cutting (SSHI)	1	31	64	342	2,967	2,765	6,170
	Rock Cutting (RSHI)	1	8	52	68	681	515	1,325
	Total	13	74	150	1,198	8,177	7,228	16,840
Network Total	Embankment (SSHI)	1,584	204	218	5,604	44,792	46,927	99,329
	Soil cutting (SSHI)	1,174	212	313	2,313	31,724	34,413	70,149
	Rock Cutting (RSHI)	108	117	187	343	4,523	9,794	15,072
	Total	**2,866**	**533**	**718**	**8,260**	**81,039**	**91,134**	**184,550**

Earthwork failures (M6)

Definition

This measure reports the annual number of rock falls, soil slips, slides or flows in a cutting, natural slope, or embankment on running lines. Failures causing a passenger or freight train derailment are recorded separately.

Reporting method

All earthwork failures are reported following occurrence and throughout the year. Relevant incidents which have been reported in the daily national incident log are recorded if they fall within the M6 definition.

Reporting confidence

The confidence rating for Earthworks Failure measure is A2, as assigned by the independent reporter.

Results

England & Wales, Scotland and overall network results

- Table 3.49 shows the number of sites of earthworks failures for England & Wales, Scotland, and for the whole network for each year of CP4.

Operating route results

Data for each operating route is shown as follows:

- Table 3.50 shows the number of sites of earthworks failures for each year of CP4
- Table 3.51 shows the earthwork failures that have occurred in each condition category as defined in Table 3.44 in the M33 measure commentary for each year of CP4.

Commentary

The total number of earthwork failures nationally in 2013/14 was 127, which is a reduction from 144 in 2012/13. There were no train derailments due to earthwork failures. There were ten passenger train collisions and one freight train collision due to failed earthworks. There were no injuries as a result of any of these collisions.

Until December 2013 there had been very few earthwork failures. However, since then southern England has experienced the wettest January since 1910 and the highest winter rainfall in parts of southern England & Wales in over 240 years.

There was a large increase in earthwork failures in Kent in 2013/14 compared to previous years. This was due to heavy winter rainfall conditions leading to saturation of ground and high ground water table in chalk geology. This is prevalent in south east England, and led to an increase in both cutting and embankment failures in Kent.

There were significant reductions in earthwork failures in 2013/14 in London North Western, London North Eastern, Western and Scotland compared to 2012/13 in which there had been significant widespread adverse weather. The asset performance under such poor weather conditions, as in 2012/13 suffered. A forensic review of all failures in 2013/14 is being undertaken to derive learning on asset resilience, trigger conditions and to support consideration of further improvements in asset management, risk assessment and control measures to those currently planned.

Table 3.49: Earthwork failures in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	45	29	12	125	118
Scotland	12	13	16	19	9
Network Total	**57**	**42**	**28**	**144**	**127**

Table 3.50: Earthwork failures in CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	2	0	1	2	7
East Midlands	0	0	1	1	3
Kent	4	2	1	5	48
London North Eastern	4	1	1	20	7
London North Western	10	8	1	42	19
Scotland	12	13	16	19	9
Sussex	5	2	0	4	7
Wales	9	2	5	6	5
Wessex	2	2	1	8	11
Western	9	12	1	37	11
Network Total	**57**	**42**	**28**	**144**	**127**

Table 3.51: Earthwork failures for 2011/12, 2012/13, 2013/14 by condition grade and operating route

		Poor	*Marginal*	*Serviceable*	*No Condition Grade*	*Total*
Anglia	2011/12	0	0	0	1	1
	2012/13	1	1	0	0	2
	2013/14	2	3	1	1	7
East Midlands	2011/12	0	1	0	0	1
	2012/13	0	1	0	0	1
	2013/14	2	1	0	0	3
Kent	2011/12	0	0	1	0	1
	2012/13	1	1	3	0	5
	2013/14	9	25	9	5	48
London North Eastern	2011/12	0	0	1	0	1
	2012/13	1	9	6	4	20
	2013/14	3	2	2	0	7

Table 3.51 continued: Earthwork failures for 2011/12, 2012/13, 2013/14 by condition grade and operating route

		Poor	*Marginal*	*Serviceable*	*No Condition Grade*	*Total*
London North Western	2011/12	0	0	1	0	1
	2012/13	11	16	9	6	42
	2013/14	7	9	2	1	19
Scotland	2011/12	2	8	6	0	16
	2012/13	3	7	7	2	19
	2013/14	3	5	1	0	9
Sussex	2011/12	0	0	0	0	0
	2012/13	1	3	0	0	4
	2013/14	3	4	0	0	7
Wales	2011/12	2	3	0	0	5
	2012/13	0	5	1	0	6
	2013/14	0	5	0	0	5
Wessex	2011/12	1	0	0	0	1
	2012/13	2	1	3	2	8
	2013/14	3	4	3	1	11
Western	2011/12	1	0	0	0	1
	2012/13	17	13	5	2	37
	2013/14	2	6	0	3	11
Network Total	**2011/12**	**6**	**12**	**9**	**1**	**28**
	2012/13	**37**	**57**	**34**	**16**	**144**
	2013/14	**34**	**64**	**18**	**11**	**127**

The improved Adverse Weather Management Plans (Rainfall) were completed in 2013/14 and deployed in every route. These plans together with other mitigation measures successfully enabled effective management of the safety consequences of asset failures.

An increase in remote condition monitoring is planned for CP5 and forms part of the Network Rail Technical Strategy and Intelligent Infrastructure programme. A range of detection and monitoring systems are being investigated and piloted, including fibre optic cable detection of rockfall, satellite observation for general ground movements and widespread development of geotechnical sensors linked to operational web based systems.

CP4 overview

Over CP4 the number of failures in a year has ranged from 28 to 144, with the infrastructure being subjected to severe weather over the last two years. Across the network, 2012/13 was the wettest year for over 100 years and in 2013/14 the south of England had the wettest January and February for 250 years.

Earthwork failures have resulted in eight train derailments over the control period, one in 2009/10, one in 2010/11 and six in 2013/14.

Failures have been reviewed and analysed in detail and have informed the development and content of the CP5 Earthworks and Drainage Policies and also the development of Examination Standards. Also in 2013/14, following a risk assessment of the whole of the network, improved Adverse Weather Management Plans were introduced in every route.

Tunnel condition (M30)

Definition

The tunnel condition score is a measure of the average condition of tunnel bores and tunnel portals (both marked on a 100 point scale) with 100 representing the best possible condition and zero representing the worst possible condition. The scoring system and resulting score is standardised and termed Tunnel Condition Marking Index (TCMI). The system, which was launched in 2009/10, covers all Network Rail managed tunnels with brickwork or masonry linings. Scores are derived separately for the tunnel bores (including shaft eyes situated within the bore) and tunnel portals. The unlined sections in 32 tunnels do not attract a TCMI score.

Reporting method

Each time a detailed examination of a tunnel is carried out, the standard defect coding within the report representing severity and the extent of all structurally significant defects generates a condition score for the tunnel. The scores range from 100 for

the best condition descending to zero for the worst condition.

Each tunnel asset is sub-divided into components such as bores and portals. Tunnel bores are broken down in to 20 metre lengths termed tunnel sections (also termed major elements within the TCMI scoring system). These split horizontally to form smaller discrete areas known as minor elements for condition reporting at a higher resolution, as shown in Figure 3.9. Similarly, tunnel portals are also split into major and minor elements as shown in Figure 3.10.

Each time a detailed examination of a tunnel is undertaken all significant defects are coded for severity and extent. This in turn calculates a condition score for each minor element.

This year's Annual Return continues to report on the greater level of condition granularity introduced in 2012 /13.

Minor element data sets continue to be used as the reporting level and so a more accurate depiction of condition, rates of change due to degradation and intervention can be provided by reporting on the entire number of tunnel minor element scores. We intend to continue to report using this measure in future years so as to allow a direct comparison year on year. The data for 2011/12 through to 2013/14 has been provided as it represents the first three years with sufficient and comparable data since the introduction of TCMI.

It was stated in last year's Annual Return that shaft TCMI would be implemented in 2013/14. This has not happened due to user testing and further TCMI audit work requiring some redesign of the TCMI version in which the shaft data is collected. It is likely that shaft TCMI will be rolled out in 2014/15 following that redesign. The development for TCMI scoring for ancillary tunnel components, such as cross passages and adits, and other bore lining types such as segmental linings and jack arches, are complete and are expected to be implemented coincident with the shaft TCMI.

Reporting confidence

We have developed the TCMI scoring system to incorporate all tunnel lining defect types that contribute to overall condition. Engineering principles and judgment have been used to generate an algorithm with appropriate defect weightings to produce a score that reflects the condition of the tunnel.

As TCMI was rolled out for the first time late in 2009/10, it was considered prudent to carry out a calibration exercise once sufficient data had been accumulated and to check whether scores reflected the perceived condition of the tunnel sections. This exercise was carried out in December 2010 by six engineers (three independent parties) to score a sample of tunnel sections using TCMI principles to represent their opinion of the tunnel section condition within that sample set. Those scores were then compared with those obtained through the examination process in the field.

We decided that, although not absolutely necessary, a small recalibration of the algorithm would be prudent in the interest of completeness of the system development and would be implemented in a future version of the TCMI software. This is now likely to take place in 2014/15 when the next version of TCMI is rolled out. During the statistical analysis in preparation for this year's Annual Return, it was identified that approximately one in 1,000 minor element scores was incorrect and had to be recalculated. Further investigation into this issue may indicate that remediation could be included in the next version of TCMI. This will be monitored in future audits. Since the screening of the data identified this issue and corrective action was taken there will be no impact on the overall scores and the more critical factor of monitoring change in condition will be unaffected.

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Results

Figure 3.9 shows the major and minor elements of a tunnel bore. Figure 3.10 shows the major and minor elements of a tunnel portal.

CP4 results

The tables and figures within this section present the condition data for tunnel bores and portals for England & Wales and Scotland for the years 2010/11 through to 2013/14.

England & Wales results

- Table 3.52 shows the tunnel bore minor element condition scores for England & Wales for 2010/11 through to 2013/14
- Figure 3.11 shows the tunnel bore minor element condition scores for England & Wales in 2013/14
- Figure 3.12 depicts the percentage of minor elements in condition score bands for tunnel bores in England & Wales for 2011/12 to 2013/14
- Figure 3.13 depicts the percentage of minor elements in condition score bands for tunnel bores in England & Wales for 2011/12 to 2013/14 but has the vertical percentage axis zoomed in to the bands showing the greatest change in condition; to provide greater visibility of the small changes

- Table 3.53 shows the tunnel portal minor element condition scores for England & Wales for 2011/12 to 2013/14
- Figure 3.14 shows the tunnel portal minor element condition scores for England & Wales in 2013/14
- Figure 3.15 depicts the percentage of minor elements in condition score bands for tunnel portals in England & Wales for 2011/12 to 2013/14
- Figure 3.16 depicts the percentage of minor elements in condition score bands for tunnel portals in England & Wales for 2011/12 to 2013/14 but has the vertical percentage axis zoomed in to the bands showing the greatest change in condition; to provide greater visibility of the small changes.

Scotland results

- Table 3.54 shows the tunnel bore minor element condition scores for Scotland for 2010/11 through to 2013/14
- Figure 3.17 shows the tunnel bore minor element condition scores for Scotland in 2013/14
- Figure 3.18 depicts the percentage of minor elements in condition score bands for tunnel bores in Scotland for 2011/12 to 2013/14
- Figure 3.19 depicts the percentage of minor elements in condition score bands for tunnel bores in Scotland for 2011/12 to 2013/14 but has the vertical percentage axis zoomed in to the bands showing the greatest change in condition; to provide greater visibility of the small changes
- Table 3.55 shows the tunnel portal minor element condition scores for Scotland for 2011/12 to 2013/14
- Figure 3.20 shows the tunnel portal minor element condition scores for Scotland in 2013/14
- Figure 3.21 depicts the percentage of minor elements in condition score bands for tunnel portals in Scotland for 2010/11 to 2013/14
- Figure 3.22 depicts the percentage of minor elements in condition score bands for tunnel portals in Scotland for 2011/12 to 2013/14 but has the vertical percentage axis zoomed in to the bands showing the greatest change in condition; to provide greater visibility of the small changes.

Data on tunnel condition in this report has been included since 2010/11. The first year of CP4, 2009/10, has been omitted as it was the first year of TCMI implementation, with a disproportionately low number of TCMI returns including this year would introduce misleading condition representation.

Commentary

The detailed tunnel examination reports that generate TCMI were first implemented in September 2009 with delivery to Network Rail commencing in October 2009. Prior to the TCMI implementation date, tunnels were examined using subjective observation resulting in a tunnel rating of good, fair or poor. With the subjective nature of the former examination process, there were limitations in understanding the relative condition of the tunnel stock across the country and from one year to the next. TCMI had brought about improvements in this area.

For terms of reference it should be considered that the score bands of:

- zero to 20 represents very poor condition
- 20 to 40 represents poor condition
- 40 to 80 represents fair condition
- over 80 represents good condition.

This year there has been a small increase in the number of bore minor elements in the very poor condition bands, where the score is less than 20, for England & Wales, as shown in Figure 3.11. This can be attributed to the inclusion of Old Corbridge disused tunnel in the 2013/14 TCMI data for the first time where there are over 50 tunnel bore minor elements with a score of less than 20, or in the very poor condition band. Other changes in condition are still very small and should be viewed as being attributed to variances due to the TCMI system being in its relative infancy with some teething issues following embedment, such as examiners becoming accustomed to the introduction of the new system.

The TCMI minor element scores for portals continue to show fluctuations. This again may be attributed to system embedment and that fact that portals now continue to be subjected to greater levels of detail than previously undertaken when conducting detailed examinations and collecting TCMI data.

CP4 overview

During CP4 the national tunnel stock, in the short period in which the more objective condition monitor (TCMI) has been in use, is showing a relatively steady state condition throughout the network for both tunnel bores and portals. At this stage of TCMI implementation, any small fluctuations in condition will need to be viewed with caution as it will most likely be attributable to system embedment issues as described above.

Taking the view that some of the variance in the data through CP4 will be attributed to the TCMI system embedment, going forward, it will be beneficial to monitor the trend in the slight migration year on year of minor element numbers in the good bands towards those numbers in the fair and poor bands.

Figure 3.9: Tunnel bore major and minor elements

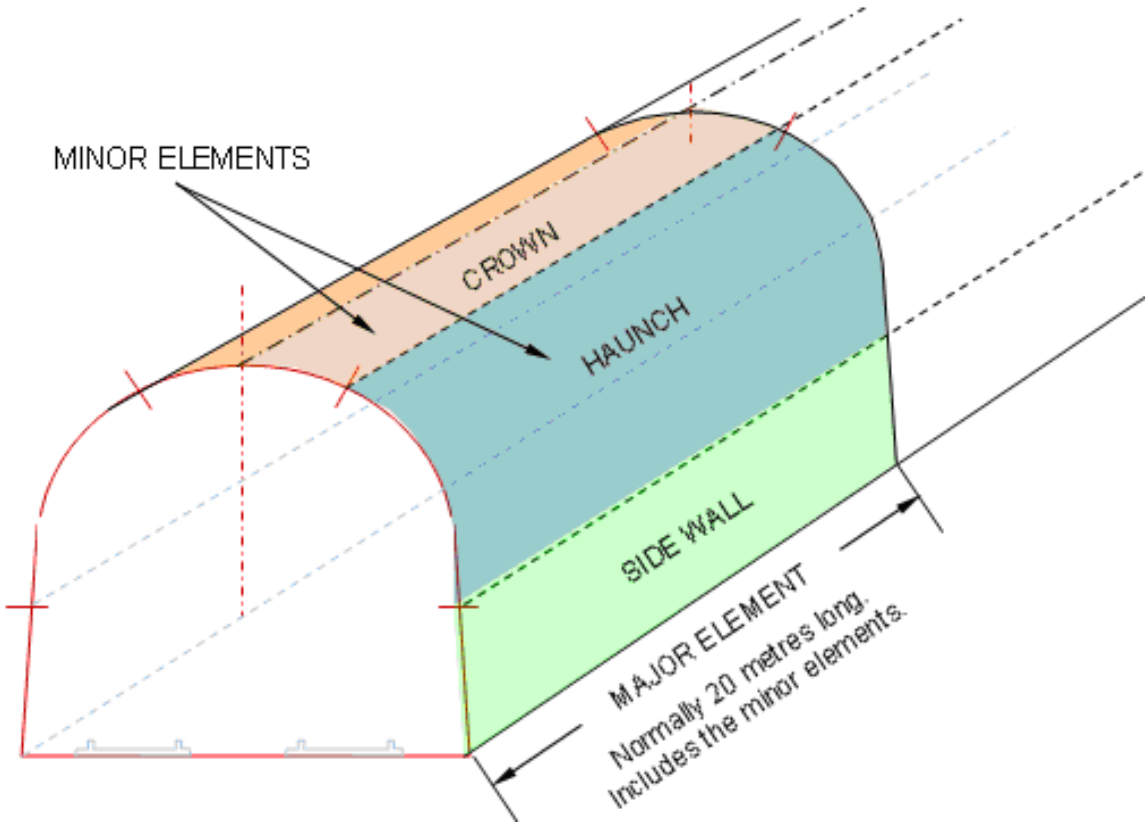


Figure 3.10: Tunnel portal major element indicating minor elements

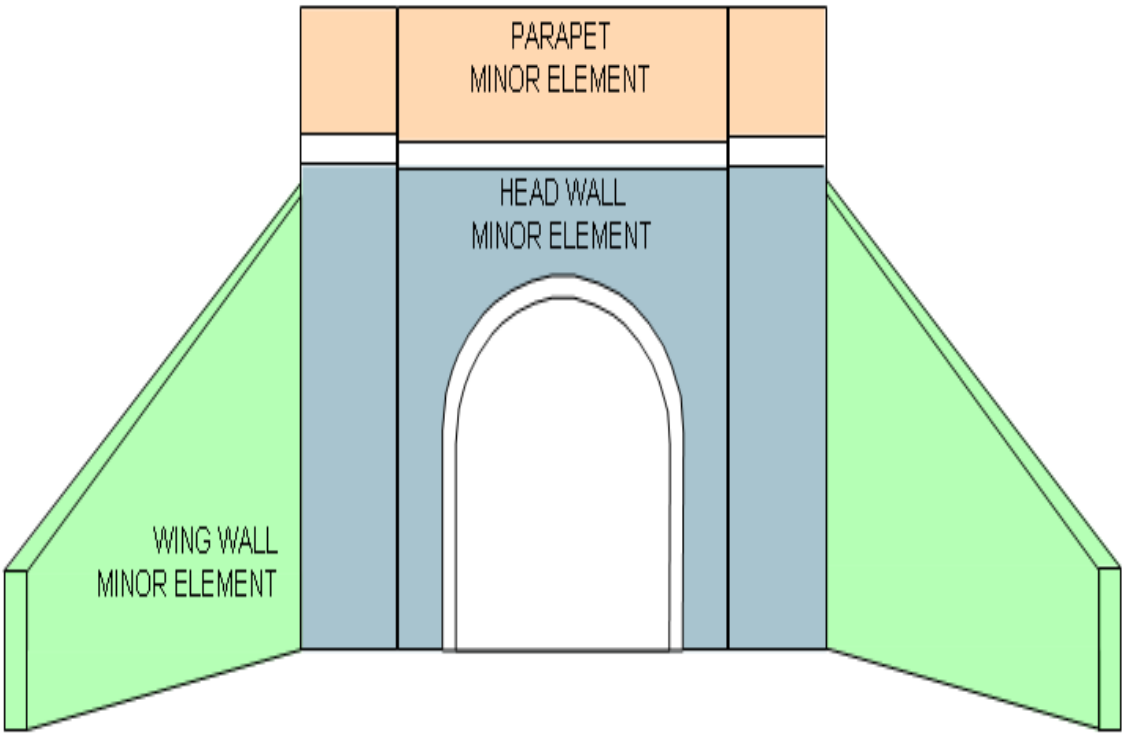


Table 3.52: Tunnel bore minor element scores for England & Wales for 2010/11 through to 2013/14

Condition Band		*2010/11*	*2011/12*	*2012/13*	*2013/14*
0 – 10	No. of minor elements	7	13	17	28
	Percentage of population (%)	0.01	0.01	0.02	0.03
10 – 20	No. of minor elements	32	55	58	104
	Percentage of population (%)	0.04	0.06	0.06	0.10
20 – 30	No. of minor elements	98	154	167	181
	Percentage of population (%)	0.13	0.16	0.16	0.17
30 – 40	No. of minor elements	350	495	542	570
	Percentage of population (%)	0.45	0.51	0.52	0.54
40 – 50	No. of minor elements	831	1129	1241	1343
	Percentage of population (%)	1.07	1.17	1.20	1.27
50 – 60	No. of minor elements	2056	2638	2974	3238
	Percentage of population (%)	2.65	2.72	2.87	3.05
60 – 70	No. of minor elements	4445	5791	6251	6714
	Percentage of population (%)	5.72	5.98	6.04	6.33
70 – 80	No. of minor elements	7705	10211	11111	11941
	Percentage of population (%)	9.91	10.54	10.73	11.25
80 – 90	No. of minor elements	15081	19379	20666	21315
	Percentage of population (%)	19.40	20.01	19.97	20.09
90 – 100	No. of minor elements	47141	56982	60481	60686
	Percentage of population (%)	60.64	58.84	58.43	57.19

Notes:
Bore minor elements assumed to be all crowns, haunch and sidewalls.

Figure 3.11: Tunnel bore minor element scores for England & Wales in 2013/14

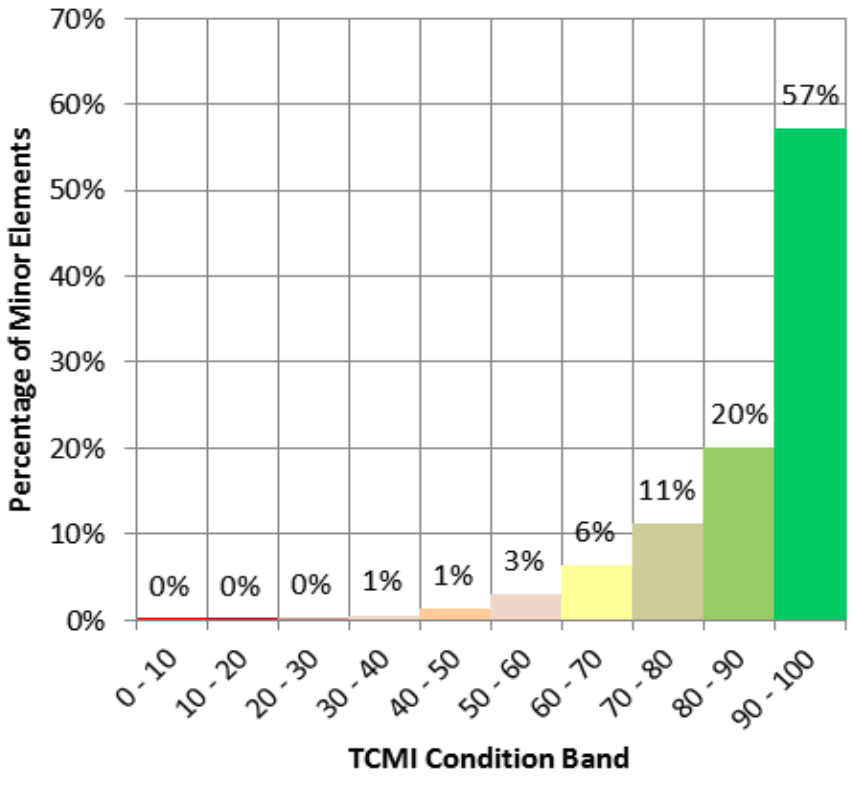


Figure 3.12: Tunnel bore minor element scores for England & Wales

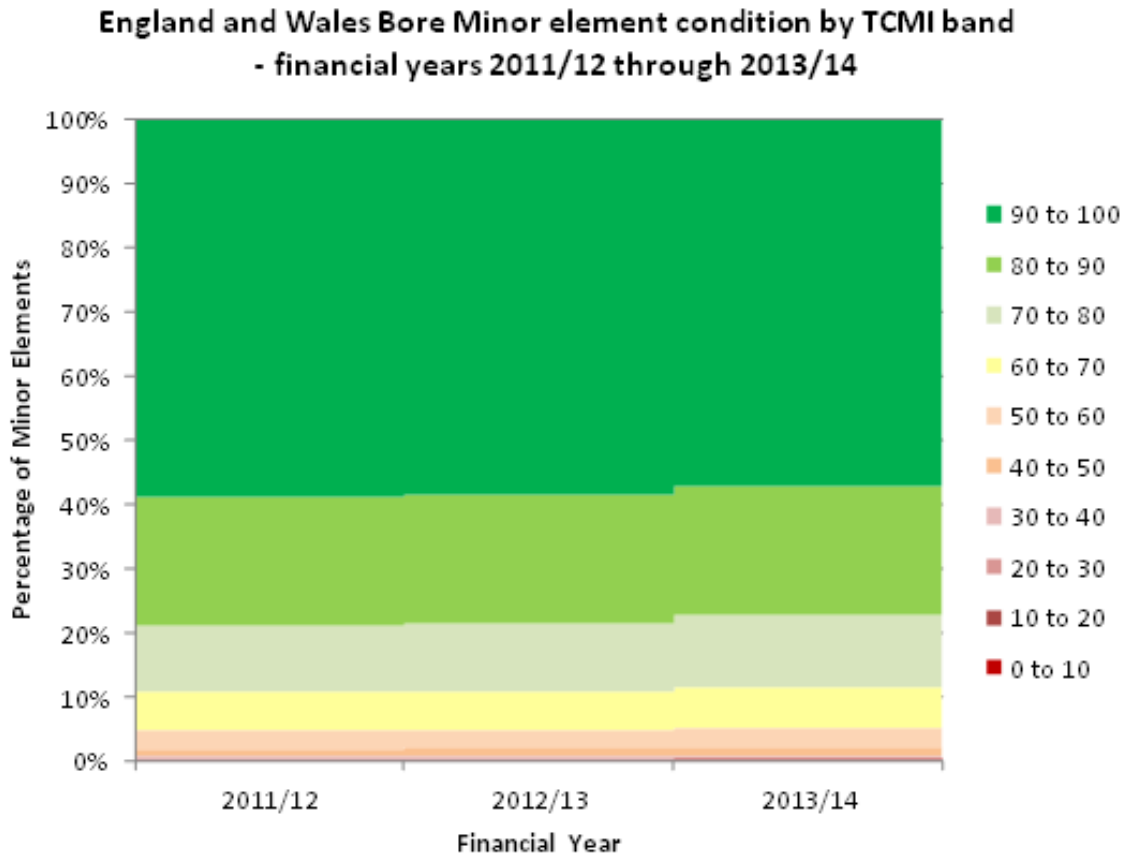


Figure 3.13: Tunnel bore minor element scores for England & Wales zoomed in to indicate condition bands where changes have occurred

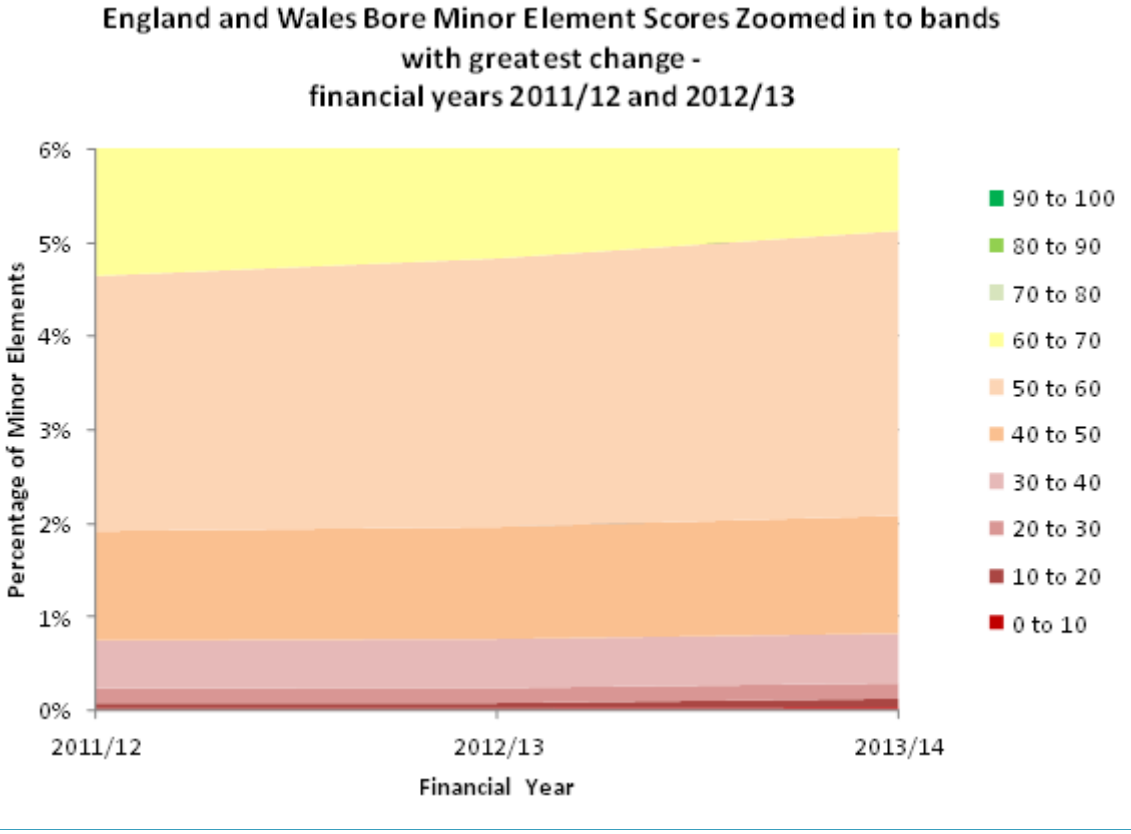


Table 3.53: Tunnel portal minor element scores for England & Wales for 2010/11 through to 2013/14

Condition Band		*2010/11*	*2011/12*	*2012/13*	*2013/14*
0 – 10	No. of minor elements	1	7	7	8
	Percentage of population (%)	0.09	0.42	0.35	0.30
10 – 20	No. of minor elements	8	9	10	18
	Percentage of population (%)	0.74	0.54	0.50	0.67
20 – 30	No. of minor elements	2	11	13	23
	Percentage of population (%)	0.19	0.66	0.64	0.86
30 – 40	No. of minor elements	10	30	33	57
	Percentage of population (%)	0.93	1.79	1.63	2.13
40 – 50	No. of minor elements	19	38	44	69
	Percentage of population (%)	1.76	2.27	2.18	2.58
50 – 60	No. of minor elements	23	51	67	101
	Percentage of population (%)	2.13	3.04	3.32	3.77
60 – 70	No. of minor elements	33	65	84	120
	Percentage of population (%)	3.05	3.88	4.16	4.48
70 – 80	No. of minor elements	69	108	135	209
	Percentage of population (%)	6.38	6.44	6.68	7.81
80 – 90	No. of minor elements	109	201	230	354
	Percentage of population (%)	10.08	11.99	11.39	13.22
90 – 100	No. of minor elements	807	1156	1397	1718
	Percentage of population (%)	74.65	68.97	69.16	64.18

Notes:
Portal minor elements assumed to be all parapets, head walls and wing walls.

Figure 3.14: Tunnel portal minor element scores for England & Wales in 2013/14

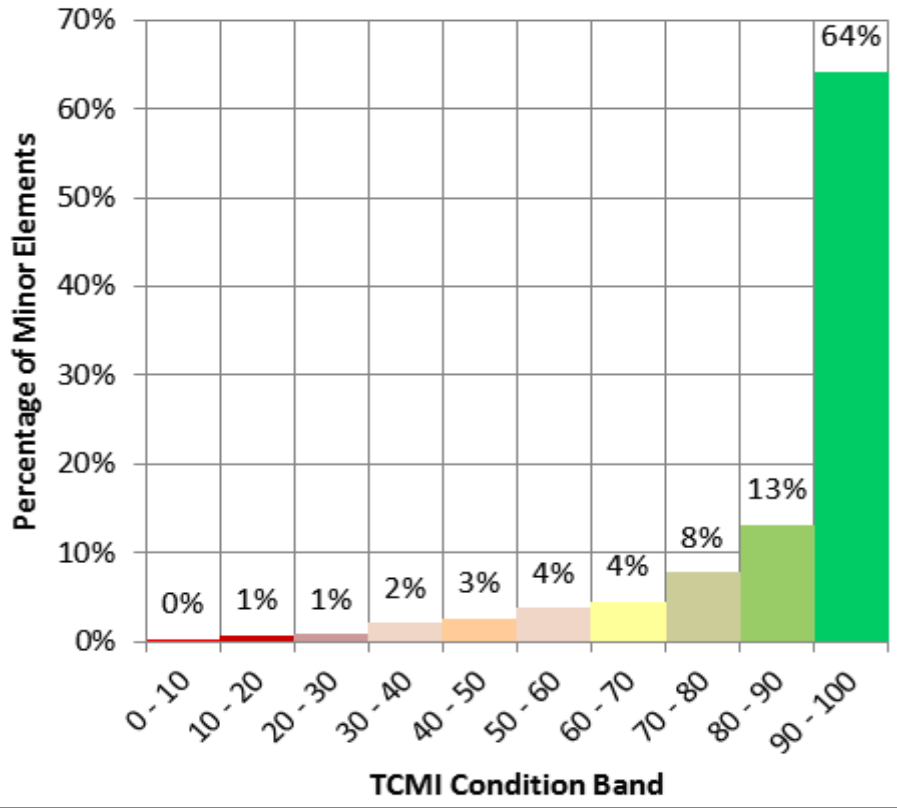


Figure 3.15: Tunnel portal minor element scores for England & Wales

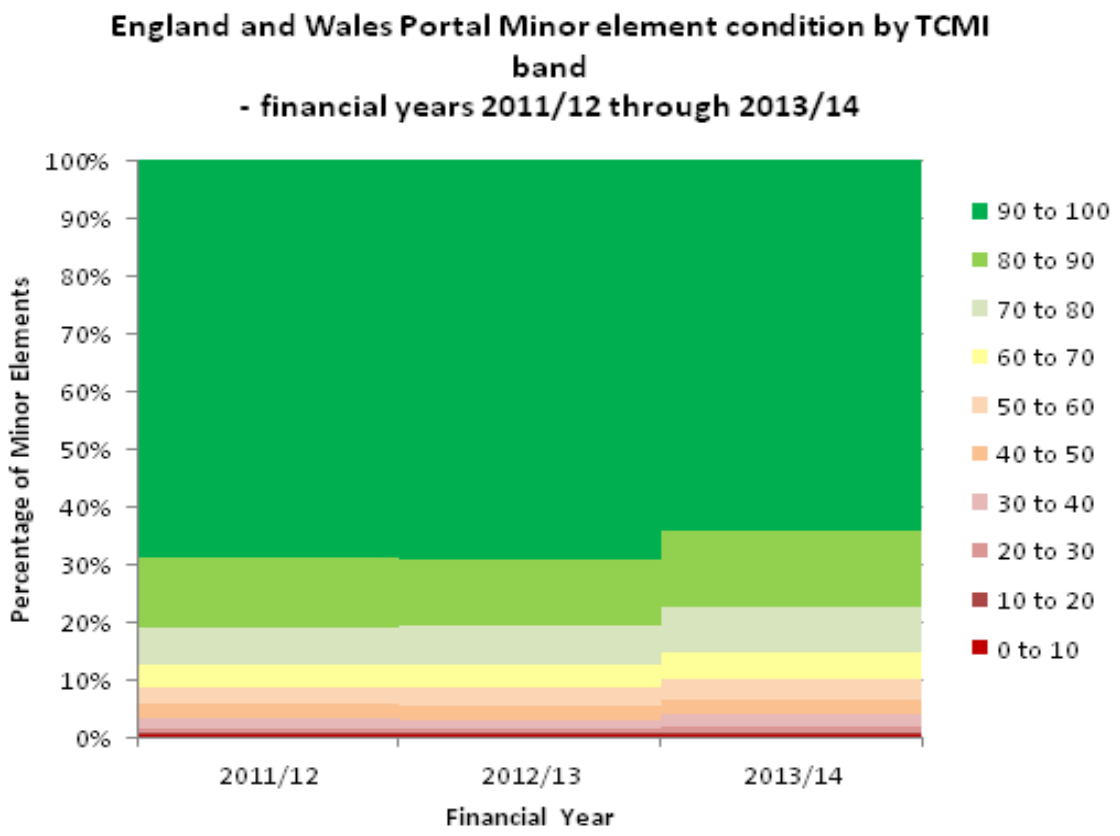


Figure 3.16: Tunnel portal minor element scores for England & Wales zoomed in to indicate condition bands where changes have occurred

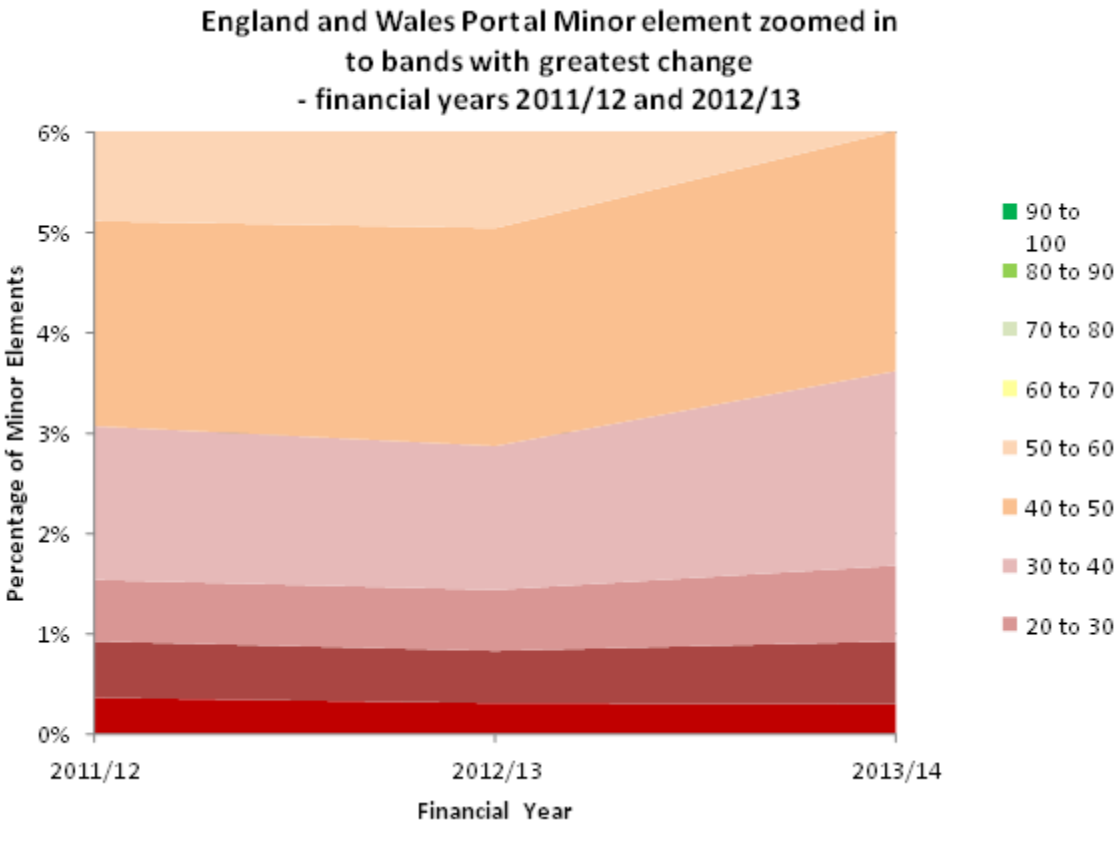


Table 3.54: Tunnel bore minor element scores for Scotland for 2010/11 through to 2013/14

Condition Band		*2010/11*	*2011/12*	*2012/13*	*2013/14*
0 – 10	No. of minor elements	0	0	0	0
	Percentage of population (%)	0.00	0.00	0.00	0.00
10 – 20	No. of minor elements	1	0	0	0
	Percentage of population (%)	0.01	0.00	0.00	0.00
20 – 30	No. of minor elements	3	1	2	2
	Percentage of population (%)	0.04	0.01	0.02	0.02
30 – 40	No. of minor elements	7	8	12	13
	Percentage of population (%)	0.09	0.10	0.15	0.16
40 – 50	No. of minor elements	21	29	27	30
	Percentage of population (%)	0.28	0.35	0.33	0.36
50 – 60	No. of minor elements	93	88	104	123
	Percentage of population (%)	1.25	1.06	1.26	1.49
60 – 70	No. of minor elements	362	386	381	394
	Percentage of population (%)	4.88	4.65	4.62	4.78
70 – 80	No. of minor elements	619	691	693	693
	Percentage of population (%)	8.34	8.32	8.40	8.41
80 – 90	No. of minor elements	1432	1547	1526	1518
	Percentage of population (%)	19.30	18.62	18.50	18.43
90 – 100	No. of minor elements	4883	5557	5504	5463
	Percentage of population (%)	65.80	66.90	66.72	66.33

Notes:
Bore minor elements assumed to be all crowns, haunch and sidewalls.

Figure 3.17: Tunnel bore minor element scores for Scotland in 2013/14

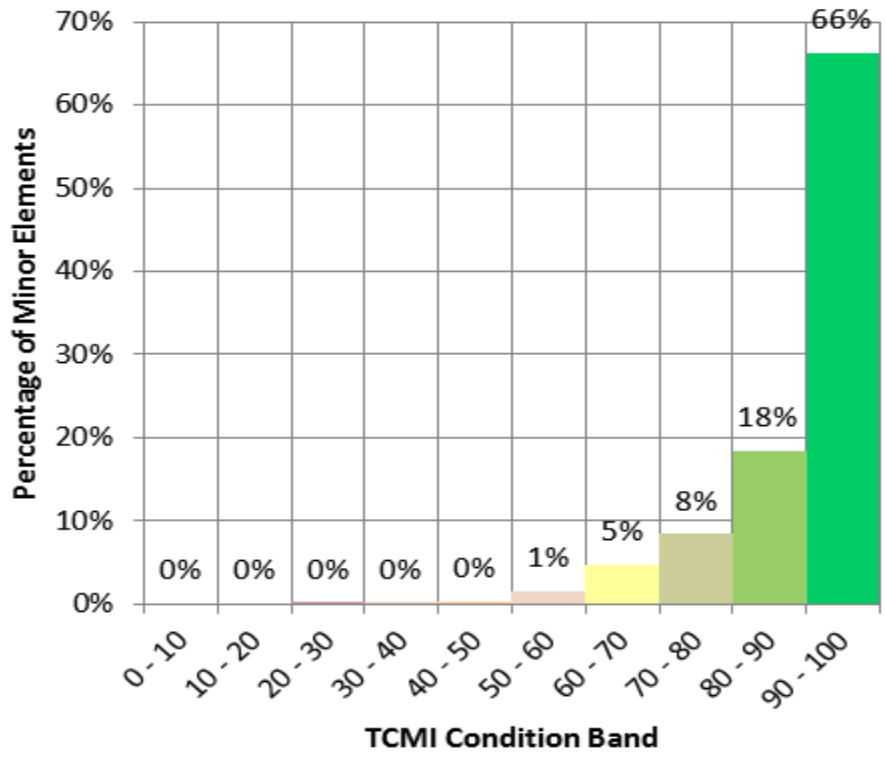


Figure 3.18: Tunnel bore minor element scores for Scotland

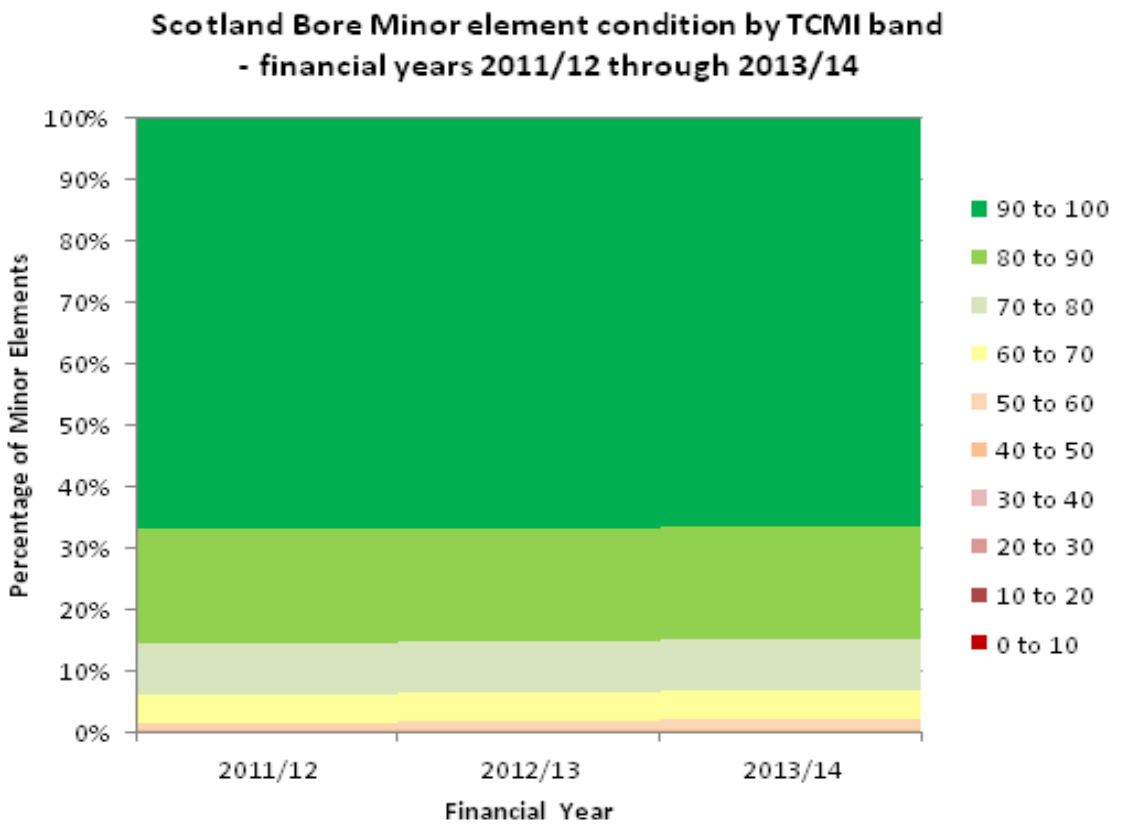


Figure 3.19: Tunnel bore minor element scores for Scotland zoomed in to indicate condition bands where changes have occurred

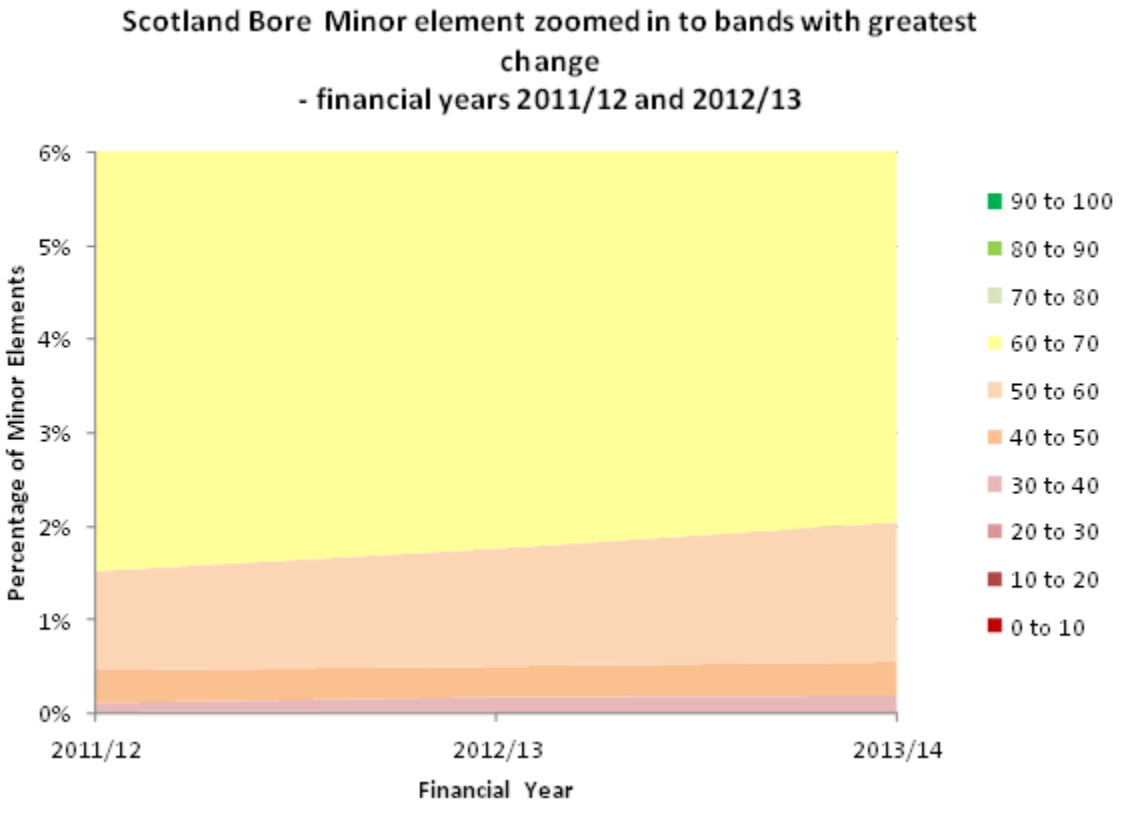


Table 3.55: Tunnel portal minor element scores for Scotland for 2010/11 through to 2013/14

Condition Band		*2010/11*	*2011/12*	*2012/13*	*2013/14*
0 – 10	No. of minor elements	0	0	0	1
	Percentage of population (%)	0.00	0.00	0.00	0.26
10 – 20	No. of minor elements	2	2	2	1
	Percentage of population (%)	1.01	0.73	0.73	0.26
20 – 30	No. of minor elements	0	1	1	1
	Percentage of population (%)	0.00	0.36	0.36	0.26
30 – 40	No. of minor elements	0	0	0	2
	Percentage of population (%)	0.00	0.00	0.00	0.52
40 – 50	No. of minor elements	2	2	6	6
	Percentage of population (%)	1.01	0.73	2.17	1.55
50 – 60	No. of minor elements	2	3	2	9
	Percentage of population (%)	1.01	1.09	0.73	2.32
60 – 70	No. of minor elements	0	2	2	4
	Percentage of population (%)	0.00	0.73	0.73	1.03
70 – 80	No. of minor elements	2	8	9	6
	Percentage of population (%)	1.01	2.90	3.26	1.55
80 – 90	No. of minor elements	40	47	57	63
	Percentage of population (%)	20.20	17.03	20.65	16.24
90 – 100	No. of minor elements	150	211	197	295
	Percentage of population (%)	75.76	76.45	71.38	76.03

Notes:
Portal minor elements assumed to be all parapets, head walls and wing walls.

Figure 3.20: Tunnel portal minor element scores for Scotland in 2013/14

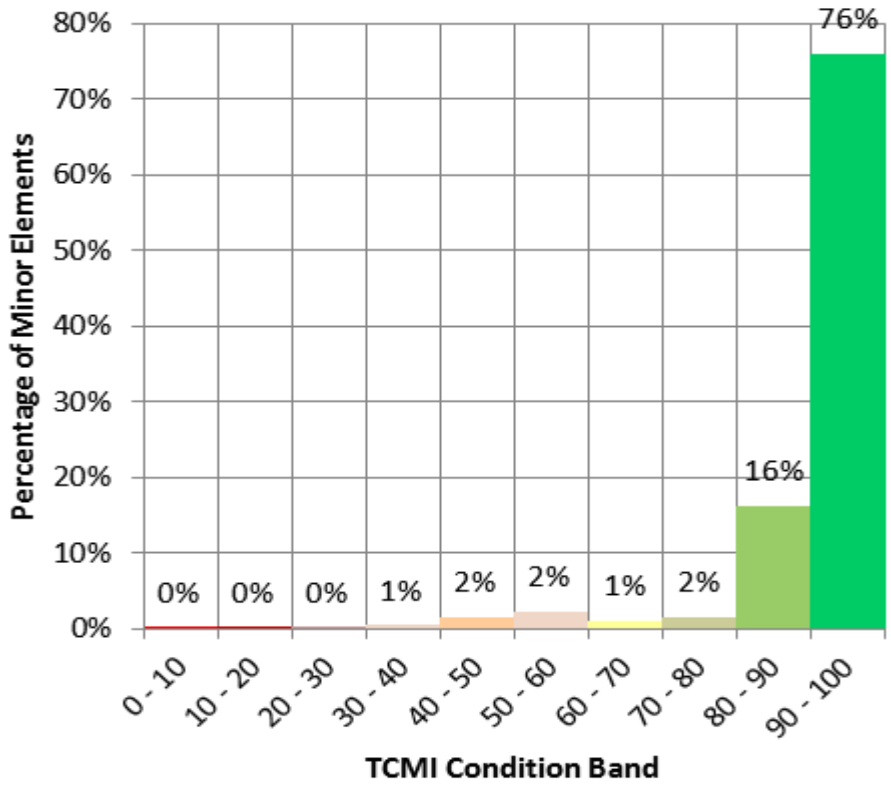


Figure 3.21: Tunnel portal minor element scores for Scotland

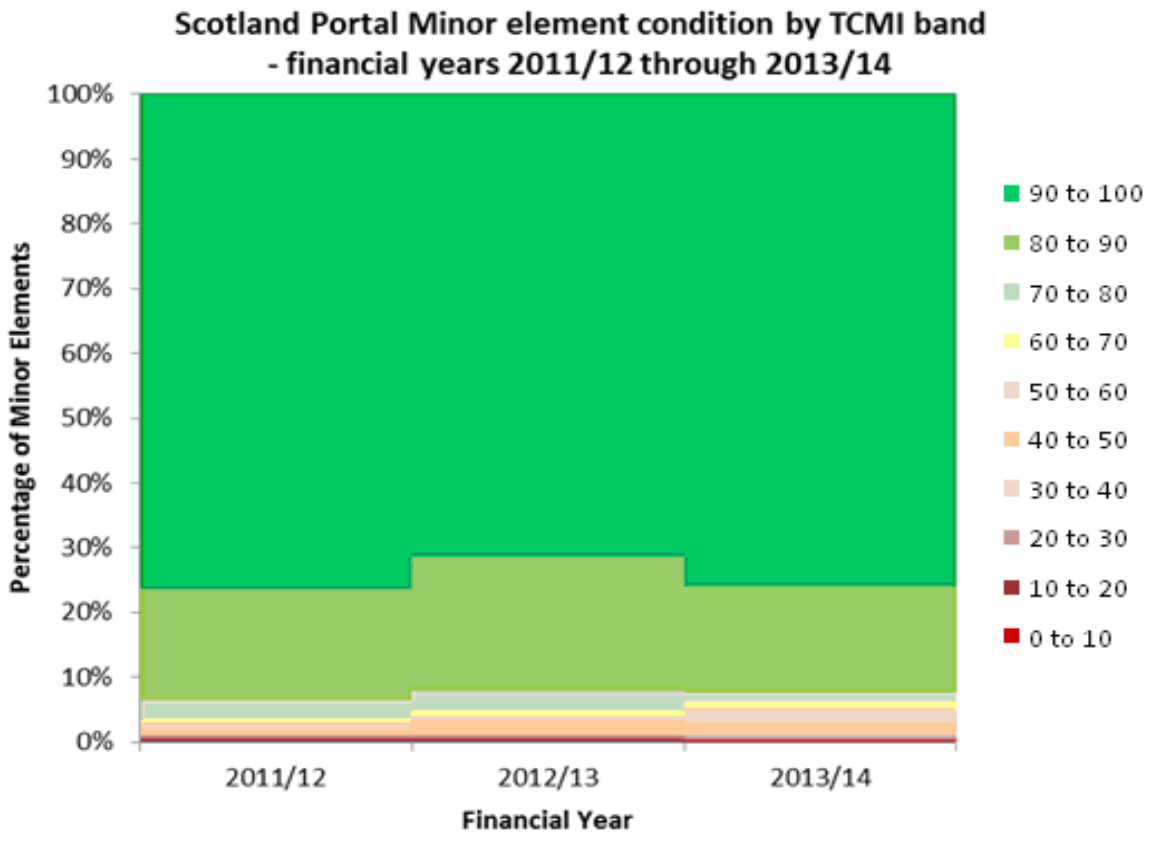
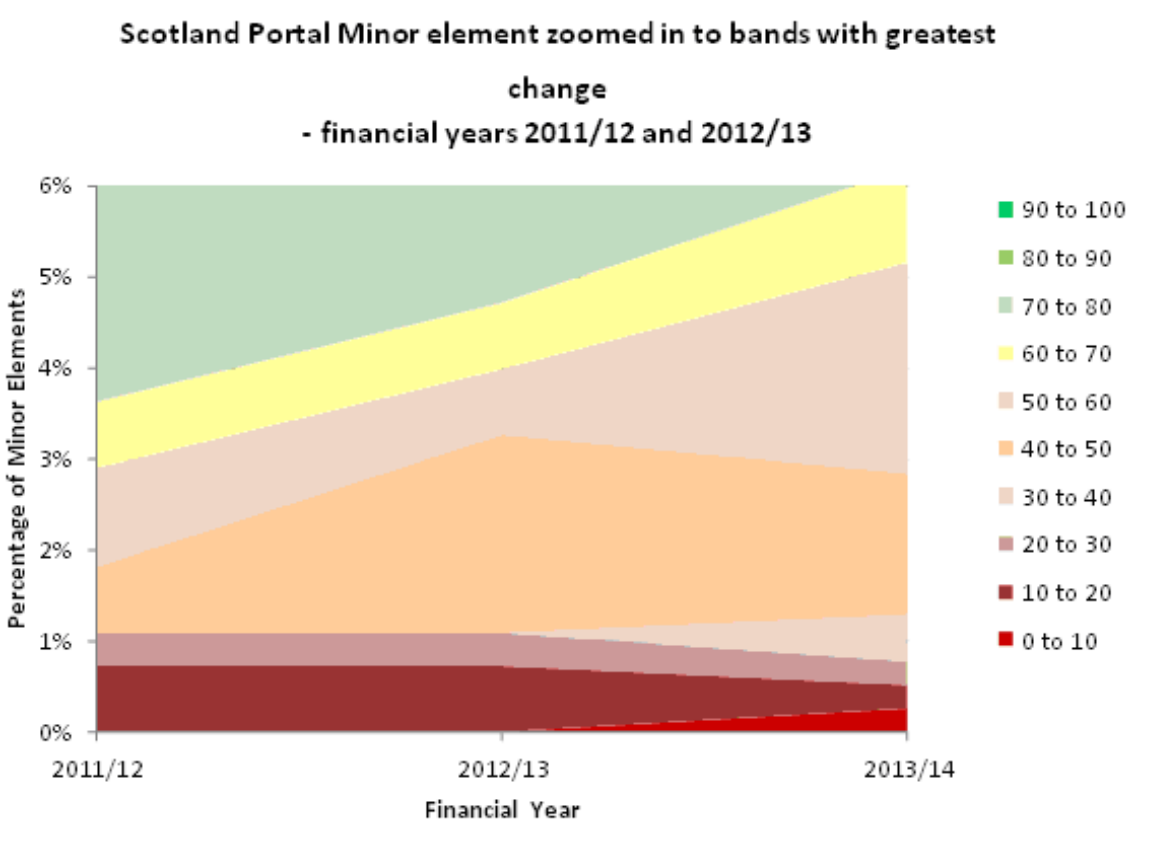


Figure 3.22: Tunnel portal minor element scores for Scotland zoomed in to indicate condition bands where changes have occurred



Bridge condition (M8)

Definition

The bridge condition grade is a measure from one to five with one representing good condition and five representing poor condition. Each bridge is graded from a Bridge Condition Marking Index (BCMI) value determined using the scoring tool set out in the BCMI handbook. BCMI, formerly known as SCMI (Structures Condition Marking Index), was renamed during the current control period to allow the introduction of condition marking indexes for other types of structures. The BCMI process, unchanged from the SCMI process, is a marking methodology that grades the condition of each bridge on a 1–100 scale and involves defining the elements of the bridge and determining the extent and severity of defects in each of the elements. These are combined to form an overall structure condition score. The condition scores are collated into the five bands as shown in Table 3.56.

Reporting method

The reported measure is presented as:

- a table (Table 3.56) showing the total number of BCMI results entered into the database within the reporting year, split into condition bands for CP4
- distribution graphs (Figure 3.23 and 3.24) showing the cumulative number of bridges assessed since 2000 on a 1–100 scale for the reporting year and the previous year, split by bridge material type
- a graph (Figure 3.25) showing how many bridges have an initial BCMI score and how many have had a subsequent update to that score
- a graph (Figure 3.26) showing the percentage split by BCMI band of the latest scores for each bridge for each year.

BCMI is not normally carried out on major structures, footbridges and some asset types not deemed suitable for BCMI, typically concrete portals, large diameter Armco pipes and clad tenanted arches.

Use of BCMI Outputs

BCMI was originally introduced to promote an objective examination process and reduce the subjectivity that previously existed with the good, fair or poor reporting system. The score is generated from an algorithm and is used as an overall measure, which is useful when applied to a population of assets and is primarily used as a trending tool.

BCMI is now being used for several asset management processes. On an individual asset it is used as part of a risk assessment to set detailed examination frequencies, component scores are used to highlight areas of concern and BCMI data has been extensively used to identify structures with a particular generic feature and at sub-component level is a driving parameter for the application of structures policy. This assists with improved risk management on a network wide basis.

Reporting confidence

The confidence grade assigned by the previous independent reporter for output measures was C3. There has been no assessment of this measure in the current control period.

Since the Independent reporter assigned the confidence grade of C3 a considerable amount of work has been carried out to improve the BCMI data quality. This work has included the matching of all BCMI scores to bridges as listed in the Civils Asset Register and Electronic Reporting System (CARRS). We do not believe that this confidence grade is therefore reflective of the current position. However, the confidence grade is reported for completeness.

Results

Table 3.56 shows the bridge condition index results for each year of CP4 for England & Wales, Scotland, and the whole network.

Commentary

The relationship between the number of bridges and the number of bridge BCMI scores is complex. This Annual Return details the work undertaken by us to explain these complexities and the actions being taken to remedy known data shortfalls.

Data improvement

Network Rail owns 28,158 bridges, excluding footbridges, as at 31 March 2014. For some of the larger bridges, principally viaducts, the bridge assets are sub divided into smaller management units to aid examination. A management unit typically comprises a grouping of a number of bridge spans. Examination and BCMI scoring is performed at management unit level therefore the number of expected BCMI scores exceeds the number of bridges. The number of management units that BCMI should be performed on is 28,536. Of these, 1,379 are known to be exempt of BCMI due to their construction type making the number of units subject to BCMI equal to 27,157.

Questions arose last year regarding the correlation between the number of bridges that we own and the information presented in the Annual Return 2012 which raised concern that some of the data contained within the BCMI database was inaccurate. This was investigated and inaccuracies confirmed and a BCMI data improvement project was carried

out between November 2012 and November 2013. This has removed some duplicate records and amalgamation of previously reported bridge scores at span level to bridge asset level. This work has resulted in some anomalies when comparing current data to previous years. These are explained where necessary below.

Network Rail currently holds BCMI scores in the BCMI database for 25,949 of the 27,157 bridge management units thought to be appropriate for BCMI, which suggests a potential shortfall of 1,208 first cycle BCMI scores. As in 2012/13, during the course of 2013/14 additional resources were once again recruited to assist with addressing an examination backlog. In addressing the backlog of examinations there has been a positive impact on the corresponding BCMI backlog. Work is continuing with the examinations supplier to obtain missing data either from the resupply of electronic files or from paper records. Following this exercise, any missing BCMI will be obtained through site work with the majority completed by the end 2015/16.

There are three main reasons, which are unchanged from last year, why some bridges have not been BCMI scored and these are:

- they were previously classed as major structures but are now not
- they were previously classed as culverts but are now classed as underbridges
- misunderstanding and inconsistency within examination suppliers of when bridges are exempt due to form of construction, particularly barrel type arches.

All the figures quoted and used in the graphs for 2013/14 are related to BCMI scores of bridge management units. There is potential for the make up of management units to vary from one year to the next to facilitate examination. This tends to be associated with long urban viaducts where the bridge arches are occupied by business tenants.

2013/14 results commentary

In 2013/14 it was planned that 3,597 examinations of bridge units subject to BCMI would be carried out. 3,412 of these have been completed on site and for 2,262 of these examinations the reports have been received. Of these, 2,130 BCMIs have been received and imported into the BCMI database.

Table 3.56: Bridge condition index results for CP4

	Bridge Condition Grade	***Equivalent***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	1	80 – 100	132	237	248	416	311
	2	60 – 79	789	1543	1368	2928	2129
	3	40 – 59	401	663	577	1406	1058
	4	20 – 39	43	80	83	152	109
	5	1 – 19	1	4	7	3	8
	Total number examined		1,366	2,527	2,283	4,905	3,165
	Average condition grade		2.26	2.24	2.23	2.27	2.27
Scotland	1	80 – 100	25	79	52	98	58
	2	60 – 79	86	475	371	706	442
	3	40 – 59	24	166	142	287	221
	4	20 – 39	3	14	16	26	23
	5	1 – 19	0	0	0	2	1
	Total number examined		138	734	581	1,119	745
	Average condition grade		2.04	2.16	2.21	2.22	2.28
Network Total	**1**	**80 – 100**	**157**	**316**	**300**	**514**	**369**
	2	**60 – 79**	**875**	**2,018**	**1,739**	**3,634**	**2,571**
	3	**40 – 59**	**425**	**829**	**719**	**1693**	**1,279**
	4	**20 – 39**	**46**	**94**	**99**	**178**	**132**
	5	**1 – 19**	**1**	**4**	**7**	**5**	**9**
	Total number examined		**1,504**	**3,261**	**2,864**	**6,024**	**4,360**
	Average condition grade		**2.24**	**2.22**	**2.22**	**2.26**	**2.28**

Notes:
Data for previous years does not align with previous Annual Returns. Reasons for this are explained within the commentary below.

Table 3.56 provides the number of BCMI results entered into the database within the five years of CP4 including 2013/14. The table has been split into England & Wales, Scotland and the network as a whole. In addition to the 2,130 results from 2013/14 loaded into the database, a large proportion of the 4,360 reported are previous years results, which were reported last year as being backlog awaiting uploading plus some historic BCMIs found to be absent from the database which have been sourced as part of the BCMI Improvement Project. Within the accuracies of the condition scoring system, the average condition grade of the bridge asset stock entered into the database in the year has fallen slightly to 2.28. This is as a result of targeted examination of poorer condition bridges through the Risk Based Examination (RBE) process.

Figure 3.23: All BCMI score distribution 2014

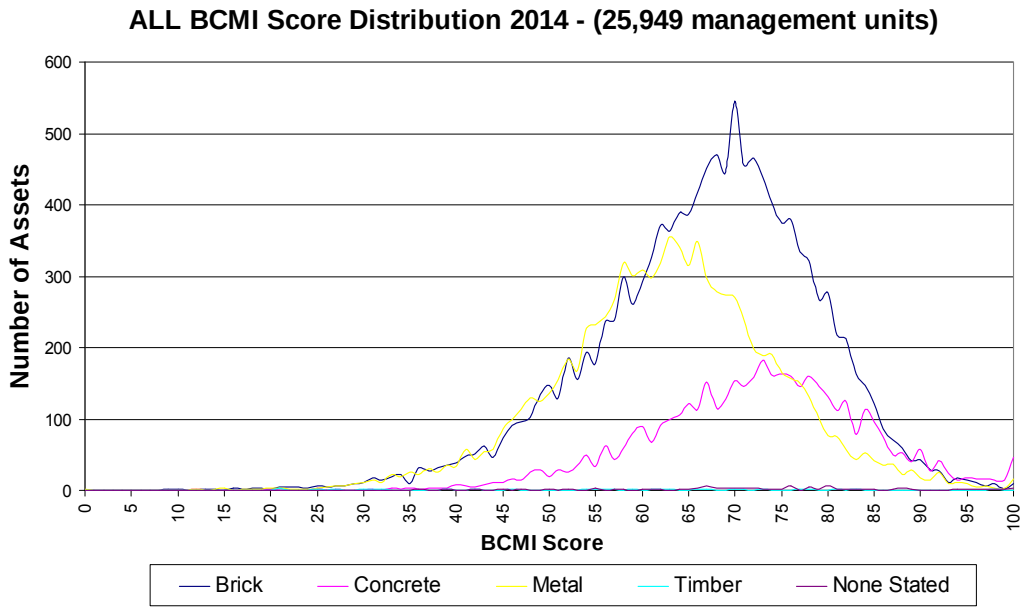
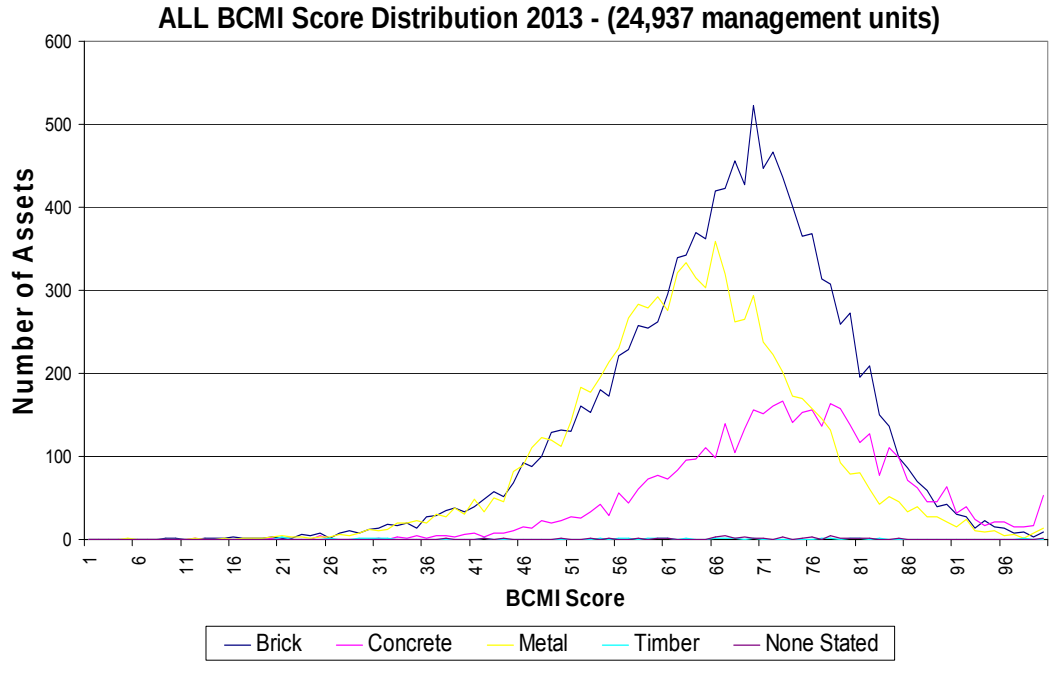


Figure 3.24: All BCMI score distribution 2013



It will be noted that Table 3.56 does not align with figures produced in previous Annual Returns. This can be attributed to two reasons: an inconsistency in the early part of the control period in the interpretation of the measure as defined in the Asset Reporting Manual (ARM), which resulted in a re-profiling of the results between years; and the BCMI Improvement Project which has succeeded in aligning all scores to management units. This has resulted in the overall number of BCMI scores reducing as several partial scores have been merged into one.

Figures 3.23 and 3.24 show the distribution of current BCMI scores by material type for 2013/14 and 2012/13. The number of scores used in the analysis this year has increased from 24,937 to 25,949 principally due to missing scores being located and imported into the database.

Figure 3.25 shows the number of bridges which have an initial BCMI score and those with a repeat score.

The number of first time scores has increased to 25,949 and the number of second/subsequent scores increased to 16,947. It is expected that the ongoing initiative to source missing scores will increase the multiple cycle to first cycle relationship shown in this figure.

Asset count commentary

The asset counts published in this Annual Return vary from those published last year for several reasons:

- minor variation in structure asset definitions within the routes
- data maintenance in terms of changed assets and ownership has improved
- historical changes to the definition of culverts has led to inconsistency
- routes have created management units to aid examination, which has affected the published count
- the database has been found to contain duplicate records, particularly for bridges on dual engineering line references (ELRs).

As a replacement database to CARRS is under development it has been decided to resolve the above issues through data cleansing and the application of a national consistency to all route data. Resolution of these issues has resulted in the changes seen in the counts.

CP4 Overview

During CP4 approximately 18,000 BCMI scores have been added to the system. Extensive data cleansing has also been undertaken and has significantly improved the quality of the data. This places Network Rail in a much improved position for policy application and risk management in CP5.

Figure 3.25: BCMI score distribution multiple cycle versus total

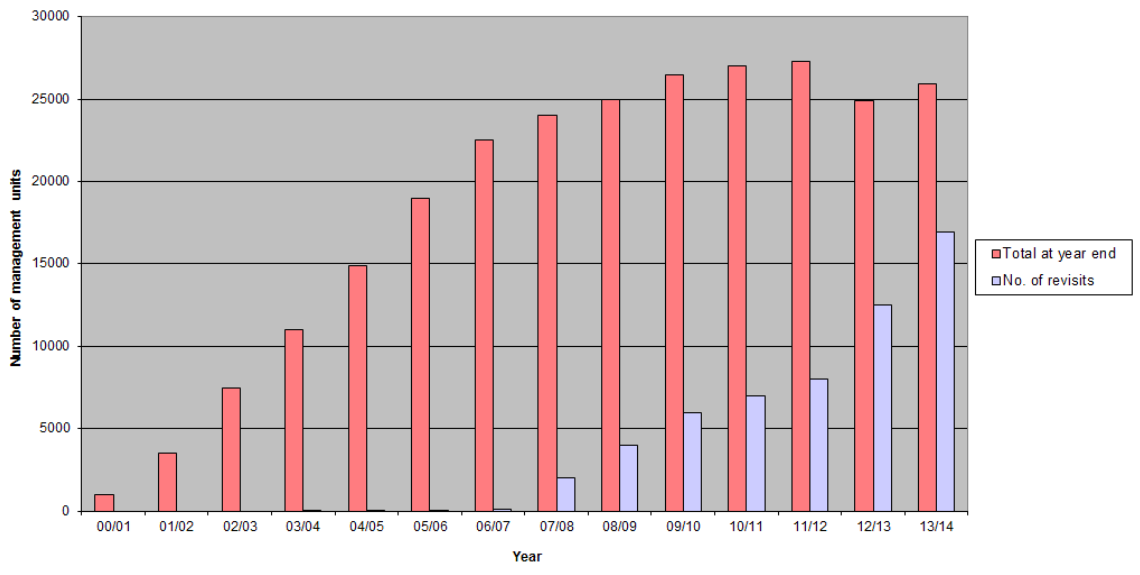
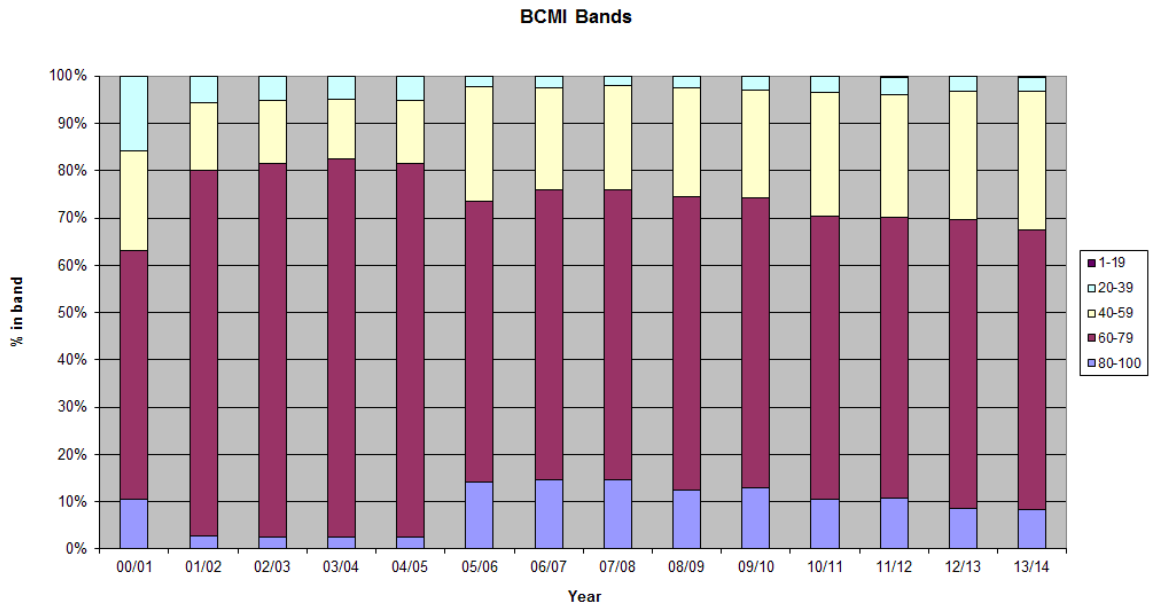


Figure 3.26: BCMI score distribution trends



Notes:
Bridge condition grade 5 (1 - 19) is shown in red at the top of the distribution graph but due to its small amount respective to the other bands it can be difficult to see. It should not be confused with bridge condition 2 (60 - 79) which is large with respect to the other bands. Table 3.56 shows the numerical condition breakdown by condition grade.

Summary of asset counts

Overline and underline bridges

Table 3.57: Summary count of bridges by type and operating route (as at 31 March 2014)

Route	Bridges (excluding footbridges)							Total Bridges	Bridge Spans
	Overline Bridges			Underline Bridges					
	Overline Bridge	Pipe Bridge	Side of Line Bridge	Intersection Bridge	Underline Bridge	Viaduct	Viaduct / Intersection		
Anglia	502	2	75	30	1,179	202	5	1,995	5,549
East Midlands	353	-	45	17	745	68	1	1,229	3052
Kent	406	6	88	28	1,140	388	-	2,056	6,163
London North Eastern	959	2	136	50	2,320	192	5	3,664	7,709
London North Western	2,262	12	255	83	3,676	342	-	6,630	13,722
Scotland	1,305	35	33	17	2,698	252	1	4,341	6,770
Sussex	229	2	12	33	520	62	-	858	1,957
Wales	655	6	120	12	1,670	69	-	2,532	4,019
Wessex	524	7	130	25	1,182	97	-	1,965	3,801
Western	870	9	112	15	1,733	149	-	2,888	5,345
Network Total	**8,065**	**81**	**1,006**	**310**	**16,863**	**1,821**	**12**	**28,158**	**58,087**

Other assets

Table 3.58: Summary count of other assets by operating route (as at 31 March 2014)

Route	Footbridges	Culverts	Tunnels		Retaining Walls	Coastal/Estuarine Defences
			Parent Tunnels	Bores		
Anglia	180	1,257	12	13	584	7
Kent	115	781	54	55	2,397	8
London North Eastern	186	2,949	76	95	2,218	2
London North Western	318	4,394	204	224	4,340	51
East Midlands	98	943	40	52	465	0
Scotland	133	4,184	68	80	3,392	138
Sussex	62	507	31	31	454	0
Wales	72	3,288	53	58	2,238	173
Wessex	107	1,016	26	30	1,601	31
Western	90	2,542	62	62	3,084	103
Network Total	**1,361**	**21,861**	**626**	**700**	**20,773**	**515**

Notes:
1. Counts only include Network Rail owned assets.
2. Footbridge counts do not include station footbridges leased to train operating companies.
3. Where a large bridge has been subdivided into management groups, these parts have been counted as a single asset.
4. Counts include 'non-operational' assets.

Structure visual and detailed examinations

Definition

Network Rail's primary means of maintaining and refreshing knowledge of its structures assets is through an examination regime. All structures receive a detailed examination at a risk based frequency which is based on the strength capability and the condition of the asset. The frequency can vary between one and 18 years. The detailed examination provides a baseline condition of the asset and involves the examiner gaining access to within touching distance of the structure. In the intervening years between detailed examinations, an annual examination is undertaken to monitor the asset. The examination regime, coupled with other asset data is used to identify and specify maintenance and renewal activity.

Examination counts include activity undertaken on bridges, culverts, retaining walls, tunnels and ancillary assets where applicable.

Reporting method

The report measure is presented as the number of visual and detailed exams in the work banks for 2013/14 against the number of examinations actually completed on site.

Reporting confidence

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Results

England & Wales and Scotland results

Data for England & Wales and Scotland, in 2013/14, is shown as follows:

- Figure 3.27 shows the number of detailed examinations of structures undertaken
- Figure 3.28 shows the number of visual examinations of structures undertaken

Figure 3.29 shows the number of examinations of structures undertaken nationally in 2013/14.

Commentary

We have now nearly removed the backlog of non compliant examinations.

In 2013/14 we planned to undertake 70,383 visual examinations and 11,889 detailed examinations, including the recovery of residual backlog exams from previous years.

During the year 70,247 visual examinations and 11,302 detailed examinations were completed. This places us in the best ever compliance examination position for in excess of a decade.

The under delivery of examinations was due to:

- severe weather that impacted on operational working and consequently possession access for exams
- high water levels that affected examination of certain structures, in particular culverts
- difficult access to sites owned by third parties
- onerous enabling works which were not completed in time for the full exam to take place.

CP4 Overview

CP4 saw the introduction of a national examinations contract awarded to a single supplier for the whole five years.

Risk based examinations were instigated as part of a national initiative to manage the examination of structures dependant on their level of risk. In addition, hidden critical elements examinations were introduced in order to fully understand structure depreciation in areas not visible to the naked eye.

During CP4 we clearly defined the parameters of compliance examinations and undertook a substantial programme of works to ensure that these parameters were met. This resulted in record years of examinations being completed in the last two years of CP4.

CP4 also saw greater technological advancement. Information technology systems were improved and a new compliance system introduced. Examiners were also able to benefit from hand held mobile devices to ensure more timely production of reports and a greater understanding of work completed.

Figure 3.27: Detailed examinations of structures for England & Wales and Scotland in 2013/14

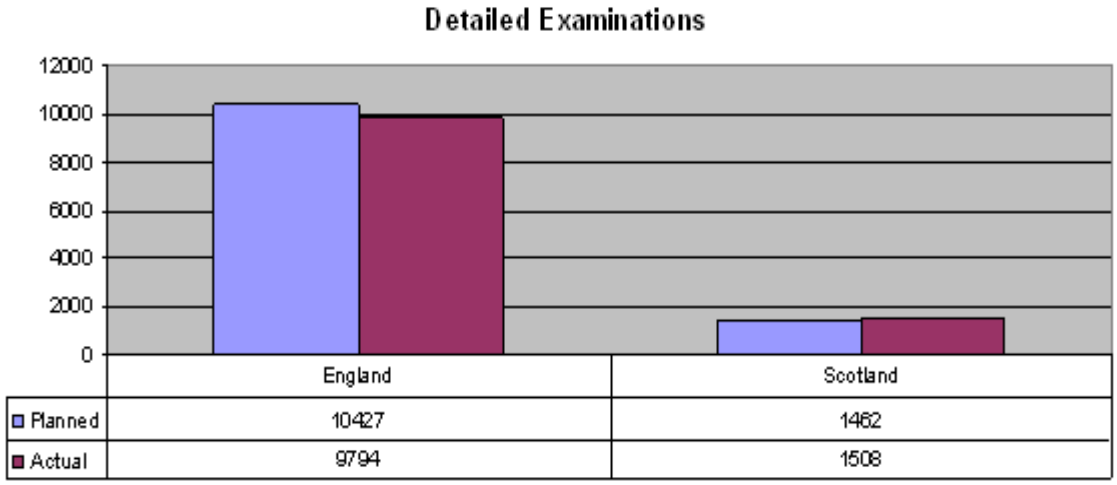


Figure 3.28: Visual examinations of structures for England & Wales and Scotland in 2013/14

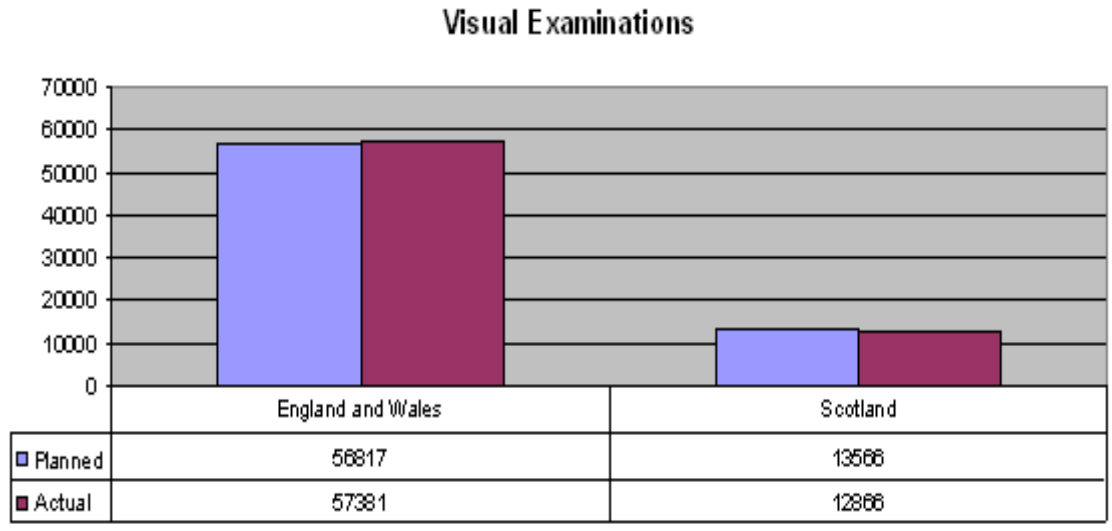
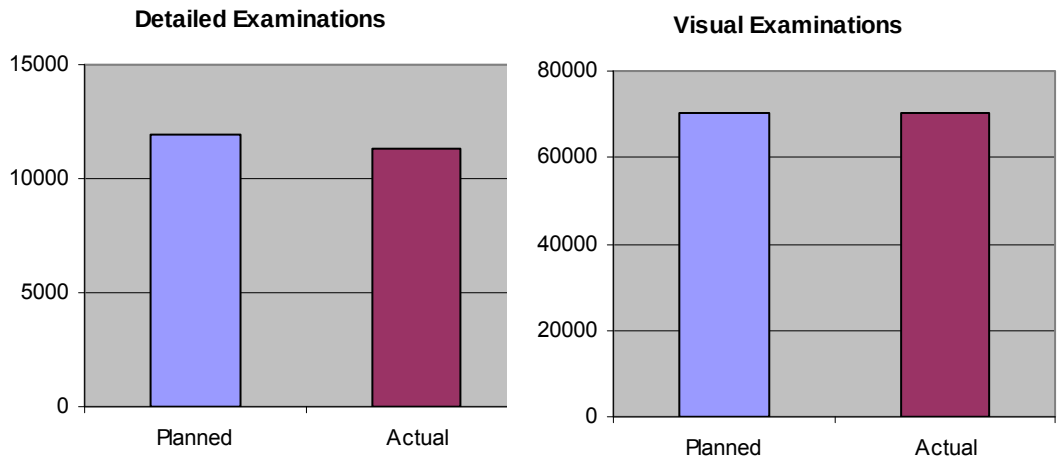


Figure 3.29: Examinations of structures nationally in 2013/14



Bridge assessment of strength (progress)

Completion of 18 year assessment programme

In 1996, an eighteen year national programme commenced to recalculate the load carrying capacity of our bridges which had not been previously assessed, with a planned completion date of 31 March 2014. Prior to 1996, bridges had either been assessed on an individual basis where required by the asset engineer to inform the management of the structure or as part of assessment programmes to support the introduction of heavier or faster rail and road traffic.

The 18 year programme to complete the remaining first time assessments was prioritised on a risk basis. In the second half of the programme our assessment resources were further prioritised on:

- re-assessing bridges where deterioration in asset condition warranted an updated assessment to inform the management of the structure
- refining the assessment of bridges initially identified as substandard using advanced assessment techniques to ensure the appropriate scope of strengthening works.

In 2012 we concluded that:

- assessment of around 5,000 previously unassessed concrete and metallic bridges should be accelerated to deliver the original programme
- in addition to the original programme scope, metallic and concrete bridges with assessments that would have been over 18 years old at the end of the programme should be reassessed
- it was also feasible to include in the assessment recovery programme the outstanding assessments of masonry bridges and repeat assessments where the existing assessment would be over 18 years old at the end of the programme.

The resultant scope of the assessment recovery programme was initially estimated at 13,431 bridges in 2012 and covered underline bridges, overline bridges, footbridges and side of line bridges of all material types managed by the Route Asset Manager (Structures). All bridges initially estimated to be without an assessment at the start of the asset recovery programme have been investigated and the work undertaken included:

- extensive assessment data cleansing to support the programme including review of asset records to confirm identification of Outside Party bridges (1,824 bridges)
- review of detailed asset records to confirm bridge identified as a modern structure not requiring an assessment (330 bridges)
- completion of assessment of bridges assessed as part of an infrastructure enhancement project or location of previous assessment following extensive asset record searches (614 bridges)
- assessment of bridges in assessment recovery programme (10,663 assessments completed).

To facilitate the maintenance of contemporary assessment knowledge of the load carrying capacity of bridges upon completion of the assessment recovery programme, Network Rail developed a suite of bridge assessment tools to automate the calculation of bridge strength. The tools cover common forms of metallic, concrete and masonry bridges.

The successful development and deployment of the assessment tools enabled the completion of the assessment recovery programme on 31 March 2014.

Signalling failures (M9)

Definition

This measure reports the total number of signalling failures causing a cumulative total train delay of more than ten minutes per incident, and only includes failures on Network Rail owned infrastructure.

Reporting method

The data is compiled from TRUST (a train running system which records details of train running as compared with schedule) and PSS (Network Rail's Performance System) and shows the number of signalling failures where train delays in excess of ten minutes have been recorded. These account for around 70 per cent of all signalling failures causing delays to train services. For calculation of failures per million train kilometres, this data is then normalised by the reported train mileage.

Reporting confidence

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, for each year of CP4, is shown as follows:

- Table 3.59 shows the total number of signalling failures leading to train delays of greater than ten minutes
- Table 3.61 shows the number of signalling failures leading to train delays of greater than ten minutes per million train kilometres.

Operating route results

- Table 3.60 shows the total number of signalling failures leading to train delays of greater than ten minutes for each year of CP4 for each operating route.

Table 3.59: Number of signalling failures greater than 10 minutes for each year of CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	16,325	14,879	14,056	13,550	13,436
Scotland	1,999	1,627	1,591	1,460	1,526
Network Total	**18,324**	**16,506**	**15,647**	**15,010**	**14,962**

Notes:
Prior year figures have been updated marginally to reflect final attribution.

Table 3.60: Number of signalling failures greater than 10 minutes for each year of CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	1,614	1,463	1,352	1,253	1,293
East Midlands	699	657	656	658	664
Kent	1,169	1,206	1,109	1,107	1,016
London North Eastern	2,879	3,007	2,774	2,850	2,849
London North Western	5,126	3,920	3,830	3,541	3,481
Scotland	1,999	1,627	1,591	1,460	1,526
Sussex	812	791	711	718	832
Wales	976	887	898	779	716
Wessex	1,154	1,105	1,109	1,098	1,090
Western	1,896	1,843	1,617	1,546	1,495
Network Total	**18,324**	**16,506**	**15,647**	**15,010**	**14,962**

Notes:
Prior year figures have been updated marginally to reflect final attribution.

Table 3.61: Number of signalling failures greater than 10 minutes per million train km for each year of CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	35	32	30	29	28
Scotland	40	32	30	27	28
Network Total	**36**	**32**	**30**	**28**	**28**

Commentary

In 2013/14 the total number of signalling failures greater than ten minutes fell marginally as shown in Table 3.59. While some improvement has continued for the main categories of points, track circuits, signal failures and level crossing failures has slowed. A number of categories have seen an increase in incidents over the last year, including signalling power supplies, signalling systems (including relays and solid state interlocking (SSI) modules) and axle counters (which are a form of train detection system.) The high failure rate of brand new signalling relays has been a particular cause for concern. This has been investigated through collaborative work with suppliers and mitigation actions have been identified. Similar investigation and improvement work is ongoing for axle counters and SSI modules.

During CP4, we have targeted improvements to our infrastructure performance as part of our overall aim of increasing train performance. We have implemented a range of reliability improvement plans, including those targeting points and train detection failures (described later in this chapter). These include the continued rollout of intelligent infrastructure systems, which strengthens our capability to predict and prevent service affecting failures. In addition to initiatives to reduce points and train detection failures, there are a range of ongoing initiatives directed at other signalling assets, such as those to improve signal failures (such as fitment of long-life LED lamps), signalling power supply (include remote condition monitoring) and level crossing reliability enhancements.

In recent years we have targeted a number of failure modes, and implementing initiatives designed to drive sustainable improvements to the reliability of signalling and other assets.

Signalling asset condition (M10)

Definition

This measure assesses the condition of signalling assets in terms of a one to five grading system, where a condition grade of one is good and five is poor. Condition grading is based on the residual life of the equipment in a signalling interlocking area using the Signalling Infrastructure Condition Assessment (SICA) tool. While the assessment is dominated by the condition of the interlocking, the condition of line side signalling equipment is also taken into account.

Reporting method

The data reported in the Annual Return is collated from the signalling infrastructure condition assessment records stored in the Signalling Schemes Asset Data Store (SSADS) which is Network Rail's repository for all SICA assessments. This tool stores information from all SICA assessments in a central repository. This allows improved visibility of the results from SICA surveys, production of up-to-date SICA assessment schedules for the routes use and multiple reporting functions of which the Annual Return is just one.

Reporting confidence

Reporting confidence is stated as B2 in line with recent audit findings. A reliability band of B is given as although there is no extrapolation of the data, there are still a number of older SICA assessments carried out to an earlier version and a small number of interlockings do not have assessments as they have been newly installed.

Results

Table 3.62 provides the number of interlocking areas with a SICA assessment condition grade for the whole network for each year of CP4.

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network is shown as follows:

- Table 3.63 shows a breakdown of the signalling condition profiles from 2011/12 to present
- Table 3.65 shows a breakdown of the signalling condition grades for CP4
- Table 3.66 shows the total number of signalled level crossings, the number surveyed and the assigned condition grades for each year of CP4.

Table 3.62: Total number of interlocking areas with a SICA assessment at end of each financial year in CP4

Condition grade	*Observed nominal residual life (in years)*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
1	>20	89	68	83	102	110
2	10 to 20	935	876	863	842	907
3	3 to 10	590	673	664	653	556
4	<3	24	21	15	15	38
5	At end of life	22	8	5	4	4
Average condition grade		**2.37**	**2.41**	**2.38**	**2.37**	**2.33**
Total number graded		**1,660**	**1,646**	**1,630**	**1,616**	**1,615**

Table 3.63: Total number of interlocking areas with a SICA assessment at end of each financial year					
Route	***Condition grade***	***Observed nominal residual life (in years)***	***2011/12***	***2012/13***	***2013/14***
England & Wales	1	>20	7	15	3
	2	10 to 20	762	755	828
	3	3 to 10	594	567	467
	4	<3	12	11	34
	5	At end of life	5	4	4
	Average condition grade		2.38	2.35	2.30
	Total signal site population		1,452	1,439	1441
	Total signal site surveyed		1,380	1,352	1336
	Total sites with no SICAs		**72**	**87**	**105**
Scotland	1	>20	0	0	0
	2	10 to 20	101	87	79
	3	3 to 10	70	86	89
	4	<3	3	4	4
	5	At end of life	0	0	0
	Average condition grade		2.4	2.53	2.55
	Total signal site population		178	177	174
	Total signal site surveyed		174	177	172
	Total sites with no SICAs		4	0	2
Network Total	**1**	**>20**	**7**	**15**	**3**
	2	**10 to 20**	**863**	**842**	**907**
	3	**3 to 10**	**664**	**653**	**556**
	4	**<3**	**15**	**15**	**38**
	5	**At end of life**	**5**	**4**	**4**
	Average condition grade		**2.38**	**2.37**	**2.33**
	Total signal site population		**1,630**	**1,616**	**1,615**
	Total signal site surveyed		**1,554**	**1,529**	**1,508**
	Total sites with no SICAs		**76**	**87**	**107**

Operating route results

Data for each operating route is shown as follows:

- Table 3.64 shows a breakdown of the signalling condition from 2011/12 to present
- Table 3.67 shows the total number of signalled level crossings, the number surveyed and the assigned condition grades for each year of CP4.

Commentary

The total population of interlockings on Network Rail infrastructure was 1,615 in April 2014. Of these, 107 do not have a current SICA assessment as they have been renewed within the last five years. This leaves a balance of 1,508 interlockings requiring a valid SICA assessment which shows that Network Rail has 100 per cent SICA coverage in compliance with the relevant standard.

The total population of signalled level crossings requiring a SICA assessment on Network Rail infrastructure is 1,581 at April 2014. Of these, 58 do not have a current SICA assessment as they have been renewed within the last five years. This leaves a balance of 1,523 level crossings requiring a valid SICA assessment shows that Network Rail has 100 per cent SICA coverage in compliance with the relevant standard.

Variances in the Interlocking Condition Index at route level are caused by variations in the average age of an operating route's infrastructure and the timing of a route's last significant level of investment. The typical renewal frequency of an interlocking is around 40 years. Routes such as Anglia, were significant work was undertaken in 2000, currently has a relatively good condition index compared with Wales, which has a high level of investment planned for future years. Following this investment, we would expect Wales' Condition Index to improve.

The Interlocking Condition Index has improved in the current year to 2.33, which is better than the 2.39 CP4 Delivery Plan target. This is in line with our current expectations based on the fact that 2013/14

had our highest level of renewals in CP4. Further details on delivered volumes are provided in Section 4, Signalling Renewed (M24).

CP4 overview

During CP4 the Interlocking Condition Index has remained stable but improving. The only year the Interlocking Condition Index was worse than our CP4 Delivery Plan target of 2.39 was in 2010/11, which saw our lowest level of renewals and a condition score of 2.41. This improved in 2011/12 to 2.38 following a year of increased renewals. 2013/14 has seen the highest level of renewals and hence our best Interlocking Condition Index of 2.33. Overall for CP4, there has been an improving trend in the Interlocking Condition index.

Table 3.64: Total number of interlocking areas with a SICA assessment at end of each financial year by operating route

Route	*Condition Grade*	*Observed nominal residual life (in years)*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	1	>20	-	0	2	1	0
	2	10 to 20	-	102	106	80	94
	3	3 to 10	-	23	20	35	22
	4	<3	-	3	1	0	0
	5	At end of life	-	0	0	0	0
	Average condition grade		-	2.15	2.1	2.11	2.02
	Total signal site population		-	136	135	135	135
	Total signal site surveyed		-	128	129	116	116
	Total sites with no SICAs		-	8	6	19	19
East Midlands	1	>20	-	1	1	1	0
	2	10 to 20	-	48	69	68	70
	3	3 to 10	-	19	15	15	17
	4	<3	-	0	0	1	0
	5	At end of life	-	0	0	0	0
	Average condition grade		-	2.02	2.16	2.19	2.2
	Total signal site population		-	84	85	85	87
	Total signal site surveyed		-	68	85	85	87
	Total sites with no SICAs		-	16	0	0	0
Kent	1	>20	-	1	1	0	0
	2	10 to 20	-	44	56	63	63
	3	3 to 10	-	41	29	21	21
	4	<3	-	0	0	0	0
	5	At end of life	-	3	0	0	0
	Average condition grade		-	2.55	2.23	2.14	2.13
	Total signal site population		-	89	93	92	93
	Total signal site surveyed		-	89	86	84	84
	Total sites with no SICAs		-	0	7	8	9
London North Eastern	1	>20	-	3	3	7	3
	2	10 to 20	-	195	194	185	211
	3	3 to 10	-	133	134	141	114
	4	<3	-	8	2	2	3
	5	At end of life	-	3	4	1	2
	Average condition grade		-	2.39	2.37	2.36	2.31
	Total signal site population		-	357	353	351	348
	Total signal site surveyed		-	342	337	336	333
	Total sites with no SICAs		-	15	16	15	15
London North Western North	1	>20	-	0	0	1	0
	2	10 to 20	-	104	81	85	109
	3	3 to 10	-	104	104	96	74

Table 3.64 continued: Total number of interlocking areas with a SICA assessment at end of each financial year by operating route

Route	*Condition Grade*	*Observed nominal residual life (in years)*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
London North Western North	4	<3	-	1	3	3	3
	5	At end of life	-	0	0	0	0
	Average condition grade		-	2.5	2.58	2.54	2.42
	Total signal site population		-	210	189	186	187
	Total signal site surveyed		-	209	188	185	186
	Total sites with no SICAs		-	1	1	1	1
London North Western South	1	>20	-	0	0	0	0
	2	10 to 20	-	103	99	101	93
	3	3 to 10	-	57	36	28	31
	4	<3	-	5	5	4	6
	5	At end of life	-	2	1	2	1
	Average condition grade		-	2.42	2.14	2.07	2.1
	Total signal site population		-	169	166	165	160
	Total signal site surveyed		-	167	141	135	131
	Total sites with no SICAs		-	2	25	30	29
Scotland	1	>20	-	0	0	0	0
	2	10 to 20	-	102	101	87	79
	3	3 to 10	-	67	70	86	89
	4	<3	-	2	3	4	4
	5	At end of life	-	0	0	0	0
	Average condition grade		-	2.36	2.4	2.53	2.55
	Total signal site population		-	178	178	177	174
	Total signal site surveyed		-	171	174	177	172
	Total sites with no SICAs		-	7	4	0	2
Sussex	1	>20	-	0	0	0	0
	2	10 to 20	-	30	30	43	45
	3	3 to 10	-	24	24	11	5
	4	<3	-	1	0	0	0
	5	At end of life	-	0	0	0	0
	Average condition grade		-	2.45	2.44	2.2	1.98
	Total signal site population		-	56	54	54	56
	Total signal site surveyed		-	55	54	54	50
	Total sites with no SICAs		-	1	0	0	6
Wales*	1	>20	-	-	0	5	0
	2	10 to 20	-	-	40	32	36
	3	3 to 10	-	-	77	78	55
	4	<3	-	-	1	1	15
	5	At end of life	-	-	0	1	1
	Average condition grade		-	-	2.6	2.64	2.71
	Total signal site population		-	-	123	119	114
	Total signal site surveyed		-	-	118	117	107
	Total sites with no SICAs		-	-	5	2	7
Wessex	1	>20	-	0	0	0	0
	2	10 to 20	-	62	59	53	45
	3	3 to 10	-	19	22	24	26

Table 3.64 continued: Total number of interlocking areas with a SICA assessment at end of each financial year by operating route

Route	*Condition Grade*	*Observed nominal residual life (in years)*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Wessex	4	<3	-	0	0	0	0
	5	At end of life	-	0	0	0	0
	Average condition grade		-	2.15	2.2	2.17	2.18
	Total signal site population		-	87	86	86	82
	Total signal site surveyed		-	81	81	77	71
	Total sites with no SICAs		-	6	5	9	11
Western	1	>20	-	0	0	0	0
	2	10 to 20	-	86	28	45	62
	3	3 to 10	-	186	133	118	102
	4	<3	-	1	0	0	7
	5	At end of life	-	0	0	0	0
	Average condition grade		-	2.65	2.75	2.69	2.6
	Total signal site population		-	280	168	166	179
	Total signal site surveyed		-	273	161	163	171
	Total sites with no SICAs		-	7	7	3	8
Network Total	**1**	**>20**	**89**	**5**	**7**	**15**	**3**
	2	**10 to 20**	**935**	**876**	**863**	**842**	**907**
	3	**3 to 10**	**590**	**673**	**664**	**653**	**556**
	4	**<3**	**24**	**21**	**15**	**15**	**38**
	5	**At end of life**	**22**	**8**	**5**	**4**	**4**
	Average condition grade		**2.37**	**2.41**	**2.38**	**2.37**	**2.33**
	Total signal site population		**1,660**	**1,646**	**1,630**	**1,616**	**1615**
	Total signal site surveyed		**-**	**1,583**	**1,554**	**1,529**	**1508**
	Total sites with no SICAs		**-**	**63**	**76**	**87**	**107**

Notes:
Data breakdown for England & Wales and Scotland for 2009/10 is not available.
*Data is not split for Wales Route in 2010/11. Data for Wales Route is included within data for Western Route for 2010/11.

Table 3.65: Signalling condition profile grade in CP4

	Condition grade	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	1	-	61	79	102	108
	2	-	774	762	755	828
	3	-	606	594	567	467
	4	-	19	12	11	34
	5	-	8	5	4	4
	Total	-	1,468	1,452	1,439	1,441
Scotland	1	-	7	4	0	2
	2	-	102	101	87	79
	3	-	67	70	86	89
	4	-	2	3	4	4
	5	-	0	0	0	0
	Total	-	178	178	177	174
Network Total	**1**	**89**	**68**	**83**	**102**	**110**
	2	**935**	**876**	**863**	**842**	**907**
	3	**590**	**673**	**664**	**653**	**556**
	4	**24**	**21**	**15**	**15**	**38**
	5	**22**	**8**	**5**	**4**	**4**
	Total	**1,660**	**1,646**	**1,630**	**1,616**	**1,615**

Notes:
Data breakdown for England & Wales and Scotland for 2009/10 is not available.

Table 3.66: Level crossing condition profile grade year totals for 2013/14

	Total level crossing population	*Total level crossings surveyed*	*Condition grade*				
			1	*2*	*3*	*4*	*5*
England & Wales	1,478	1,420	47	941	422	9	1
Scotland	103	103	0	28	70	5	0
Network Total	**1,581**	**1,523**	**47**	**969**	**492**	**14**	**1**

Table 3.67: Level crossing condition profile grade year totals for CP4 by operating route

	Condition grade	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	1	8	12	13	9	6
	2	198	98	172	192	189
	3	40	136	60	38	49
	4	1	0	0	0	0
	5	0	0	0	0	0
	Level crossings not surveyed	9	10	10	16	11
	Total level crossings population	256	256	255	255	255
East Midlands	1	4	7	10	9	10
	2	63	59	57	59	58
	3	21	19	21	20	21
	4	0	2	0	1	0
	5	0	0	0	0	0
	Level crossings not surveyed	2	4	2	1	0
	Total level crossings population	90	91	90	90	89
Kent	1	0	0	0	0	0
	2	47	37	36	35	39
	3	13	22	22	21	16
	4	1	1	0	0	0
	5	0	0	0	0	0
	Level crossings not surveyed	0	0	1	4	5
	Total level crossings population	61	60	59	60	60
London North Eastern	1	49	22	31	33	27
	2	543	283	395	394	375
	3	43	324	114	110	117
	4	1	2	0	1	0
	5	0	1	0	0	0
	Level crossings not surveyed	2	4	2	2	18
	Total level crossings population	638	636	542	540	537
London North Western	1	6	1	1	2	3
	2	101	98	95	95	79
	3	46	53	42	42	56
	4	3	2	5	3	4
	5	0	0	1	1	1
	Level crossings not surveyed	2	2	2	2	4
	Total level crossings population	158	156	146	145	147

Table 3.67 continued: Level crossing condition profile grade year totals for CP4 by operating route

	Condition grade	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Scotland	1	0	2	0	0	0
	2	61	50	57	45	28
	3	39	52	44	58	70
	4	0	1	2	2	5
	5	0	0	0	0	0
	Level crossings not surveyed	5	0	2	0	0
	Total level crossings population	105	105	105	105	103
Sussex	1	0	0	0	0	0
	2	58	48	42	43	42
	3	8	18	24	22	19
	4	0	0	0	0	1
	5	0	0	0	0	0
	Level crossings not surveyed	0	0	0	1	5
	Total level crossings population	66	66	66	66	67
Wales*	1	-	-	0	0	0
	2	-	-	63	57	59
	3	-	-	41	51	47
	4	-	-	0	0	3
	5	-	-	0	0	0
	Level crossings not surveyed	-	-	12	8	7
	Total level crossings population	-	-	116	116	116
Wessex	1	0	0	0	0	0
	2	79	21	32	50	53
	3	18	73	61	38	38
	4	2	1	0	0	0
	5	0	0	0	0	0
	Level crossings not surveyed	0	5	7	10	8
	Total level crossings population	99	100	100	98	99
Western	1	0	0	0	1	1
	2	123	91	54	56	47
	3	87	109	51	52	59
	4	5	3	0	0	1
	5	0	0	0	0	0
	Level crossings not surveyed	1	11	4	0	0
	Total level crossings population	216	214	109	109	108

Notes:
*Data is not split for Wales Route in 2009/10 and 2010/11. Data for Wales Route is included within data for Western Route for 2009/10 and 2010/11.

Points failures

Definition

This measure covers the total number of points failures resulting in disruption to train services.

Reporting method

The data is compiled from TRUST (a train running system which records details of train running as compared with schedule) and PSS (Network Rail's Performance System) and shows the number of points failures which cause delay to trains in a period. Failures are also reported in the fault management system (FMS) and are allocated to delivery units. FMS is used to manage failures and capture details of the technical causes and components which led to the equipment failure.

Reporting confidence

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Results

Table 3.68 shows the total number of points failures for each year of CP4 for England & Wales, Scotland and the whole network, along with a comparison to our target for the year.

Commentary

Points failures impacting on train services fell by thirteen per cent in 2013/14, following an improvement of three per cent in the previous year.

This improvement has arisen due to a wide range of initiatives at route level but also through national co-ordinated programmes including the use of remote condition monitoring equipment and a campaign to improve the set-up and gauging of points.

The difference in improvement rates between the two years is largely due to the difference in winter weather, with 2012/13 adversely affected by snow and ice. This was much less of an issue in 2011/12 and particularly in 2013/14.

Severe winter weather with snow and ice leads to increases in points failures. This is due to a combination of factors; including snow and ice obstructing the free movement of components, the risk of snow ingress into electrical components, the reduction in the effectiveness of lubrication at low temperatures and points components freezing up. While this is mitigated to an extent by the installation of points heaters, the more severe the winter, the greater the likelihood that heaters themselves will prove unable to cope with the conditions. A significant programme of implementing remote condition monitoring to these heaters has been implemented, which will improve the reliability of this equipment in CP5. Due to the mild winter of 2013/14 the benefits of this improved system have yet to be seen.

CP4 Overview

The number of points failures affecting train services fell by 38 per cent between 2009/10 and 2013/14, with improvements in each year.

These improvements have resulted primarily from a range of initiatives across the network by local teams, through support by National Reliability team, and the continued implementation of remote condition monitoring and improvements in the process of responding to the alerts and alarms generated by the system and the points campaign noted above. The learning from this campaign is being embedded within route teams to ensure it is sustained.

Train detection failures (track circuit / axle counter failures)

Definition

This measure covers the number of failures (causing disruption to train services) of the two types of equipment used for train detection, track circuits and axle counters.

Reporting method

The data is compiled from TRUST (a train running system which records details of train running as compared with schedule) and shows the number of train detection (track circuit and axle counter) failures recorded which cause delay to trains in a period. Failures are also reported in the fault management system (FMS) and are allocated to delivery units. FMS is used to manage failures and capture details of the technical causes and components which led to the equipment failure.

Table 3.68: Number of points failures for each year of CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*DPu10 2013/14*	*Variance*
England & Wales	6,342	5,251	4,602	4,529	3,934	-	-
Scotland	776	552	560	493	453	-	-
Network Total	**7,118**	**5,803**	**5,162**	**5,022**	**4,387**	**2,871**	**1,516**

Notes:
No breakdown was given for England & Wales and Scotland in the DPu10. Network totals are only therefore reported.

Reporting confidence

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Results

Table 3.69 shows the total number of train detection failures for each year of CP4 for England & Wales, Scotland and the whole network, along with a comparison to our target for the year.

Commentary

Track circuits and axle counters showed a combined improvement of a further two per cent in 2013/14. Track circuit failures fell by four per cent, and have started to benefit from the fitment of remote condition monitoring equipment, and knowledge has been gained on how to harness the information this provides to ensure the most effective response.

Track circuit failures were adversely affected by the period of very hot weather during the summer of 2013 with high temperatures increasing the risk of failures occurring due to thermal expansion and components suffering heat related failures. Nevertheless, an equipment upgrade has led to improvements with the reliability (at very high ambient temperatures) of one particular equipment type (TI21 track circuits used mainly on southern routes) following the problems encountered with this type of track circuit during the previous summer.

Axle counter failures, by contrast, increased by thirteen per cent during 2013/14. This reflects an increasing population of these assets arising from new signalling schemes.

CP4 Overview

The number of train detection failures impacting on train services fell by 25 per cent between 2009/10 and 2013/14, with improvements in each year. For track circuits the reduction was 27 per cent, whilst for axle counters the reduction was 12 per cent.

The improvement in track circuit failures over this period was partly due to a reduction in the asset population, but was primarily due to the range of reliability initiatives, including remote condition monitoring and the earlier campaign to address failures of insulated block joints.

Whilst various component and software upgrades have reduced the failure rate of axle counters, the absolute number of such incidents has improved more slowly during CP4 (by comparison with the change observed for track circuit failures) due to the rapid increase in the population of these assets.

Telecoms condition

Definition

This is a measure of the overall average condition of operational concentrator assets based on the observed asset condition and utilises the prioritisation factor generated by each asset specific assessment in the Telecoms Decision Support Tool (DST).

Individual asset scores are weighted against condition, maintainability, operability and reliability.

The values are multiplied together in the DST to give a prioritisation factor, which is then used to recommend the course of action to be taken for the particular asset. The prioritisation factor for the individual asset is interpreted as:

- less than one - would lead to a reduction in remaining life
- equal to one - would have no impact on remaining life
- greater than one - would lead to an extension of remaining life.

This means that the higher the number, the better the individual condition of the asset.

Reporting method

The Telecoms Asset Condition measure was developed in 2008/09 to include telecoms within the overall Asset Stewardship Index and contributes 2.5 per cent to the overall measure. The measure has been used across CP4 to determine overall condition of operational assets that have a direct impact on the operational railway. The measure currently excludes a number of assets such as Station Information & Security Systems (SISS) or network assets such as the fixed telecoms network (FTN) or Global System for Mobile Communications – Railway (GSM-R). We are expecting to expand and improve our reporting set in CP5.

Table 3.69: Number of train detection (track circuit) failures for each year of CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*DPu10 2013/14*	*Variance*
England & Wales	5,426	4,711	4,424	4,156	4,039	-	-
Scotland	632	504	502	451	497	-	-
Network Total	**6,058**	**5,215**	**4,926**	**4,607**	**4,536**	**3,857**	**679**

Notes:
No breakdown was given for England & Wales and Scotland in the DPu10. Network totals are only therefore reported.

Table 3.70: Summary of telecoms asset condition in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*DPu10 2013/14*
England & Wales	0.925	0.935	0.940	0.963	0.975	n/a
Scotland	0.911	0.987	1.000	1.000	1.000	n/a
Network Total	**0.923**	**0.940**	**0.946**	**0.966**	**0.977**	**0.890**

Notes:
Data for 2011/12 has been updated to correct a typographical error identified in the Annual Return 2013.

Asset condition inspections are carried out as part of the asset inspection regime. The output of these inspections is then input to the DST, which determines the prioritisation factor and, when combined with the number of assets, derives the asset condition value.

Reporting confidence

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Results

Table 3.70 provides a summary of telecoms asset condition in CP4 for England & Wales, Scotland and the overall network, for comparison with the Plan 2013/14 target. Our target for CP4 was 0.890.

Commentary

The Telecoms Asset Condition results for 2013/14 are ahead of target at 0.977 reflecting the stable level of investment in the operational concentrator assets across CP3 and during CP4. During 2013/14 the measure has improved from 0.966 to 0.977.

The number of signal post telephones (SPT) concentrator assets recorded in the Telecoms Decision Support Tool (DST) at the beginning of 2013/14 was 776:

- 666 Processor's controlled concentrators
- 104 PABX concentrators
- six mechanical concentrators.

The corresponding number of SPT concentrator assets in March 2014 was 754, giving a net reduction of SPT concentrator assets during the year of 22. The overall net reduction is directly attributed to continued signalling renewal projects re-controlling signalled areas into larger signalling centres or Rail Operating Centres (ROCs) that enable smaller signal boxes to be closed, thereby reducing the number of small SPT concentrators required and delivering operating efficiencies and updated working practices.

This has led to a continued increase in the overall average condition of operational concentrator assets as the lower scoring signalling boxes are removed from the DST. The current asset condition score for the existing signalling centres, which the telecoms services have been transferred to, is higher in the DST for the SPT concentrators.

Based upon the total number of SPT concentrator assets at the beginning of the year, we have condition assessed 46 (or six per cent) of the assets during the year. The route split of completion of assessments is as follows:

- London North Eastern / East Midlands - ten inspections
- London North Western – ten inspections
- Scotland – five inspections
- Kent and Sussex – eight inspections
- Wessex and Anglia – eight inspections
- Wales – three inspections
- Western – two inspections.

CP4 overview

Over the course of CP4, we have progressively improved our ACI score from 0.923 in 2009/10 to 0.977 in 2013/14. This improvement has been achieved through both the closing of signal boxes by means of a move towards further use of re-signalling at Rail Operating Centres (ROCs) and work delivered as part of the National Operating Strategy (NOS) programme.

The National Operating Strategy sets out our vision to consolidate all signalling and control activity into 12 proposed rail operating centres (ROCs) over the next 15 to 30 years. This will allow larger areas of our network to be controlled from fewer locations and help increase capacity and improve reliability.

Telecoms failures

Definition

This covers the total number of telecoms incidents or failures causing train delay of more than ten minutes.

Reporting method

The information is derived from delay information sourced from the train running system (TRUST) and is attributed to assets via the Fault Management System (FMS). TRUST provides data for each recording point on the network and all information on current delay is ultimately sourced from the TRUST database.

Reporting confidence

The independent reporter has not assessed the accuracy or reliability of this measure. Therefore, no confidence grade is provided.

Results

England & Wales, Scotland and overall network results

- Table 3.71 shows the number of telecoms failures causing train delays of more than ten minutes in CP4 for England & Wales, Scotland and the overall network.

Operating route results

- Table 3.72 shows the number of telecoms failures causing train delays of more than ten minutes in CP4 for each operating route.

Table 3.73 shows the number of Global System for Mobile Communications Railway system (GSM-R) base stations that were supporting operational traffic in each period during 2013/14. Although the number of GSM-R base stations progressively increased, it was predominantly the large number of cab radios introduced that caused the telecoms delays.

Commentary

The total number of telecoms failures causing more than ten minutes of train delay for 2013/14 was 1,310 against a Delivery Plan target of 644. This represents a large decline in telecoms asset performance against target, although delay minutes did not increase in proportion to the failure numbers (1.8 per cent of infrastructure minutes versus 1.5 per cent in 2012/13). As for previous years of CP4 this decline can be attributed mostly to the rise in incidents caused by GSM-R failures reported.

Throughout the year GSM-R train delays have increasingly impacted the overall telecoms performance with 40 per cent of all train delays greater than ten minutes in 2013/14 being attributable to GSM-R. This rose to 70 per cent of all telecoms train delays greater than ten minutes in 2013/14. The increase has been predominately caused by large GSM-R introduction, with cab mobile software issues causing problems with cab mobiles being set-up and also causing Disk on Module (DOM) failures.

These software issues are currently being addressed following research, testing and now implementation of an upgrade to cab mobile software. This software update has been rolled out to over 565 vehicles, reaching more than 200,000 mean time before failures (MTBF) minutes so far.

Since roll out we have also seen a decrease in the number of cab mobile failures and provisioning errors (excluding Wales, which only completed roll out in April 2014 so the reduction in failures was not achieved by the end of CP4) as the reduction in DOM failures reduces the number of radio swap outs.

A total of eleven train operators have commenced roll out of the software update and plans are in place to address roll out to the remaining operators. As roll out continues, we expect to see a reduction in cab mobile incidents and improved performance.

Twenty-four power and data loggers are currently being installed on train stock to investigate other infrequent spurious issues that are being reported but not captured so we can better identify upcoming issues.

There have also been a high number of driver errors when routes have first adopted the new GSM-R system with errors during registration as well as the failure of drivers to follow bulletin 21, which allows drivers to commence their journey as long as the GSM-R network is displayed on their cab mobiles. These issues are now being mitigated with the implementation and re-briefing of bulletin 21 to the TOCs.

We have also improved reporting to the TOCs to better identify incidents where a driver error has occurred.

The number of base stations that were supporting operational traffic each period during 2013/14 (including Global System for Mobile Communications Railway system (GSM-R) sites) is shown in Table 3.73.

A further 855 GSM-R sites went live during 2013/14 providing secure driver to signaller radio communication. These GSM-R sites were predominantly in the north of the country and bring the total number of GSM-R sites in service to 2,217. The main areas covered during 2013/14 were Wales, the northeast and the northwest England. The only remaining parts of Great Britain's rail network yet to go live with GSM-R are Merseyrail and the freight-only branch lines in the north of England. These are scheduled for completion in July 2014.

Crossing telephone failures account for 15 per cent of the delay incidents. There were 202 train delay incidents greater than ten minutes attributed to crossing telephones in 2013/14 with a total of 9,496 minutes delay, compared to 212 incidents with a total of 9,493 minutes delay in 2012/13.

There has been extensive work to identify and replace the worst performing crossing telephones, including tackling obsolescence as well as route initiated projects to reposition crossing phones on our network. We are renewing fixed telephones on a

new for old basis to improve reliability and reduce whole life costs.

Nationally there have been 102 PETS renewals and 327 crossings with central battery telephones renewed.

We are investigating potential infrastructure single point of failures related to crossing telephones with a view to mitigate loss of communications by addressing common failures. We will be selecting a preferred manufacturer for future phone replacements and have reviewed the whole life cost benefits of removing repaired telephones and replacing with new going forward. This is currently being trialled in London North Eastern and Scotland with a view to expanding to the other routes if successful.

The preferred telephone model (DAC 708) was selected following trials and has now been adopted as the phone of choice for installing and using at level crossings. This new phone has proved to be more reliable and will be used for future projects and renewals in CP5 where possible.

Asset improvement plan

Asset performance initiatives to telecoms have continued during 2013/14 building on the activities commenced in 2012/13. During the year the focus has principally been on 13 work streams delivering improved asset reliability of crossing telephones, FTN and GSM-R as well as other local initiatives. The most significant performance initiative, which is for the GSM-R cab mobile software upgrade, was

Table 3.71: Number of telecoms failures causing delays greater than ten minutes in each year of CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	651	554	605	605	1,223
Scotland	119	135	93	92	87
Network Total	**770**	**689**	**698**	**697**	**1,310**

Table 3.72: Number of telecoms failures causing delays greater than ten minutes in each year of CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	88	102	108	107	258
East Midlands	31	45	22	20	53
Kent	35	21	40	37	32
London North Eastern	190	154	144	142	154
London North Western	59	38	81	85	103
Scotland	119	135	93	92	87
Sussex	34	41	49	48	60
Wales	121	80	76	78	92
Wessex	48	25	30	36	257
Western	45	48	55	52	214
Network Total	**770**	**689**	**698**	**697**	**1,310**

Table 3.73: Number of base stations that were supporting traffic each period during 2013/14

Period	*Date from*	*Date to*	*GSM-R BTSs in service (cumulative)*
1	31/03/2013	27/04/2013	1,362
2	28/04/2013	25/05/2013	1,362
3	26/05/2013	22/06/2013	1,362
4	23/06/2013	20/07/2013	1,416
5	21/07/2013	17/08/2013	1,538
6	18/08/2013	14/09/2013	1,579
7	15/09/2013	12/10/2013	1,579
8	13/10/2013	09/11/2013	1,620
9	10/11/2013	07/12/2013	1,713
10	08/12/2013	04/01/2014	1,781
11	05/01/2014	01/02/2014	1,914
12	02/02/2014	01/03/2014	2,013
13	02/03/2014	29/03/2014	2,217

trialled in February 2014 and approved for release at the end of March 2014. Cable route hardening has also contributed to the reduction in instances of cable theft resulting in the lowest levels of theft in CP4.

Following implementation in 2012/13, telecoms caused train delays that incur more than 200 minutes delay now have a service performance improvement report created to support investigation of incidents and establish the fundamental cause of failure. Within the report a set of recommendations to prevent re-occurrence are provided and these are added to the telecoms service improvement plan as actions. The telecoms service improvement plan then tracks progress so that service improvements that have been identified are implemented.

CP4 overview

The majority of telecoms failures in CP4 have been due to the implementation of the new GSM-R system. This system is an EU legal requirement for Network Rail to implement and has resulted in significant safety improvements. However, the introduction of this completely new system has also caused a significant increase in telecoms incidents. If not for these GSM-R failures, the total number of telecoms failures would have been within our national targets.

Aside from the GSM-R failures, the failure of crossing telephones continues to be a main point of concern as the next largest contributor to the national figures, comprising around 50 per cent of the non-GSM-R failure figures. We will be undertaking important work on GSM-R and level crossings to improve the performance of the GSM-R system early in CP5, which is of high priority. These are anticipated to deliver improvement over the early part of CP5.

The remaining failures are mostly caused by transmission systems and legacy radio systems. However, with the increased roll out and utilisation of GSM-R, we will see the failure of legacy radio systems reduce as utilisation is reduced and systems are recovered. We are also undertaking work to improve our transmission systems to reduce the rate of ongoing failures.

Alternating current traction power incidents causing train delays (M11)

Definition

This measure reports the number of overhead line (OHL) equipment component related failures that lead to incidents that cause delays exceeding 500 minutes. Incidents due to bird strikes and vegetation incursion are included but those proved to have been caused by defective train equipment, outside parties, vandalism and those arising as a direct result of extreme weather conditions are excluded.

Reporting method

The asset reporting manager monitors the failures reported in the Daily National Incident Report and at each period end the summary is sent to our Route Asset Managers to review and verify. They investigate the cause of each traction power incident, and the verified figures are provided back to the asset reporting manager for collation.

Reporting confidence

This measure was assigned a B2 confidence grade by the previous independent reporter for output monitoring. As this measure has not been reassessed since 2009/10 this confidence grade does not take into account the improvements that have been made since that time. We do not believe that this confidence grade is therefore reflective of the current position. However, the confidence grade is reported for completeness.

Results

Table 3.74 shows the proportion of identified root causes of alternating current (AC) traction power incidents causing train delays in 2013/14.

England & Wales, Scotland and overall network results

- Table 3.75 shows the annual number of AC electrification (OHL equipment) failures in England & Wales, Scotland, and the network total.

Operating route results

- Table 3.76 shows the annual number of AC electrification (OHL equipment) failures for each operating route.

Commentary

During 2013/14 there were 61 incidents, an increase on last year's figure of 52 incidents. The performance in England & Wales is in line with recent years but Scotland's performance was significantly worse than the previous years of CP4. This decline was due to asset condition, equipment design and construction delivery issues associated with work on the Springburn – Cumbernauld new electrification.

Table 3.74 shows that the most significant contributors to AC traction power incidents causing delay is asset condition and equipment design.

The number of AC traction power incidents causing delay due to asset condition has increased by three percentage points compared to 2012/13 when it was 17 per cent.

There was a significant increase in the number of AC traction power incidents causing delay due to equipment design, which increased by 23 percentage points, from 15 per cent in 2012/13 to 38 per cent in 2013/14.

This was caused by design issues associated with a particular specification of neutral section (an OHL asset used to separate different electrical supply points). A prioritised programme of detailed inspections (using a Borescope) of other similar neutral sections has therefore been implemented to reduce the risk of further failures.

Other equipment design related issues included:

- a known campaign change on the UK1 design of OHL and an OHL configuration that led to a component carrying current (when it should not have done) under certain train movement
- limited electrical clearances being encroached by birds which led to flashovers and associated damage.

The impact of a significant campaign prior to the 2012 Olympics and subsequent ongoing management to identify and clear defects on the overhead line equipment has continued to have a positive effect on Anglia's performance.

The approach of a targeted campaign to achieve a stepped increase in reliability has been adopted by the London North Western (LNW) Route which had previously seen an increasing trend in OHL failures in CP4, some of which were associated with design issues on Mark One OHL. In 2013/14 a total of 6,416 defects, of which 438 were high priority, were removed from OHL assets in the southern part of LNW as part of the targeted campaign.

The ongoing efforts in Anglia and more recently in LNW have had a continued positive effect on containing the number of asset condition based failures this year.

Table 3.74 shows that maintenance delivery and the maintenance regime remain notable root causes of the overall number of incidents. It is anticipated that these will be addressed as the programme to implement Risk Based Maintenance for OHL (based on the Reliability Centred Maintenance process) completes its implementation phase which has commenced in Scotland and LNW. This will be supported by ongoing work to improve the training and competence of OHL maintenance staff.

In CP5 Network Rail will be electrifying significant amounts of the existing non electrified network with new OHL. The analysis in Table 3.74 shows that in 2013/14 equipment design and construction delivery accounted for nearly 50 per cent of the root cause of ac traction power failures. The new electrification programme presents opportunities to significantly reduce the volume of failures due to these root causes for the new OHL assets.

The mechanisms by which this will be achieved include:

- improved processes (assurance) e.g. 'safety by design' initiatives, material quality control, supplier qualification and construction assurance
- improved designs e.g. known failure modes eliminated, fewer component parts, application of European best practice
- improved competence and training for OHL construction staff (as noted above for maintenance staff)
- cross industry collaboration e.g. technical forums and work with the Rail Electrification Delivery Group.

CP4 Overview

Despite a backdrop of increased network utilisation and electrical demand across CP4 the number of greater than 500 minute events for alternating current traction power incidents remained broadly steady. However, the abnormal performance in Scotland in 2013/14, as previously discussed, has led to a return to a number of failures similar to that of early CP4.

This has meant that the target of reducing the number of failures across CP4 was not met. It is anticipated that the initiatives described earlier e.g. focussed efforts on defect removal, removal of design issues through campaign changes, increased OHL construction and maintenance competences and renewals investment should help to improve AC traction power performance in CP5.

Table 3.74: Root causes of AC traction power incidents causing train delays (%) in 2013/14

Asset condition	20
Equipment design	38
Construction delivery	10
Maintenance delivery	15
Maintenance regime	16
Other	2

Notes:
Percentage splits do not add to 100 per cent due to rounding.

Table 3.75: Annual number of AC electrification (overhead line equipment) failures in CP4					
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	43	56	46	51	52
Scotland	3	5	4	1	9
Network Total	**46**	**61**	**50**	**52**	**61**

Table 3.76: Annual number of AC electrification (overhead line equipment) failures in CP4 by operating route					
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	13	26	21	11	7
East Midlands	4	3	0	2	3
Kent	0	1	0	0	1
London North Eastern	9	14	5	12	15
London North Western	17	10	20	25	24
Scotland	3	5	4	1	9
Sussex	0	0	0	0	1
Wales	n/a	n/a	n/a	n/a	n/a
Wessex	n/a	n/a	n/a	n/a	n/a
Western	0	2	0	1	1
Network Total	**46**	**61**	**50**	**52**	**61**
Notes: Wales and Wessex do not have any AC electrification assets.					

Direct current traction power incidents causing train delays (M12)

Definition

This measure reports the number of conductor rail component related failures that lead to incidents that cause delays exceeding 500 train delay minutes. It excludes incidents caused by defective train equipment, outside parties, vandalism, animals and those arising as a direct result of extreme weather conditions.

Reporting method

The asset reporting manager monitors failures reported in the Daily National Incident Report and at each period end the summary is sent to our Route Asset Managers to review and verify. They investigate the cause of each traction power incident and the verified figures are provided back to the asset reporting manager for collation.

Reporting confidence

This measure was assigned a BX confidence grade by the previous independent reporter for output monitoring. This was because the Reporter found that the data pool was too small to support an accuracy assessment. As this measure has not been reassessed since 2009/10 this confidence grade does not take into account the improvements that have been made since that time. We do not believe that this confidence grade is therefore reflective of the current position. However, the confidence grade is reported for completeness.

Results

Table 3.77 shows the proportion of identified root causes of direct current (DC) traction power incidents causing train delays in 2013/14.

England & Wales, Scotland and overall network results

- Table 3.78 shows the annual number of DC electrification (conductor rail) failures in England & Wales, Scotland and the network total.

Operating route results

- Table 3.79 shows the annual number of DC electrification (conductor rail) failures for each operating route with this asset type.

East Midlands, Scotland, Wales and Western do not have any DC traction power assets.

Commentary

There were 16 incidents during 2013/14 which is a significant increase on last year but consistent with performance during earlier years of CP4. Of these incidents nine were in Wessex, four were in Sussex and three were in Kent.

One of the main causes of failures in all routes, and particularly in Wessex, was cable failures where a particular design of a cable lug (the interface between the 650/750V cable and the conductor rail) is not performing as expected in an operational environment. We are working with the manufacturer of the lug (now on version two) to improve the performance of this asset.

Table 3.77: Root causes of DC traction power incidents causing train delays (%) in 2013/14	
Asset condition	31
Equipment design	31
Construction delivery	0
Maintenance delivery	0
Maintenance regime	38
Other	0

Table 3.78: Annual number of DC electrification (conductor rail) failures in CP4					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	14	14	16	8	16
Scotland	n/a	n/a	n/a	n/a	n/a
Network Total	**14**	**14**	**16**	**8**	**16**
Notes: Scotland does not have any DC conductor rail.					

Table 3.79: Annual number of DC electrification (conductor rail) failures in CP4 by operating route					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	0	0	1	0	0
East Midlands	n/a	n/a	n/a	n/a	n/a
Kent	2	6	5	0	3
London North Eastern	0	0	0	0	0
London North Western	1	0	0	0	0
Scotland	n/a	n/a	n/a	n/a	n/a
Sussex	6	3	5	5	4
Wales	n/a	n/a	n/a	n/a	n/a
Wessex	5	5	5	3	9
Western	n/a	n/a	n/a	n/a	n/a
Network Total	**14**	**14**	**16**	**8**	**16**
Notes: East Midlands, Scotland, Wales and Western do not have any DC traction power assets.					

An analysis of the root causes of DC traction failures shows a notable improvement in the percentage of failures attributed to asset condition, decreasing from 88 per cent in 2012/13, where it had been the dominant root cause, to 31 per cent in 2013/14. In 2013/14 equipment design and maintenance regime were notable contributors to the number of incidents, where as they previously had no affect.

The increase in incidents caused by equipment design was largely due to the performance of the 650/750V cables / cable lugs as noted above.

The increase in incidents caused by the maintenance regime was due to a combination of factors which included:

- planned maintenance being impacted by resources diverting onto action plans to address the cable lug issue
- a planned preventative maintenance and defect management regime in need of overhaul.

The second item above will be addressed by the implementation of a new set of conductor rail equipment work instructions that have been set up for the implementation of reliability centred maintenance. Roll out of the new work instructions has commenced.

CP4 Overview

The number of direct current traction power incidents causing delays exceeding 500 train delay minutes remained broadly steady across the control period. This steady performance is despite an increase in train movements and electrical power demand across the control period.

The performance in 2012/13 was markedly better than previous years as a result of a steady or improved performance across all routes. If it were not for the atypical performance in Wessex in 2013/14 then the 2012/13 national performance levels are likely to have been maintained.

The number of incidents per year for this measure is relatively low and as such can be volatile as demonstrated by the 2012/13 performance compared to other years. The 2013/14 result has meant that the target of reducing the number of failures across CP4 was not met but the cause for the 2013/14 performance is understood and, as noted earlier, there are plans in place to address it.

In addition it is anticipated that the implementation of the new inspection and maintenance work instructions will help to improve the performance of the DC traction power system.

Electrification condition – AC traction feeder stations and track sectioning points (M13)

Definition

This is a measure of the condition of alternating current (AC) traction feeder stations and track sectioning points, on a scale of one to five, based on visual inspection, age, robustness of design, maintenance / refurbishment history and operational performance of the 25kV switchgear. The condition grades are as follows:

- Band 1: equipment is free from defects with negligible deterioration in condition
- Band 2: evidence of minor defects and/or early stage deterioration that may require some remedial work to be undertaken
- Band 3: defects and/or a level of deterioration that requires remedial work to be undertaken
- Band 4: significant defects and/or a high level of equipment deterioration needing major repairs / heavy maintenance or complete renewal to be programmed
- Band 5: serious defects and deterioration of a level that, should the equipment still be in operation, has potential for service disruption.

The condition measure reports the percentage of AC traction feeder stations and track sectioning points falling within each of the above defined condition grades.

Reporting method

The data in this Annual Return has been produced in accordance with the methodology utilised in previous years and supports the Network Rail standard for this measure, first published in September 2009. The condition assessments are carried out through a combination of visual inspections and measurements at 25kV switchgear feeder stations and traction sectioning points.

The condition assessment grade is a result of weighted pre-determined questions that consider the robustness of the installation, fitness for purpose, and maintainability. The measure takes advantage of in-house maintenance and developments in technology to allow an element of non-intrusive measurement to be made, therefore reducing the subjectivity of the assessment.

Reporting confidence

This measure was assigned a XX confidence grade by the previous independent reporter for output monitoring. This was because the year that this review was conducted was a transitional year for this measure with the reporting process having just been revised and improved. As this measure has not been reassessed since 2009/10 this confidence grade does not take into account the improvements that have been made since that time. We do not believe that this confidence grade is therefore reflective of the current position. However, the confidence grade is reported for completeness.

Results

England & Wales, Scotland and overall network results

- Table 3.80 provides the number and proportional percentage of AC traction feeder stations and track sectioning points within each of the condition bands for England & Wales, Scotland, and the overall network, based on a sample size of 307 sites, which is consistent with the 2012/13 sample size of 311 sites. This sample size, at around 98 per cent, is very slightly behind the target of 100 per cent for the end of CP4. This is due, in part, to changes in the asset base during CP4, with some sites being removed and new sites being commissioned which have yet to have a condition assessment.

Operating route results

- Table 3.81 shows the average condition grade for each AC operating route in CP4. Kent, Wales and Wessex routes are not reported as they do not currently have any AC traction feeder stations or track sectioning points.

Commentary

The average condition score of AC traction feeder substations for 2013/14 is 2.35, which is a slight reduction on last year's score of 2.29 but better than our target of 2.78 for these assets and ahead of the average for CP4.

The score for each route has deteriorated slightly in 2013/14, with the exception of Sussex. This is as a result of several factors which include:

- a general ageing of the asset population
- planned renewals in CP4 largely being completed in the earlier years of CP4

- planned refurbishments on London North Eastern (LNE) being put on hold pending power supply upgrade works in CP5
- a deferral of the renewal on London North Western (LNW) of five sites containing K11 oil filled switchgear due to contractor performance and operational constraints.

Sussex's score has experienced significant improvement in 2013/14 due to a data validation exercise to reflect the fact that the site was renewed in 2012/13.

CP4 Overview

Table 3.80 shows that overall the condition of AC traction feeder stations and track sectioning points has improved over CP4 and was consistently better than the target in each year.

The renewal of some of the older style oil filled high voltage switchgear along with the impact of power supply upgrade enhancement schemes, notably on the West Coast Main Line, have contributed to these improved scores.

Table 3.80: Electrification condition – AC traction feeder substations (overhead line) in CP4

	Condition Grade		***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	1	Number	*	37	33	57	56
		Percentage	*	14	13	22	21
	2	Number	*	54	61	80	83
		Percentage	*	20	24	30	32
	3	Number	*	112	124	105	91
		Percentage	*	41	49	40	35
	4	Number	*	58	31	22	31
		Percentage	*	21	12	8	12
	5	Number	*	11	2	0	0
		Percentage	*	4	1	0	0
	Average condition grade		*	2.58	2.59	2.32	2.37
Scotland	1	Number	*	3	14	14	13
		Percentage	*	8	30	30	28
	2	Number	*	13	19	18	12
		Percentage	*	34	40	38	26
	3	Number	*	16	13	14	19
		Percentage	*	42	28	30	41
	4	Number	*	6	1	1	2
		Percentage	*	16	2	2	4
	5	Number	*	0	0	0	0
		Percentage	*	0	0	0	0
	Average condition grade		2.60	2.41	2.13	2.18	2.26
Network Total	**1**	**Number**	**8**	**40**	**47**	**71**	**69**
		Percentage	**15**	**13**	**16**	**23**	**22**
	2	**Number**	**13**	**67**	**80**	**98**	**95**
		Percentage	**24**	**22**	**27**	**32**	**31**
	3	**Number**	**20**	**128**	**137**	**119**	**110**
		Percentage	**37**	**41**	**46**	**38**	**36**
	4	**Number**	**12**	**64**	**32**	**23**	**33**
		Percentage	**22**	**20**	**11**	**7**	**11**
	5	**Number**	**1**	**11**	**2**	**0**	**0**
		Percentage	**2**	**4**	**1**	**0**	**0**
	Average condition grade		**2.70**	**2.56**	**2.57**	**2.29**	**2.35**

Notes:
Percentage splits do not add to 100 per cent due to rounding.
* Information unavailable due to a different reporting format in 2009/10.

Table 3.81: Average electrification condition – AC traction feeder substations (overhead line) in CP4 by operating route					
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	2.59	2.40	2.55	2.09	2.13
East Midlands	*	2.48	2.45	2.23	2.31
Kent	n/a	n/a	n/a	n/a	n/a
London North Eastern	2.21	1.99	2.27	2.17	2.26
London North Western	3.29	3.11	3.02	2.51	2.62
Scotland	2.60	2.41	2.13	2.18	2.26
Sussex	*	2.81	3.19	3.25	1.03
Wales	n/a	n/a	n/a	n/a	n/a
Wessex	n/a	n/a	n/a	n/a	n/a
Western	*	2.03	2.40	2.33	2.40
Network Total	**2.70**	**2.56**	**2.57**	**2.29**	**2.35**

Notes:
Kent, Wales and Wessex do not currently have any AC traction feeder stations or track sectioning points.
* Data not available.

Electrification condition – DC traction substations (M14)

Definition

A high level measure of the condition of direct current (DC) traction substations, on a scale of one to five, based on visual inspection, age, robustness of design, maintenance / refurbishment history and operational performance of the equipment.

The condition grades are as follows:

- Band 1: equipment is free from defects with negligible deterioration in condition
- Band 2: evidence of minor defects and/or early stage deterioration that may require some remedial work to be undertaken
- Band 3: defects and/or a level of deterioration that requires remedial work to be undertaken
- Band 4: significant defects and/or a high level of equipment deterioration needing major repairs / heavy maintenance or complete renewal to be programmed
- Band 5: serious defects and deterioration of a level that, should the equipment still be in operation, has potential for service disruption.

The condition measure reports the percentage of DC traction substations falling within each of the above defined condition grades.

Reporting method

The data in this Annual Return has been produced in accordance with the methodology utilised in previous years and supports the Network Rail standard for this measure. The condition assessment grade is a result of visual inspection based on weighted pre-determined questions that consider the age, robustness of design, maintenance / refurbishment history and the operational performance of the HV switchgear, rectifier transformers, rectifiers and DC switchgear. The measure takes advantage of in-house maintenance and developments in technology to allow an element of non-intrusive measurement to be made, therefore reducing the subjectivity of the assessment.

Reporting confidence

This measure was assigned a XX confidence grade by the previous independent reporter for output monitoring. This was because the year that this review was conducted was a transitional year for this measure with the reporting process having just been revised and improved. As this measure has not been reassessed since 2009/10 this confidence grade does not take into account the improvements that have been made since that time. We do not believe that this confidence grade is therefore reflective of the current position. However, the confidence grade is reported for completeness.

Results

England & Wales, Scotland and overall network results

- Table 3.82 provides the number and proportional percentage of DC traction substations for England & Wales, and the overall network. There are no DC traction substations in Scotland so the England & Wales results are also the network results.

Operating route results

- Table 3.83 shows the average condition grade by operating route in CP4. East Midlands, Scotland, Wales and Western routes are not reported as they do not have any DC traction substations.

Table 3.82: Electrification condition – DC traction substations in CP4

	Condition Grade		2009/10	2010/11	2011/12	2012/13	2013/14
England & Wales	1	Number	8	17	25	14	20
		Percentage	16	14	9	5	7
	2	Number	22	51	141	161	180
		Percentage	45	43	48	58	61
	3	Number	16	44	98	92	83
		Percentage	33	37	34	33	28
	4	Number	3	7	20	13	13
		Percentage	6	6	7	4	4
	5	Number	0	0	7	0	0
		Percentage	0	0	2	0	0
	Average condition grade		2.32	2.36	2.45	2.38	2.34
Scotland	1	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	2	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	3	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	4	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	5	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	Average condition grade		n/a	n/a	n/a	n/a	n/a
Network Total	**1**	**Number**	**8**	**17**	**25**	**14**	**20**
		Percentage	**16**	**14**	**9**	**5**	**7**
	2	**Number**	**22**	**51**	**141**	**161**	**180**
		Percentage	**45**	**43**	**48**	**58**	**61**
	3	**Number**	**16**	**44**	**98**	**92**	**83**
		Percentage	**33**	**37**	**34**	**33**	**28**
	4	**Number**	**3**	**7**	**20**	**13**	**13**
		Percentage	**6**	**6**	**7**	**4**	**4**
	5	**Number**	**0**	**0**	**7**	**0**	**0**
		Percentage	**0**	**0**	**2**	**0**	**0**
	Average condition grade		**2.32**	**2.36**	**2.45**	**2.38**	**2.34**

Notes:
Percentage splits do not add to 100 per cent due to rounding.
Scotland does not have any DC traction substations so the England & Wales results also represent the Network Total results.

Commentary

The average condition score of DC traction substations reported represents an average of the last available scores for each location that has had a condition assessment. The average condition score for DC traction substations has continued to improve since 2011/12 when it was 2.45, to 2.38 in 2012/13 and 2.34 in 2013/14. For 2013/14 the condition score was calculated using the condition scores for 296 substations. This is a slight increase on the 2012/13 sample size and so the results reflect a consistent approach in the final year of CP4. The sample size population is however lower than the target of 100 per cent at the end of CP4. The root causes for the incomplete sample size are being investigated so that we can improve future asset condition assessment and reporting processes.

The London North Western score has worsened slightly from 2.10 to 2.18 as result of the general aging of the asset population.

The 2012/13 score reported for LNE in the 2013 Annual Return was incorrect due to a typographical error and should have been reported as 2.04. The 2013/14 score has slightly worsened to 2.07 due to the general aging of the assets.

Sussex's score has improved as a result of a data cleansing and verification exercise by the route's electrification and plant asset management team, as well as the impact of planned renewals.

Table 3.83: Average electrification condition – DC traction substations in CP4 by operating route					
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	2.34*	2.11	1.89	1.92	1.95
East Midlands	n/a	n/a	n/a	n/a	n/a
Kent	2.34*	2.69	2.7	2.54	2.53
London North Eastern	2.12	1.17	2.01	2.04**	2.07
London North Western	2.41	2.34	2.47	2.10	2.18
Scotland	n/a	n/a	n/a	n/a	n/a
Sussex	2.34*	1.77	2.25	2.32	2.16
Wales	n/a	n/a	n/a	n/a	n/a
Wessex	2.34*	2.49	2.22	2.34	2.34
Western	n/a	n/a	n/a	n/a	n/a
Network Total	**2.32**	**2.36**	**2.45**	**2.38**	**2.34**

Notes:
East Midlands, Scotland, Wales and Western do not currently have any DC traction substations.
* There are no individual condition scores for Anglia, Kent, Sussex or Wessex in 2009/10 due to these Routes being reported under the banner of South East in that year's Annual Return.
** 201213 data for London North Eastern was previously reported as 2.40 due to a typing error. Correct figure is 2.04.

The stable results for both Kent and Wessex are as a result of the impact of renewals and enhancement schemes as well as a condition data verification exercise in Kent.

The modest improvement in the average score for the network reflects the impact of the scores in Kent, Sussex and Wessex which have the majority of the DC traction substation asset base.

CP4 Overview

Table 3.82 shows that the average condition grade for DC traction substations in CP4 has remained steady and has consistently been better than the regulatory target. This is as a result of planned renewals and assets being enhanced as part of power supply enhancement activities in Kent, Sussex and Wessex.

The adverse performance in 2011/12 was as a result of a number of asset renewal projects being delayed due to system design issues and changes to the delivery strategy. In addition there were also some minor errors identified in the condition assessment process which were remedied the following year.

Electrification condition – AC traction contact systems (M15)

Definition

A high level measure of the condition of Network Rail's alternating current (AC) contact systems, on a scale of one to five, based on the physical wear of the contact wire and visual inspection of key components including the contact and catenary wires, registration assemblies and structures. A condition grade of one indicates that the assessed equipment is in good condition where as a measure of five indicates that the assessed equipment is in poor condition. This measure excludes all earthing, bonding and traction return circuits.

Reporting method

In order to report the condition of AC contact systems a condition assessment is undertaken of the overhead line equipment. During 2012/13 there was a change in the process for reporting the condition assessments, with data now being taking information from Network Rail's corporate asset register for electrification assets, Ellipse, allowing use of a larger data sample than before. The score reported is an average of the last five years' data. The condition grade is as detailed in reporting methods for M13 and M14 previously.

Reporting confidence

This measure was assigned a C4 confidence grade by the previous independent reporter for output monitoring. As this measure has not been reassessed since 2009/10 this confidence grade does not take into account the improvements that have been made since that time. We do not believe that this confidence grade is therefore reflective of the current position. However, the confidence grade is reported for completeness.

Results

Table 3.84 provides the CP4 results for the number and proportional percentage of the AC contact systems within the five condition grades for England & Wales, Scotland and the overall network, based on a sample size not covering the total population of wire runs.

Table 3.84: Electrification condition – AC traction contact systems in CP4							
	Condition Grade		***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	1	Number	*	1,039	628	503	2,536
		Percentage	*	87	73	89	87
	2	Number	*	153	140	57	344
		Percentage	*	13	16	10	12
	3	Number	*	0	70	2	39
		Percentage	*	0	8	0	1
	4	Number	*	4	18	1	3
		Percentage	*	0	2	0	0
	5	Number	*	1	4	1	0
		Percentage	*	0	0	0	0
	Average condition grade		1.60	1.60	1.62	1.34	1.26
Scotland	1	Number	n/a	n/a	4	89	83
		Percentage	n/a	n/a	5	39	36
	2	Number	n/a	n/a	76	138	141
		Percentage	n/a	n/a	92	60	62
	3	Number	n/a	n/a	3	2	5
		Percentage	n/a	n/a	4	1	2
	4	Number	n/a	n/a	0	0	0
		Percentage	n/a	n/a	0	0	0
	5	Number	n/a	n/a	0	0	0
		Percentage	n/a	n/a	0	0	0
	Average condition grade		n/a	n/a	1.58	1.53	1.54
Network Total	**1**	**Number**	*	**1,039**	**632**	**592**	**2,619**
		Percentage	*	**87**	**67**	**75**	**83**
	2	**Number**	*	**153**	**216**	**195**	**485**
		Percentage	*	**13**	**23**	**25**	**15**
	3	**Number**	*	**0**	**73**	**4**	**44**
		Percentage	*	**0**	**8**	**1**	**1**
	4	**Number**	*	**4**	**18**	**1**	**3**
		Percentage	*	**0**	**2**	**0**	**0**
	5	**Number**	*	**1**	**4**	**1**	**0**
		Percentage	*	**0**	**0**	**0**	**0**
	Average condition grade		**1.60**	**1.60**	**1.62**	**1.40**	**1.34**

Notes:
Percentage splits do not add to 100 per cent due to rounding.
* Information unavailable due to a different reporting format in 2009/10.
There is no condition data available for Scotland for 2009/10 and 2010/11 due to delays in adopting the revised condition assessment and reporting process.

In 2013/14 the sample size was 3,151 wire runs compared to 793 wire runs in 2012/13. Over CP4 some 7,700 wire runs have had their condition assessed and reported. However, these are not unique condition scores and as there were circa 9,700 wire runs nationally this overall sample size is less than the target of 100 per cent by the end of CP4. The root causes for the incomplete sample size are being investigated so that we can improve future asset condition assessment and reporting processes.

In CP5 a forecast of asset remaining life will replace this measure.

Commentary

The condition score of AC traction contact systems for the whole network has improved from 1.40 in 2012/13 to 1.34 in 2013/14. A significant increase in the amount of assets being assessed, the impact of defect removal and renewal works in 2012/13 and 2013/14 have all contributed to this improvement.

In England & Wales the condition score has improved from 1.34 in 2012/13 to 1.26 in 2013/14.

This is due to poor condition scores for LNE and LNW in 2008/09 no longer appearing in the last five years' data which is used to determine the score.

For Scotland the condition score has degraded slightly from 1.53 in 2012/13 to 1.54 in 2013/14 due to an increase of defects in backlog. The Route has developed an action plan to recover the situation by the end of 2014/15.

CP4 Overview

Table 3.84 shows that over CP4 the five year average condition score for AC traction contact systems (OHL) has either been in line with or slightly better than our target of 1.6.

As noted earlier there has been a change in process for reporting the condition score for this asset and so care must be taken making direct year on year comparisons. However, the condition scores in Table 3.84 show that there has been a general improvement in condition as a result of the different interventions (maintenance, defect removal, campaign changes, etc) carried out during CP4.

Electrification condition – DC traction contact systems (M16)

Definition

A high level measure of the condition of Network Rail's direct current (DC) contact systems, on a scale of one to five, based on physical wear measurement of the conductor rail. A condition grade of one indicates that the assessed equipment is in good condition where as a measure of five indicates that the assessed equipment is in poor condition. The measure excludes any associated equipment such as insulators, anchor assemblies, and protective boarding.

Reporting method

In order to report the condition of the DC contact system a condition assessment is undertaken on the conductor rail to see how much wear has occurred on a sample of the asset. The conductor rail material and design is taken into account as part of the assessment of condition as different materials/ designs wear at different rates.

The score reported takes account of the reporting year (the fact that the majority of the asset population is one year older than the previous assessment of condition), the impact of renewals (where wear is reset to zero) and any updated wear measurements or new wear measurements from assets not previously included.

Reporting confidence

This measure was assigned a C4 confidence grade by the previous independent reporter for output monitoring. As this measure has not been reassessed since 2009/10 this confidence grade does not take into account the improvements that have been made since that time. We do not believe that this confidence grade is therefore reflective of the current position. However, the confidence grade is reported for completeness.

Results

Table 3.85 provides the number and proportional percentage of the DC contact systems within the five condition grades for England & Wales and the whole network for CP4. There are no DC traction contact systems in Scotland so the England & Wales results are also the network results. The results are based on a sample size of 74 per cent.

The sample size is less than the target of 100 per cent for the final year of CP4. This was due, in the main, to the manual method of wear measurement of live conductor rail being withdrawn. Whilst a train borne measurement system was introduced part way through CP4 its availability has been limited and it presents data in a different format to the manual measurement technique.

Output from the train borne system will be used to report on DC traction contact system remaining life in CP5.

Commentary

The condition score of DC traction contact systems for the whole network has degraded slightly from 1.99 in 2012/13 to 2.01 in 2013/14. This decrease in the condition score is a reflection of the continued slow movement of the asset base through the condition bands as a result of the general aging of this large asset base.

The under delivery of renewal volumes in 2013/14 had a small impact. The root cause analysis of service affecting incidents would indicate that this has not had any material impact on overall network performance.

The extent of the decrease in condition score has been mitigated slightly by a cleansing of data for the Euston – Watford section of LNW. In addition, the scoring methodology for the Euston – Watford Route was aligned to the other sections of DC traction contact system on LNW, namely the Merseyrail network.

The score also reflects the impact of the renewals that were completed in 2013/14 and an update in condition data from the Merseyrail network.

General asset deterioration has continued to be addressed with interventions through asset renewal and refurbishment. These have included routes targeting renewals / refurbishment of:

- localised accelerated wear at level crossings that has been caused by the change to electric multiple unit shoe-gear configuration
- poorly performing sections of aluminium steel composite in underground railway
- welding of fish plate joints and braided connections.

Route renewal activity has focused on addressing locations with poor condition assets (condition four and five) to mitigate any potential adverse impacts e.g. breaks in the conductor rail. However, the previously mentioned under delivery of volumes in 2013/14 has meant that the volume of assets in conditions four and five has seen small increases when compared to 2012/13.

Further targeted renewals and refurbishments are planned for CP5 and these have been identified in part, by making greater use of increased output from the train borne Conductor Rail Measurement System (CRMS). The use of CRMS along with the introduction of new inspection and maintenance procedures (as described earlier under M12) means that there is increased focus on the performance and condition of this asset.

Table 3.85: Electrification condition – DC traction contact systems in CP4

	Condition Grade		***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	1	Number	*	1,059	1,025	988	968
		Percentage	*	33	31	30	29
	2	Number	*	1,414	1,464	1,487	1,504
		Percentage	*	44	45	45	45
	3	Number	*	656	671	699	711
		Percentage	*	20	20	21	21
	4	Number	*	108	109	117	130
		Percentage	*	3	3	4	4
	5	Number	*	7	7	8	9
		Percentage	*	0	0	0	0
	Average condition grade		1.90	1.90	1.96	1.99	2.01
Scotland	1	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	2	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	3	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	4	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	5	Number	n/a	n/a	n/a	n/a	n/a
		Percentage	n/a	n/a	n/a	n/a	n/a
	Average condition grade		n/a	n/a	n/a	n/a	n/a
Network Total	**1**	**Number**	*	**1,059**	**1,025**	**988**	**968**
		Percentage	*	**33**	**31**	**30**	**29**
	2	**Number**	*	**1,414**	**1,464**	**1,487**	**1,504**
		Percentage	*	**44**	**45**	**45**	**45**
	3	**Number**	*	**656**	**671**	**699**	**711**
		Percentage	*	**20**	**20**	**21**	**21**
	4	**Number**	*	**108**	**109**	**117**	**130**
		Percentage	*	**3**	**3**	**4**	**4**
	5	**Number**	*	**7**	**7**	**8**	**9**
		Percentage	*	**0**	**0**	**0**	**0**
	Average condition grade		**1.90**	**1.90**	**1.96**	**1.99**	**2.01**

Notes:
Percentage splits do not add to 100 per cent due to rounding.
* Information unavailable due to a different reporting format in 2009/10.
Scotland does not have any DC conductor rail.

CP4 Overview

Table 3.85 shows that the condition of the DC traction contact system has degraded slightly over CP4 and has been worse than the regulatory target of 1.9 for the last three years.

This is mainly a reflection of the movement of the overall asset base moving slowly through the condition grades as the overall age/utilisation of the c. 4,400 kilometres of conductor rail increases.

The worsening condition score of this asset base during CP4 also reflects, in small part, the under delivery of conductor rail renewal activities (due to access constraints and other logistical issues), although the locations which were in poorest condition have been targeted as a result of better asset knowledge through the use of data from the CRMS.

Since 2011, the use of output from the CRMS has helped the routes to identify and prioritise high priority intervention activities and locations. Furthermore, the identification of poor condition assets has been made significantly easier in 2013/14 through the development and application of a web based reporting tool known as the conductor rail web reporting tool.

Traction power incidents causing train delays of more than 300 minutes

Definition

A measure which reports the number of:

- overhead line equipment component related failures that led to incidents causing delays exceeding 300 train delay minutes, including incidents due to bird strikes and vegetation incursion
- conductor rail component related failures that lead to incidents exceeding 300 train delay minutes, excluding incidents proven to have been caused by defective train equipment, outside parties, vandalism, animals and those arising as a direct result of extreme weather conditions.

Reporting method

The asset reporting manager monitors failures reported in the Daily National Incident Report. At each period end a summary is then sent to the Route Asset Managers to review and verify. They investigate the cause of each traction power incident, and the verified figures are provided back to the asset reporting manager.

Reporting confidence

This measure was introduced part way through CP4 and has not been audited by the independent reporter. As a result there is no reporting confidence grade assigned to this measure.

Results

Table 3.86 shows the annual number of power incidents causing train delays of more than 300 minutes in CP4 against our Delivery Plan target for 2013/14.

Commentary

After two years of significant reduction in the number of power incidents causing train delays of more than 300 minutes from 100 in 2010/11 to 65 in 2012/13, performance in 2013/14 has degraded.

Incidents in England & Wales rose from 64 in 2012/13 to 73 in 2013/14 but the most notable increase was in Scotland where there was a significant increase in incidents from one in 2012/13 to eleven in 2013/14.

The reasons for the increase in incidents in England & Wales included a number of cable failures on the conductor rail system and asset design related issues on existing overhead lines.

In Scotland an increase in asset design and construction delivery related incidents led to the degraded performance in 2013/14. No common theme/failure mode was identified from the asset design incidents. The detail behind the incidents included:

- a known issue with return conductor insulators
- an electrical clearance issue related to a specific design of OHL
- an OHL fixing that unscrewed itself (newer versions have a locking thread)
- an instance of current being drawn across an OHL component (under certain train movements) not designed to carry current which led to the component's failure.

Table 3.86: Traction power incidents causing train delays of more than 300 minutes in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*DPu10 2013/14*
England & Wales	69	95	66	64	73	n/a
Scotland	6	5	5	1	11	n/a
Network Total	**75**	**100**	**71**	**65**	**84**	**77**

Were it not for this unusual performance in Scotland then the national performance for this measure would have been in line with the target for 2013/14.

CP4 Overview

Across CP4 the performance for power incidents causing train delays of more than 300 minutes has remained broadly steady when taking the 2013/14 results into account. Prior to 2013/14 there had been a significant improvement in performance for two years following an adverse year in 2010/11.

Reviewing the data for 2010/11 all routes seem to have suffered from an adverse performance with no particular identifiable common root cause. Anglia, in particular, had a doubling of incidents from 13 in 2009/10 to 26 in 2010/11. The majority of these were found to have been due to issues with the implementation of planned and reactive maintenance activities within defined timescales.

This issue was addressed by the route implementing a zero tolerance to 28 day and greater priority asset defects. The route also focused on compliance with regards to the completion of high level (working at height in and around OHL) intrusive maintenance.

The impact of targeted interventions for defect removal in routes such as Anglia and LNW was clearly demonstrated earlier in this section when considering the number of incidents causing train delays of more than 500 minutes and it is anticipated that these interventions and the planned interventions on other routes will have a positive impact on train delay incidents in CP5.

Station stewardship measure (M17)

Definition

The Station Stewardship Measure (SSM) is the average condition rating of each station where Network Rail is the operator or landlord. The rating score is calculated by assessing the asset remaining life of elements within the station lease area by visual and detailed inspection and combining these results into an overall station score.

Regulatory target

Network Rail is required to maintain average condition scores within each station category, A to F, in England, Wales and across all stations in Scotland. This requirement is specific to the day to day maintenance and planned renewal of the asset but excludes the impact of enhancement works funded by Network Rail or other station stakeholders. The categories are designed to reflect the different sizes and complexities of the stations and passenger throughput. The regulatory targets are the minimum levels of average condition for each station category and are shown in Table 3.88.

Reporting method

The rating score is calculated by assessing the asset remaining life of elements within the station lease area by visual and detailed inspection and combining these results into an overall station score. The result represents the remaining life of the asset as a percentage of the expected life on a scale of 1 to 5, as illustrated in Table 3.87. This approach has been adopted as a standard method for expressing the condition of a variety of asset types.

Reporting confidence

The condition of each element within a station is assessed by a competent survey before being uploaded into our Operational Property Asset System (OPAS) following checks by the asset management teams within the routes. The Station Stewardship Measure scores are based on validated OPAS examination data generated automatically by the OPAS system. The confidence rating for SSM was B2 at Quarter 4 of 2011/12 following a Data Assurance Report by the independent reporter. There has been no Data Assurance Reviews since this time so the confidence rating remains unchanged.

Results

Table 3.88 shows the station stewardship measure scores for CP4 as well as the CP4 regulatory targets for categories A – F and Scotland (all stations). Table 3.89 shows a comparison of SSM scores at completed National Station Improvement Programme (NSIP) stations and non-NSIP stations as well as the CP4 regulatory targets for categories A – F. Table 3.90 shows the SSM results for Greater Anglia stations and the CP4 regulatory target for each category.

Commentary

The latest results show an improvement to the scores for stations in all categories. Scotland (all stations) shows a 4.3 per cent improvement. This can be attributed to a number of interventions to rectify extensive frost heave issues experienced in Scotland. Approximately 70 per cent of stations in Scotland were affected by frost heave in CP4 due to sustained low temperatures.

Although the overall score continues to improve (approximately 1.9 per cent overall in 2013/14), this is at a faster rate than in 2012/13 but similar to preceding years (approximately 1.8 per cent overall in 2011/12). We believe that the underlying condition remains broadly stable and that the reduction in the scores is driven by two main factors unrelated to maintenance and renewal activities.

Unchanged from previous years, these factors are the improved state of surveys at locations where

previously there had been 'ADC-lite' surveys and the influence of network enhancement investment where the introduction of additional assets and the improvement of existing co-located assets are contributing to an improvement in the scores. This activity comprises enhancements such as platform lengthening, access for all schemes and franchise commitments.

The primary objective of the National Stations Improvement Programme (NSIP) is to bring about a tangible and lasting improvement in the environment at stations for the benefit of passengers. NSIP addresses such matters as personal safety, access and the provision of information rather than the condition of the more substantive station infrastructure.

Table 3.87: Definition of scoring in the station stewardship measure

Remaining life as a percentage of expected full life	*Condition rating*
76% – 100%	1
46% – 75%	2
16% – 45%	3
1% – 15%	4
0%	5

Table 3.88: Station stewardship measure ratings for CP4

Station category	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Regulatory target – max. average score at end of CP4*
A	2.38	2.30	2.26	2.21	2.16	2.48
B	2.46	2.40	2.37	2.34	2.32	2.60
C	2.52	2.47	2.43	2.40	2.36	2.65
D	2.54	2.47	2.41	2.39	2.35	2.69
E	2.58	2.50	2.43	2.39	2.36	2.74
F	2.56	2.50	2.47	2.47	2.44	2.71
Scotland (all stations)	2.39	2.33	2.28	2.33	2.23	2.39

Table 3.89: Station stewardship measure comparison of completed NSIP and non-NSIP stations in 2013/14

Station category	*Regulatory target – max. average score at end of CP4*	*Completed NSIP stations*		*All other stations*	
All network	SSM	SSM	No. of stations	SSM	No. of stations
A	2.48	2.14	8	2.17	19
B	2.60	2.36	35	2.27	31
C	2.65	2.36	129	2.37	115
D	2.69	2.31	96	2.37	201
E	2.74	2.39	86	2.35	579
F	2.71	2.54	165	2.42	1,040

Notes:
519 stations have has specific station improvements completed as part of the National Stations Improvement Programme (NSIP).

Table 3.90: Greater Anglia stations

Station category	*Network Rail measured SSM score as at end of Period 13, 2012*	*Greater Anglia SSM score as at Period 13, 2013*	*Greater Anglia SSM score as at Period 13, 2014*	*Regulatory target – max. average score at end of CP4*
A	n/a	n/a	n/a	2.48
B	2.46	2.47	2.47	2.60
C	2.44	2.40	2.43	2.65
D	2.52	2.50	2.46	2.69
E	2.39	2.38	2.41	2.74
F	2.66	2.64	2.59	2.71

Therefore, minimal improvement to overall station condition measures is expected from NSIP introduced assets. This is due to the cyclical pattern of surveys resulting in the full impact of NSIP schemes completed across the portfolio not being realised for a number of years.

A change to the franchise arrangements in CP4 led to Greater Anglia taking full repair and renewal responsibility for 167 stations in Anglia. Year end asset condition results for these stations have been incorporated in the reported figures. In addition, Table 3.90 shows the SSM figures at the point of transfer from Network Rail to Greater Anglia TOC in 2012, the Greater Anglia results at 2013 and the Greater Anglia results at 2014, for comparison. Reported resultant scores are comparable as expected and remain within the CP4 target.

CP4 overview

Overall, the end of CP4 SSM results show an improvement to the regulatory targets defined at the beginning of the control period. We believe this is due to better asset data and improved asset knowledge. CP4 witnessed radical changes to Operational Property asset data capture through enhanced survey and inspection regimes along with the implementation and use of the Operational Property Asset System (OPAS) to manage all operational property assets.

Substantial station enhancement projects carried out across the network in CP4. These projects were implemented by Network Rail, the Department for Transport, Train Operating Companies and more. The enhancement programmes introduced new assets to the station portfolio, the projects also carried out replacement and renewal works to existing assets therefore improving the asset conditions and SSM results at the stations.

Light maintenance depot stewardship measure (M19)

Definition

The Light Maintenance Depot Stewardship Measure (LMDSM) assesses the overall average condition of Light Maintenance Depots (LMDs) where Network Rail has responsibility for the repair and renewal of assets, providing at year-end, the average condition ratings of each depot. Depots leased to Depot Facility Owners on a full repairing basis are excluded from the calculation.

Reporting method

The score is calculated by assessing the asset remaining life of the elements within the LMD via an annual visual inspection then rolling up the results into an overall LMD score. As with the Station Stewardship Measure, the scale represents the remaining life (as a percentage of the expected life) of all measured assets within the LMD on a scale of one to five as shown in Table 3.87. This has been adopted as a standard method for expressing the condition of a variety of asset types.

Reporting confidence

The condition of each element within a depot is assessed by a competent survey before being uploaded into our Operational Property Asset System (OPAS) following checks by the asset management teams within the Routes. The confidence rating for the Light Maintenance Depot Stewardship Measure is C2 following the Q4 2011/12 Data Assurance Report by the independent reporter. As there has been no data assurance review since then, the confidence rating is reported as unchanged.

Results

Table 3.91 shows the light maintenance depot stewardship measure results for CP4 as well as the CP4 regulatory targets for England & Wales and Scotland.

Commentary

The results for 2013/14 continue the year on year improvement in the average score for all LMDs seen throughout CP4, improving from 2.39 in 2012/13 to 2.37 in 2013/14. The underlying trend of depot condition is broadly stable with this improvement (0.8 per cent from 2012/13) driven by further detailed data collection from an additional seven sites this year (10 per cent of the portfolio). This improvement in score is consistent with what is seen in the Stations Stewardship Measure as the data set is broadened.

The LMD stewardship measure in Scotland shows a slight improvement (2.9 per cent) compared to the previous year. This is driven by updated asset information based on the operational property surveys and capture of LMD repair and renewal works carried out at Perth and Shields depots.

CP4 overview

The end of CP4 LMDSM results exceeds the targets. We believe this is due to improved asset knowledge and an increase in the number of depot conditions being recorded across the network. The enhanced survey and inspection regime and introduction of the Operational Property Asset System (OPAS) in CP4 have improved the granularity and accuracy of LMD asset information available to Network Rail. Another influencing factor is the number of depot enhancement projects carried out within the control period, notably Reading Depot.

Table 3.91: Light maintenance depot stewardship measure ratings for CP4

Light maintenance depot (LMD)	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Regulatory target – max. average score at end of CP4*
England & Wales	2.47	2.46	2.40	2.38	2.37	2.22
Scotland	2.65	2.67	2.66	2.45	2.38	2.73
All LMDs (Network Total)	**2.50**	**2.48**	**2.43**	**2.39**	**2.37**	**2.52**

Section 4 – Activity volumes

Introduction

This section provides data on the level of renewal activity on the network. It reports volumes of work undertaken for each asset category, including 13 measures for track renewals, four for signalling, nine for telecoms, ten for civils and 13 for electrification and plant.

There are no regulatory targets set for the volume of renewal activity.

The following volumes are reported in this section:

- Track renewals
- Rail renewed (M20)
- Sleepers renewed (M21)
- Ballast renewed (M22)
- Switches and crossings renewed (M25)
- Track drainage renewals
- Track maintenance volumes
- Signalling renewed (M24)
- Level crossing renewals (M31)
- Telecom renewals (M32)
- Civils activity volumes
- Bridge renewals and remediation (M23)
- Culvert renewals and remediation (M26)
- Retaining walls remediation (M27)
- Earthwork remediation (M28)
- Tunnel remediation (M29)
- Electrification and plant renewal activity volumes
- Operational property volumes.

Reference to ‘M’ numbers in this Annual Return is coding which aligns with our internal Asset Reporting Manual. This provides the definitions and reporting methods that we include in the Annual Return.

Table 4.1 provides a summary of the renewals volumes for 2013/14 and the whole of CP4 compared to planned volumes.

Table 4.1: Comparison of 2013/14 and whole of CP4 asset condition results with planned volumes

Full year summary of results 2013/14

	Plan 2013/14	*2013/14*	*2013/14 Variance*	*CP4 Plan*	*CP4 Actual*	*CP4 Variance*
Track						
Rail (km)	1,034	783	251	3,767	3,652	115
Sleeper (km)	595	594	1	2,670	2,477	193
Ballast (km)	592	591	1	3,018	2,680	338
Composite / Plain line km	2,215	1,861	361	9,455	8,809	646
S&C (equivalent units)	427	439	(12)	1,781	1,799	(18)
Signalling						
Conventional SEU	2,279	1,883	396	5,328	5,328	0
ERTMS SEU	0	0	0	867	199	668
Crossrail accelerated (SEU)	290	0	290	0	211	(211)
Total SEUs	2,569	1,883	686	6,195	5,742	453
Level crossings (no.)	118	37	81	234	142	92
Telecoms - Station information and surveillance systems						
CIS (monitors)	371	421	(50)	1,944	2,300	356
Public address (speakers)	3,794	4,771	(977)	11,547	15,812	4,265
CCTV (cameras)	59	93	(34)	1,758	1,631	(127)
Clocks (no.)	14	14	0	223	199	(24)
Operational telecoms						
Large concentrators (no.)	2	1	1	20	11	9
Small concentrators (no.)	23	16	7	191	118	73
DOO CCTV (systems)	39	5	34	497	542	(45)
PETS (no.)	13	7	6	170	85	85
Voice recorders (no.)	43	21	22	56	79	(23)
Electrification						
Overhead Line						
Campaign changes (wire runs)	566	427	139	5,697	3,482	2,215
Re-wiring (wire runs)	22	14	8	365	238	127
Conductor rail (km)	57	18	39	124	39	85
AC distribution						
HV switchgear (no.)	31	0	31	320	163	157
GSP transformer (no.)	1	0	1	2	1	1
GSP cable (km)	0	0	0	4	0	4
Booster transformers (no.)	8	6	2	226	99	127
DC distribution						
HV switchgear (no.)	164	39	125	747	216	531
HV cabling (km)	148	73	75	346	210	136
LV switchgear (no.)	363	271	92	593	425	168
LV cabling (km)	280	16	264	358	29	329
Transformer rectifiers (no.)	22	6	16	208	109	99
Plant & machinery						
Points heaters (no.)	413	134	279	1,767	1,458	309
Civils						
Overbridges (sq ms)	7,901	9,061	(1,160)	39,810	40,223	413
Underbridges (sq ms)	69,989	68,232	1,757	424,372	381,771	(42,601)
Bridgeguard 3 (sq ms)	6,382	4,003	2,379	22,965	22,932	(33)
Footbridges (sq ms)	1,402	591	811	8,100	6,035	(2,065)
Tunnels (sq ms)	11,283	11,009	274	71,034	76,841	5,807
Culverts (sq ms)	1,840	1,063	777	6,985	7,610	625
Retaining walls (sq ms)	2,334	1,786	548	14,755	19,925	5,170
Earthworks (sq ms)	488,442	682,377	(193,935)	2,450,724	2,494,395	43,671
Coastal/estuary defence (ms)	3,318	2,548	770	5,585	5,547	(38)
Other (including major structures) (sq ms)	13,085	8,300	4,785	112,860	80,357	(32,503)

Track renewals

We usually consider plain line track renewal volumes in terms of composite kilometres (ckm), which measure the number of components included in a renewal. The components are rail, sleepers and ballast as reported in Tables 4.2 to 4.26.

The volume of plain line track renewals delivered in 2013/14 was 1,861 ckm compared to a plan of 2,215 ckm, which included recovery of loses experienced earlier in the control period. In contrast the overall number of S&C units delivered in 2013/14 was slightly higher than planned at 439 equivalent units against a plan of 427 equivalent units.

The largest variances to plan were in the Wessex and London North Eastern (LNE) routes which delivered 73 per cent and 74 per cent of planned plain line track renewal volumes. Other routes also struggled to deliver more than 80 per cent of plan.

This shortfall in delivery against plan is tied to three key themes which have affected all routes to a greater or lesser extent:

- access constraints on high critically track
- supply chain resource-based constraints
- programme slippage.

It should be noted that with track renewals volumes a degree of variance from forecast is expected. This is due to the details of planned work being refined (e.g. in response to more detailed site knowledge) and engineering priorities being adjusted to focus on key areas for improving asset condition and operational performance. Renewals may also be replanned or rescheduled to achieve efficiencies in the delivery of this work.

CP4 overview

In 2009/10 a revised Track Asset Policy was developed recognising the different operational criticalities of the different sections of track. In line with this policy we revised our plan so that scheduled renewals works within sections with lower criticality banding would, instead, be refurbished as part of a robust and sustainable approach to cost reduction and efficiency. This approach also enabled a change in the principal focus of track renewals towards the high priority sections for full renewal. This resulted in a reduction in overall planned CP4 renewals as published in our Delivery Plan Update 2010 to 9,455 ckm (from 10,956 ckm) for plain line track and 1,781 equivalent units (from 2,249 equivalent units) for S&C renewals.

This policy shift has had the desired effect, shifting the balance of renewals towards the higher criticality routes where asset lives are typically shorter and the requirement for more robust, less maintenance reliant track is a priority.

During the first two years of the control period, due to the planning timescales involved, we experienced a delay in being able to implement the results of the track asset policy review. Consequently, we decided to reduce the volume of track renewals during this period so that a greater percentage of the revised plan could be implemented during the last three years of the control period. This can be seen especially in the plain line volume plan where the increased activity was facilitated by the introduction of our second High Output Track Renewal System (a combination of track relaying and ballast cleaning trains).

Following a review at the end of 2012/13 the total CP4 volumes were further revised, plain line track from 9,455 to 9,176 ckm, and S&C from 1,781 to 1,788 equivalent units, to reflect the latest delivery work bank and having cognisance of what we considered it was possible to deliver in the final year of the control period.

Notwithstanding, the restatement of planned track renewals over the course of CP4, we delivered less overall work that set out in our reviews plans with plain line delivering 8,811ckm and S&C delivering 1,478 equivalent units. Both the immediate (site specific) and long term (sustainability) impacts of this under-delivery have been fully assessed and we believe that we have maintained our assets in a sustainable way over CP4.

Asset Condition

The end of CP4 asset condition targets set out in our Delivery Plan Update 2010 for serious defects and breaks and poor track geometry (PTG) were both achieved. Analysis shows that had the Delivery Plan Update ballast renewal volumes been delivered, then PTG would likely have been improved by a further 0.08 per cent, although that is well within the range of variability caused to weather (0.2 per cent, up or down).

Sustainability

The long-term sustainability of the track asset is unaffected by the shortfall in CP4, but it does mean that track is more vulnerable to under delivery in future control periods, especially for ballast. A similar under delivery in CP5 might lead to an accumulated problem for track sustainability. We are therefore focused on delivering our planned track renewals volumes in CP5.

Immediate Impact

Although we believe that the overall impact of under delivery minor, the loss of high priority individual jobs or programmes could result in localised asset condition and performance risk at route level.

As a result all shortfalls to plan are managed in accordance with Network Rail's standard which relates to the management of risk arising from deferred renewals. Each site is reviewed by the Route Asset Manager and a decision made regarding re-planning within either the same or future years.

Where possible all deferrals are incorporated into the same control period work banks in order to achieve the same level of sustainability and outputs. Access can have an impact on our ability to achieve this, but all sites are reviewed on their own merit and re-planned as required either within the control period or deferred to a later control period.

In the case of condition led renewals, additional works can be undertaken on the infrastructure to enable it to be maintained until the re-planned date if required. This decision is taken with the maintainer as appropriate and forms part of the Risk Assessment of Deferred Renewals (RADR) process.

In the case of strategic renewals, a further review is undertaken regarding the most appropriate time to re-plan the work. This will include a review of potential access and batching with other works to allow this to be delivered in the most efficient way and could result in the item of work moving to either a later year in the current control period or even to a later control period.

Rail renewed (M20)

Definition

This is the total length of track in kilometres where re-railing has been carried out. This measure counts the total length of plain line track where both rails have been replaced and if only one rail is replaced the length counts as half.

Results

England & Wales, Scotland and overall network results

- Table 4.2 shows the total kilometres of rail renewed in England & Wales, Scotland and for the overall network, for each year of CP4, along with the 2013/14 plan.

Operating route results

- Table 4.3 shows the total kilometres of rail renewed in each operating route, for each year of CP4, along with the 2013/14 plan.

Commentary

As rails are a component of track, commentary for this measure is included within the track renewals commentary.

Table 4.2: Rail renewed in kilometres in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
England & Wales	730	532	698	625	734	978	3,319	n/a
Scotland	80	55	76	74	48	60	333	n/a
Network Total	**810**	**587**	**774**	**699**	**783***	**1,038**	**3,652**	**3,767**

Notes:
***Difference in total due to rounding.**

Table 4.3: Rail renewed in kilometres in CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
Anglia	n/a	n/a	72	60	78	87	210	n/a
East Midlands	n/a	n/a	29	103	60	114	192	n/a
Kent	n/a	n/a	29	23	33	37	85	n/a
London North Eastern	166	87	102	134	170	274	659	n/a
London North Western	151	105	187	146	163	200	752	n/a
Scotland	80	55	76	74	48	60	333	n/a
South East*	151	183	n/a	n/a	n/a	n/a	334	n/a
Sussex	n/a	n/a	20	20	19	33	60	n/a
Wales	n/a	n/a	27	25	52	46	104	n/a
Wessex	n/a	n/a	66	73	91	118	230	n/a
Western	261	157	165	41	67	70	691	n/a
Network Total	**810**[+]	**587**	**774**[+]	**699**	**783**[+]	**1,038**[+]	**3,652**[+]	**3,767**

Notes:
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
***As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+]Difference in total due to rounding.

Sleepers renewed (M21)

Definition

This is the total length of track in kilometres where re-sleepering has been carried out, using either concrete, timber or steel sleepers.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, for each year of CP4, is shown as follows:

- Table 4.4 shows the total kilometres of sleepers renewed, along with the 2013/14 and CP4 plan
- Table 4.6 shows the total kilometres of concrete sleepers renewed
- Table 4.8 shows the total kilometres of timber sleepers renewed
- Table 4.10 shows the total kilometres of steel sleepers renewed.

Operating route results

Data for each operating route, for each year of CP4, is shown as follows:

- Table 4.5 shows the total kilometres of sleepers renewed, along with the 2013/14 and CP4 plan
- Table 4.7 shows the total kilometres of concrete sleepers renewed
- Table 4.9 shows the total kilometres of timber sleepers renewed
- Table 4.11 shows the total kilometres of steel sleepers renewed.

Commentary

As sleepers are a component of track, commentary for this measure is included within the track renewals commentary.

Table 4.4: Sleepers renewed in kilometres in CP4: All types

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
England & Wales	403	401	510	464	488	551	2,266	n/a
Scotland	35	44	57	36	38	43	211	n/a
Network Total	**438**	**445**	**567**	**501***	**526**	**594**	**2,477**	**2,670**

Notes:
***Difference in total due to rounding.

Table 4.5: Sleepers renewed in kilometres in CP4: All types by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
Anglia	n/a	n/a	38	48	29	45	115	n/a
East Midlands	n/a	n/a	19	103	57	51	179	n/a
Kent	n/a	n/a	15	9	13	18	37	n/a
London North Eastern	92	74	78	106	121	146	471	n/a
London North Western	84	88	143	104	125	131	544	n/a
Scotland	35	44	57	36	38	43	211	n/a
South East*	84	84	n/a	n/a	n/a	n/a	168	n/a
Sussex	n/a	n/a	12	11	12	14	34	n/a
Wales	n/a	n/a	17	20	48	44	85	n/a
Wessex	n/a	n/a	32	41	53	67	125	n/a
Western	144	155	156	24	29	34	508	n/a
Network Total	**438**[+]	**445**	**567**	**501**[+]	**526**[+]	**594**[+]	**2,477**	**2,670**

Notes:
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
***As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+]Difference in total due to rounding.

Table 4.6: Concrete sleepers renewed in kilometres in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	310	305	397	365	408
Scotland	26	30	42	24	28
Network Total	**335***	**335**	**439**	**389**	**436**

Notes:
***Difference in total due to rounding.

Table 4.7: Concrete sleepers renewed in kilometres in CP4 by operating route					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	-	n/a	30	39	29
East Midlands	-	n/a	12	93	35
Kent	-	n/a	14	9	13
London North Eastern	-	39	39	86	103
London North Western	-	62	117	77	122
Scotland	-	30	42	24	28
South East*	-	66	n/a	n/a	n/a
Sussex	-	n/a	11	10	12
Wales	-	n/a	5	5	23
Wessex	-	n/a	29	23	51
Western	-	138	140	22	20
Network Total	**335**	**335**	**439**	**389**[+]	**436**

Notes:
Operating route data for 2009/10 is not available.
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
*****As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+] Difference in total due to rounding.

Table 4.8: Timber sleepers renewed in kilometres in CP4					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	6	6	9	7.1	0
Scotland	1	1	1	0.4	0
Network Total	**7**	**7**	**10**	**7.5**	**0.0**

Table 4.9: Timber sleepers renewed in kilometres in CP4 by operating route					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	-	n/a	1	0.6	0
East Midlands	-	n/a	0	1.9	0
Kent	-	n/a	0	0.2	0
London North Eastern	-	1	1	1.7	0
London North Western	-	1	2	1.5	0
Scotland	-	1	1	0.4	0
South East*	-	1	n/a	n/a	n/a
Sussex	-	n/a	0	0.2	0
Wales	-	n/a	0	0.1	0
Wessex	-	n/a	1	0.4	0
Western	-	3	3	0.4	0
Network Total	**7**	**7**	**10**[+]	**7.5**[+]	**0**

Notes:
Operating route data for 2009/10 is not available.
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
***** As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+] Difference in total due to rounding.

Table 4.10: Steel sleepers renewed in kilometres in CP4					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	88	90	105	92	80
Scotland	8	13	14	12	10
Network Total	**96**	**103**	**119**	**105***	**90**

Notes:
*****Difference in total due to rounding.

Table 4.11: Steel sleepers renewed in kilometres in CP4 by operating route					
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	-	n/a	8	8.6	0
East Midlands	-	n/a	7	7.9	22
Kent	-	n/a	0	0.0	0
London North Eastern	-	34	39	17.4	19
London North Western	-	25	24	25.4	3
Scotland	-	13	14	12.4	10
South East*	-	17	n/a	n/a	n/a
Sussex	-	n/a	0	0.0	0
Wales	-	n/a	12	14.5	25
Wessex	-	n/a	2	17.3	2
Western	-	14	13	1.0	9
Network Total	**96**	**103**	**119**	**105**[+]	**90**

Notes:
Operating route data for 2009/10 is not available.
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
***As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+] Difference in total due to rounding.

Ballast renewed (M22)

Definition

This is the total length of track, in kilometres, where re-ballasting has been carried out.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, for each year of CP4, is shown as follows:

- Table 4.12 shows the total kilometres of ballast renewed, along with the 2013/14 and CP4 plan
- Table 4.14 shows the total kilometres of full ballast renewed
- Table 4.16 shows the total kilometres of partial ballast renewed
- Table 4.18 shows the total kilometres of scarify-reballast renewed.

Operating route results

Data for each operating route, for each year of CP4, is shown as follows:

- Table 4.13 shows the total kilometres of ballast renewed, along with the 2013/14 and CP4 plan
- Table 4.15 shows the total kilometres of full ballast renewed by operating route
- Table 4.17 shows the total kilometres of partial ballast renewed by operating route
- Table 4.19 shows the total kilometres of scarify-reballast renewed by operating route.

Commentary

As ballast is a component of track, commentary for this measure is included within the track renewals commentary.

Table 4.12: Ballast renewed in kilometres in CP4: All types								
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
England & Wales	476	483	521	485	515	549	2,480	n/a
Scotland	34	42	53	37	37	42	203	n/a
Network Total	**509***	**525**	**573***	**522**	**552**	**591**	**2,680***	**3,018**

Notes:
***Difference in total due to rounding.

Table 4.13: Ballast renewed in kilometres in CP4: All types by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
Anglia	n/a	n/a	35	39	35	44	109	n/a
East Midlands	n/a	n/a	19	44	93	59	157	n/a
Kent	n/a	n/a	15	9	13	20	37	n/a
London North Eastern	108	144	146	103	100	113	601	n/a
London North Western	98	140	133	118	91	100	581	n/a
Scotland	34	42	53	37	37	42	203	n/a
South East*	99	85	n/a	n/a	n/a	n/a	184	n/a
Sussex	n/a	n/a	12	11	12	14	34	n/a
Wales	n/a	n/a	14	21	57	50	92	n/a
Wessex	n/a	n/a	32	116	26	47	174	n/a
Western	170	114	116	24	87	102	511	n/a
Network Total	**509**	**525**	**573**[+]	**522**	**552**[+]	**591**	**2,680**[+]	**3,018**

Notes:
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
***As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+] Difference in total due to rounding.

Table 4.14: Full ballast renewals by excavation in kilometres in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	213	187	182	172	202
Scotland	18	7	13	21	23
Network Total	**231**	**194**	**195**	**192***	**225**

Notes:
***Difference in total due to rounding.

Table 4.15: Full ballast renewals by excavation in kilometres in CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	-	n/a	30	30	29
East Midlands	-	n/a	11	10	7
Kent	-	n/a	11	7	11
London North Eastern	-	36	23	36	41
London North Western	-	63	65	38	48
Scotland	-	7	13	21	23
South East*	-	58	n/a	n/a	n/a
Sussex	-	n/a	11	10	8
Wales	-	n/a	3	5	15
Wessex	-	n/a	17	17	24
Western	-	30	13	19	18
Network Total	**231**	**194**	**195**[+]	**192**[+]	**225**[+]

Notes:
Operating route data for 2009/10 is not available.
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
***As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+] Difference in total due to rounding.

Table 4.16: Partial reballast-automatic ballast cleaning renewals in kilometres in CP4					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	140	198	224	206	197
Scotland	1	18	21	1	0
Network Total	**141**	**216**	**245**	**207**	**197**

Table 4.17: Partial reballast-automatic ballast cleaning renewals in kilometres in CP4 by operating route					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	-	n/a	1	0	4
East Midlands	-	n/a	1	25	63
Kent	-	n/a	0	0	0
London North Eastern	-	74	82	50	38
London North Western	-	52	44	52	29
Scotland	-	18	21	1	0
South East*	-	2	n/a	n/a	n/a
Sussex	-	n/a	0	0	0
Wales	-	n/a	3	0	7
Wessex	-	n/a	0	78	0
Western	-	70	92	0	56
Network Total	**141**	**216**	**245**[+]	**207**[+]	**197**

Notes:
Operating route data for 2009/10 is not available.
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
***As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+] Difference in total due to rounding.

Table 4.18: Scarify-reballast with sleeper relay renewals in kilometres in CP4					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	122	98	114	108	117
Scotland	15	17	19	15	14
Network Total	**137**	**115**	**133**	**123**	**131**

Table 4.19 Scarify-reballast with sleeper relay renewals in kilometres in CP4 by operating route					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	-	n/a	4	9	2
East Midlands	-	n/a	7	9	23
Kent	-	n/a	4	1	2
London North Eastern	-	34	41	18	22
London North Western	-	25	24	27	14
Scotland	-	17	19	15	14
South East*	-	25	n/a	n/a	n/a
Sussex	-	n/a	1	1	4
Wales	-	n/a	8	16	35
Wessex	-	n/a	15	21	2
Western	-	14	10	5	13
Network Total	**137**	**115**	**133**	**123**[+]	**131**

Notes:
Operating route data for 2009/10 is not available.
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
***As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+] Difference in total due to rounding.

Switches and crossings renewed (M25)

Definition

This measure records the total number of switches and crossings (S&C) units renewed. The tables include data on the numbers of full renewals, the number of abandoned (removed or recovered) units and the number where asset life has been extended through partial renewal or reballasting.

Results

The Plan 2013/14 figure includes figures for S&C equivalent units to give an overall metric of total activity delivered. To convert the data in the following tables to equivalent units, we use a factor of 1.0 for a full renewal, 0.5 for an abandoned unit and 0.33 for a partial/reballasting renewal.

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, for each year of CP4 along with the 2013/14 plan, is shown as follows:

- Table 4.20 shows the total S&C equivalent units renewed, along with CP4 plans
- Table 4.21 shows the total full S&C units renewed
- Table 4.23 shows the total abandonment S&C units renewed
- Table 4.25 shows the total partial/reballasting S&C units renewed.

Operating route results

Data for each operating route, for each year of CP4 along with the 2013/14 plan, is shown as follows:

- Table 4.22 shows the total full S&C units renewed
- Table 4.24 shows the total abandonment S&C units renewed
- Table 4.26 shows the total partial/reballasting S&C units renewed.

Commentary

As switches and crossings are components of track, commentary for this measure is included within the track renewals commentary.

Table 4.20: S&C equivalent units (EQU) renewed in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
England & Wales	286	308	289	327	394	381	1,602*	n/a
Scotland	33	39	44	34	45	45	194*	n/a
Network Total	**319**	**347**	**333**	**361**	**439**	**426**	**1,799***	**1,781**

Notes:
* Difference in total due to rounding.

Table 4.21: S&C full renewals in units in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*
England & Wales	206	240	247	241	292	319
Scotland	25	29	38	23	31	33
Network Total	**231**	**269**	**285**	**264**	**323**	**352**

Table 4.22: S&C full renewals in units in CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*
Anglia	0	n/a	n/a	17	22	32
East Midlands	0	n/a	n/a	15	28	35
Kent	0	n/a	n/a	10	19	22
London North Eastern	55	71	63	53	40	45
London North Western	50	54	66	75	120	108
Scotland	25	29	38	23	31	33
South East*	65	76	76	n/a	n/a	n/a
Sussex	0	n/a	n/a	16	16	16
Wales	0	n/a	n/a	3	0	3
Wessex	0	n/a	n/a	29	23	25
Western	36	39	42	23	24	33
Network Total	**231**	**269**	**285**	**264**	**323**	**352**

Notes:
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
*****As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.

Table 4.23: S&C abandonment in units in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*
England & Wales	61	61	62	69	68	56
Scotland	5	8	9	4	5	5
Network Total	**66**	**69**	**71**	**73**	**73**	**61**

Table 4.24: S&C abandonment in units in CP4 by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*
Anglia	-	n/a	n/a	6	2	2
East Midlands	-	n/a	n/a	4	1	0
Kent	-	n/a	n/a	6	2	4
London North Eastern	-	16	10	10	2	0
London North Western	-	13	6	25	29	33
Scotland	-	8	9	4	5	5
South East*	-	8	16	n/a	n/a	n/a
Sussex	-	n/a	0	1	0	0
Wales	-	n/a	2	5	22	14
Wessex	-	n/a	n/a	12	3	1
Western	-	24	28	0	7	2
Network Total	**66**	**69**	**71**	**73**[+]	**73**	**61**[+]

Notes:
Operating route breakdown data for 2009/10 is not available.
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
*****As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+] Difference in total due to rounding.

Table 4.25: S&C partial renewals / reballasting in units in CP4						
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*
England & Wales	150	113	32	157	203	104
Scotland	16	18	4	26	36	29
Network Total	**166**	**131**	**36**	**183**	**239**	**133**

Table 4.26: S&C partial renewals / reballasting in units in CP4 by operating route						
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*
Anglia	n/a	n/a	0	0	12	0
East Midlands	n/a	n/a	0	10	23	19
Kent	40	n/a	0	3	0	0
London North Eastern	37	39	8	101	113	0
London North Western	47	27	8	3	13	16
Scotland	16	18	4	26	36	29
South East*	47	26	n/a	0	n/a	n/a
Sussex	n/a	n/a	0	1	1	0
Wales	26	n/a	3	12	11	5
Wessex	n/a	n/a	0	17	29	58
Western	47	21	12	10	1	6
Network Total	**166**	**131**	**36**[+]	**183**	**239**	**133**

Notes:
2009/10 and 2010/11 data for East Midlands is reported under London North Eastern and under Western for Wales.
***As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.
[+] Difference in total due to rounding.

Track drainage renewals

Definition

Track drainage renewal expenditure covers all types of track drainage work. Drainage activities are planned in the same way as other delivery activities and costs are apportioned to those activities in accordance with the normal commercial administration of the projects in the delivery portfolio.

Results

Table 4.27 shows the total expenditure in millions of pounds on track drainage renewals in England & Wales, Scotland and for the overall network, for each year of CP4.

Table 4.28 shows the total volume of track drainage renewals in England & Wales, Scotland and for the overall network, in 2013/14.

Table 4.27: Expenditure on drainage renewals (£ million) in CP4					
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	5.04	9.20	11.26	17.97	25.15
Scotland	0.42	1.07	2.26	2.45	0.24
Network Total	**5.46**	**10.27**	**13.52**	**20.42**	**25.40**

Table 4.28: Volumes of drainage renewals in 2013/14			
	Volume of drainage renewals undertaken (yds)	*Volume of drainage pipes cleaned (yds)*	*Volume of catchpits cleaned out (number)*
England & Wales	38,647	122,389	24,434
Scotland	10,053	18,392	2,008
Network Total	**49,640**	**140,781**	**26,442**

Table 4.29: Track maintenance volumes for 2011/12, 2012/13 and 2013/14 against plan

Maintenance type	*Actual*			*Planned*			*Variance*		
	2011/12	*2012/13*	*2013/14*	*2011/12*	*2012/13*	*2013/14*	*2011/12*	*2012/13*	*2013/14*
England & Wales									
Plain line tamping	3,217	2,989	3,238	3,706	4,126	3,699	(489)	(1,137)	(461)
S&C tamping	3,073	2,668	2,433	3,907	3,042	3,825	(834)	(374)	(1,392)
Plain line stoneblowing	1,177	1,120	1,179	1,743	1,565	1,455	(566)	(445)	(276)
S&C stoneblowing	133	266	210	32	553	571	101	(287)	(361)
Replacement of pads & insulators	522,242	438,178	388,695	657,350	670,507	618,795	(135,108)	(232,329)	(230,100)
Scotland									
Plain line tamping	254	291	334	262	299	334	(8)	(8)	0
S&C tamping	228	354	322	374	248	342	(146)	106	(20)
Plain line stoneblowing	82	94	120	117	106	151	(35)	(12)	(31)
S&C stoneblowing*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Replacement of pads & insulators	41,920	34,023	54,835	53,618	53,087	92,036	(11,698)	(19,064)	(37,201)
Network Total									
Plain line tamping	**3,471**	**3,280**	**3,572**	**3,968**	**4,425**	**4,033**	**(497)**	**(1,145)**	**(461)**
S&C tamping	**3,301**	**3,022**	**2,755**	**4,281**	**3,290**	**4,167**	**(980)**	**(268)**	**(1,412)**
Plain line stoneblowing	**1,259**	**1,214**	**1,299**	**1,860**	**1,671**	**1,606**	**(601)**	**(457)**	**(307)**
S&C stoneblowing	**133**	**266**	**210**	**32**	**553**	**571**	**101**	**(287)**	**(361)**
Replacement of pads & insulators	**564,162**	**472,201**	**443,530**	**710,968**	**723,594**	**710,831**	**(146,806)**	**(251,393)**	**(267,301)**

Notes:
* Scotland does not currently use stoneblowing on S&C track.

Commentary

2013/14 saw an increase in overall expenditure on drainage renewals to £25.4 million.

CP4 overview

CP4 has seen successive year on year increases in expenditure on track drainage renewals. This reflects in part our response to flooding incidents, but also recognition that drainage is a key component that has a significant effect on the overall condition and life of the Track asset.

Notwithstanding this we recognise that more work should have been done on drainage related matters over the course of the control period.

Track maintenance volumes

In this Annual Return 2014 we have provided details of tamping, stone-blowing and pad replacement volumes against plan for the first time in Table 4.29. A supporting commentary will be provided in future Annual Return documents.

Signalling renewed (M24)

Definition

This measure reports the total number of signalling equivalent units (SEU) which are commissioned each year. A SEU is defined as each single trackside output function controlled by the interlocking, including every signal, each controlled point end, plungers and any other attribute that requires a particular control function and each ground frame. Partial renewals are allocated partial values (50 per cent for external equipment and 45 per cent for an interlocking, the residual five per cent is two per cent for a control centre and three per cent for control equipment). The SEUs recorded do not cover minor works and only include individual schemes with an anticipated forecast cost greater than £5 million but with the exception of stand-alone level crossing

projects where one SEU is recorded for renewal of the control circuitry interface (where applicable). SEUs are recorded at GRIP Stage 6 of a projects' lifecycle.

Results

Table 4.32 shows the number of SEUs that have reached GRIP stage 4. Table 4.33 shows the total signalling renewed in 2013/14 and CP4, against plan.

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network is shown as follows:

- Table 4.34 shows the conventional SEUs renewed in CP4 compared to the plan for 2013/14 and CP4
- Table 4.36 shows the number of signalling minor works volumes for 2013/14.

Operating route results

- Table 4.35 shows the conventional SEUs renewed for each year of CP4.

Commentary

During 2013/14 a total of 1,883 of the planned 2,279 SEUs were commissioned after adjusting for the type of work undertaken. It is noted in the delivery plan update 2010 that the profile of volume delivery for CP4 was always forecast to be higher in 2013/14 than previous years, despite delivering a smaller number of projects compared with 2012/13.

The main SEU commissionings for 2013/14 are set out in Table 4.30. The key variances to plan in 2013/14 (together with associated commentary) are provided in Table 4.31.

CP4 overview

For CP4, 5,328 conventional SEUs have been delivered exactly matching the delivery plan update 2010 baseline of 5,328. Generally it has been noted that there has been an increasing trend in the volumes delivered throughout CP4. This has been expected due to the profile of delivery in the delivery plan update 2010 and a continually maturing delivery organisation.

199 ERTMS SEUs were delivered as part of Cambrian ERTMS project against the control period baseline of 867. 779 ERTMS SEUs were re-categorised as Crossrail SEUs with a reduced scope of works as part of DPu11. From this,211 Crossrail SEUs were delivered during the control period (which represent the same geographical area of the 779 re-categorised ERTMS SEUs) against a baseline of 0.

In CP5 we are forecasting to deliver around double the number of SEUs as compared with CP4. The number of volumes reaching GRIP 4 this year was therefore expected to be higher as volumes are worked up for delivery in CP5.

Table 4.30: Main commissionings of SEUs in 2013/14

Scheme	*Signalling Equivalent Units*
Warrington Preston and Carlisle Life Extension Works	390
Walsall and Cannock	308
Nottingham Station Area Renewals	238
Glasgow South Suburban Renewals	166
Cardiff Area Signalling Renewal Phase 2	135
Hertford North Integration	118
Victoria Central and Eastern Interlocking Renewal	114
Shrewsbury Crewe resignalling	83
Thrumpton Area resignalling	76
Farnham Area Signalling Renewals	59
Arun Valley resignalling	51
Gatwick Station area resignalling	41

Table 4.31: Main variance to planned SEU renewals in 2013/14

Scheme	*Commentary*	*Signalling Equivalent Units*
Cardiff Area Signalling Renewal	Commissioning rescheduled as the site was not ready to be brought into service. This will now be commissioned in June 2014.	114
Poole to Wool resignalling	Commissioning delayed due to issues surrounding the availability of engineering access and lack of specialist resource. This is now likely to be commissioned in June 2014.	107
Sudforth Lane, Whitley Bridge and Hensall	Commissioning delayed due to the landslip at Hatfield colliery. This is now planned for commissioning in May 2014.	91
East Sussex Coast resignalling	Commissioning delayed due to issues surrounding the availability of engineering access and specialist resource.	72
Rugeley North & Colwich Area	Required works are mostly completed, except for two location cases which will be commissioned in August 2014. For this reason, the SEUs cannot be declared as complete until 2014/15.	34
Romiley Interlocking Renewal	Commissioning delayed due to a need to change the scope. They will now be commissioned in November 2014.	23
East Nottingham Modular Resign	Commissioning delayed due to additional GRIP 1-4 work being required.	22

Table 4.32: Signalling – GRIP 4 volumes

	Plan 2013/14	*Actual*	*Variance*
England & Wales	n/a	1,918	n/a
Scotland	n/a	22	n/a
Network Total	**n/a**	**1,940**	**n/a**

Table 4.33: Signalling renewed (SEUs)

	2013/14	*Plan 2013/14*	*Variance*	*CP4 Actual*	*CP4 Plan*
Conventional SEU	1,883	2,279	396	5,328	5,328
ERTMS SEU	0	0	0	199	867
Crossrail accelerated (SEU)	0	0	0	211	0
Total SEU	**1,883**	**2,279**	**396**	**5,742**	**6,195**

Table 4.34: Total Signalling renewed per year in CP4 (SEUs)

	2009/10	*2010/1**	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
England & Wales	778	797	1,266	978	1,693	2,090	5,511	5,990
Scotland	35	1	0	0	189	189	226	205
Network Total	**813**	**798**	**1,266**	**978**	**1,883**[+]	**2,279**	**5,738**[+]	**6,195**

Notes:
The total includes conventional, ERTMS and Crossrail SEUs.
* Data for 2010/11 has been updated to reflect the latest data available.
[+] Discrepancy in totals due to rounding.

Table 4.35: Total Signalling renewed per year by operating route (SEUs)					
	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	220	0	40	198	0
East Midlands	274	0	41	59	359
Kent	0	0	321	0	3
London North Eastern	0	150	56	75	85
London North Western	19	117	126	501	734
Scotland	35	1	0	0	189
Sussex	0	0	0	0	206
Wales	206	199	218	136	220
Wessex	0	114	251	0	87
Western	59	217	213	10	0
Network Total	**813**	**798**	**1,266**	**978**	**1,883**[+]

Notes:
The total includes conventional, ERTMS and Crossrail SEUs.
* Data for 2010/11 has been updated to reflect the latest data available.
[+] Discrepancy in totals due to rounding.

Table 4.36: Signalling Minor Works Volumes in 2013/14						
	Cable Route (km)	*Points (per end)*	*Signals*	*Location Cases*	*Main Cables (km)*	*Power Supplies*
England & Wales	21	10	33	149	40	7
Scotland	0	0	0	0	0	0
Network Total	**21**	**10**	**33**	**149**	**40**	**7**

Level crossing renewals (M31)

Definition

This measure reports the number of level crossings renewed each year by route. Each level crossing accounts for one Level Crossing Equivalent Unit (LXEU). If a partial renewal is undertaken then an appropriate part LXEU will be declared. The volumes are captured and monitored within our project planning tool, P3e, with the volumes declared within the year that the level crossing is commissioned.

Results

England & Wales, Scotland and overall network results

- Table 4.37 shows the number of level crossings equivalent units renewed in England & Wales, Scotland and for the overall network, for each year of CP4, along with the 2013/14 and CP4 plan.

Operating route results

- Table 4.38 shows the number of level crossings equivalent units renewed in each operating route, for each year of CP4, along with the 2013/14 and CP4 plan.

Commentary

37 level crossings were renewed across the network this year compared to the 118 that were planned. The key reasons for this variance are:

- 17 level crossings have been re-scoped, resulting in no renewal volume. For example, a number of level crossings have been identified for closure or replacement with a bridge.
- 25 level crossings have been delayed to CP5 as we have rolled up individual projects into larger schemes to achieve efficiencies.

The remainder of the variance to plan is due to extended consultation with stakeholders during planning of the works. This was as a result of different local authorities and lobby groups having differing opinions and positions on the acceptability of closure, bridging, disabled access and convenience.

CP4 overview

For CP4, 142 LXEUs have been delivered against the delivery plan update 2010 baseline of 234. During the control period, changes have taken place in the mechanism for delivery of level crossing renewals and this continues to evolve to optimise delivery.

Table 4.37: Number of level crossings renewed in CP4 (equivalent units)

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
England & Wales	20	10	23	51	36	115	140	229
Scotland	0	0	1	0	1	3	2	5
Network Total	**20**	**10***	**24**[+]	**51**	**37**	**118**	**142**	**234**

Notes:
* Data for 2010/11 has previously been reported as 9.75 but we are now rounding to whole numbers.
[+] Data for 2011/12 has been updated to reflect the latest data available.

Table 4.38: Number of level crossings renewed in CP4 (equivalent units by operating route)

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
Anglia	4.45	1	0	11	0	3	16	n/a
East Midlands	6	1	1	0	5	8	13	n/a
Kent	0	0	1	0	4	5	5	n/a
London North Eastern	4.35	2	9	17	9	27	41	n/a
London North Western	1	0	0	8	7	39	16	n/a
Scotland	0	0	1	0	1	3	2	n/a
Sussex	0	0	0	0	2	8	2	n/a
Wales	0	0	0	1	7	7	8	n/a
Wessex	0	0	2	0	1	6	3	n/a
Western	4.2	5.75	7	14	1	12	32	n/a
Network Total	**20**	**9.75**	**24***[+]	**51**	**37**	**118**	**142**[+]	**234**

Notes:
* Data for 2011/12 has been updated to reflect the latest data available.
[+] Discrepancies in total counts due to rounding of partial renewals.

Telecom renewals (M32)

Definition and reporting method

This measure reports on nine CP4 categories of telecoms volumes that were commissioned over the course of the year. The nine categories span two main telecoms asset groups: Operational Telecoms and Station Information and Surveillance Systems (SISS).

Operational telecoms consist of the following assets (unit of measure given in brackets where appropriate):

- LC - Large concentrators
- SC - Small concentrators
- PETS - level crossing public emergency telephone systems (per crossing)
- DOO - driver only operation systems (per car stop)
- VR - voice recorders.

The SISS group consists of the following assets (unit of measure given in brackets):

- CIS – customer information screen (per display)
- PA – public address (per speaker)
- CCTV – closed circuit television (per camera)
- Clock – (per clock).

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, for each year of CP4, is shown as follows:

- Table 4.39 shows the different types of operational telecom renewals
- Table 4.41 shows the different types of SISS telecom renewals.

Operating route results

Data for each operating route, for each year of CP4, is shown as follows:

- Table 4.40 shows the different types of operational telecom renewals
- Table 4.42 shows the different types of SISS telecom renewals.

Partial renewals to extend the life of assets are not reported in this measure.

Commentary

Large Concentrators

One of the planned two large concentrators was delivered. The variance from plan was caused as the decision was taken to delay renewal until the Stoke Signal Box closure in 2016. Renewal has therefore been avoided.

Small Concentrators

16 of the planned 23 small concentrators were delivered. The variance from plan was caused by the LNE Concentrator Renewals schemes which delayed the delivery of six concentrators into 2014/15 due to BT circuit installing problems which need to be resolved before these concentrators can be commissioned. The remaining one concentrator was incorrectly overstated in the baseline.

Table 4.39: Operational telecom renewals (number of units) in CP4

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
Large Concentrators								
England & Wales	2	3	1	3	1	2	10	18
Scotland	0	0	1	0	0	0	1	2
Network Total	2	3	2	3	1	2	11	20
Small concentrators								
England & Wales	27	22	24	23	14	22	110	182
Scotland	0	6	0	0	2	1	8	8
Network Total	27	28	24	23	16	23	118	191
Public Emergency Telephone Systems (PETS)								
England & Wales	5	14	12	40	7	13	78	160
Scotland	0	0	0	7	0	0	7	10
Network Total	5	14	12	47	7	13	85	170
Driver only operation systems								
England & Wales	247	120	117	53	5	39	542	497
Scotland	0	0	0	0	0	0	0	0
Network Total	247	120	117	53	5	39	542	497
Voice Recorders								
England & Wales	3	13	0	36	21	43	73	48
Scotland	5	0	1	0	0	0	6	8
Network Total	8	13	1	36	21	43	79	56

Table 4.40: Operational telecom renewals (number of units) in CP4 by operating route

Route	*System*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	Large concentrators	0	0	0	0	0
	Small concentrators	5	2	0	0	0
	Public Emergency Telephone Systems	5	14	8	8	0
	Driver only operation systems	0	0	0	0	0
	Voice recorders	0	0	0	0	0
East Midlands	Large concentrators	0	1	0	0	0
	Small concentrators	0	0	0	1	0
	Public Emergency Telephone Systems	0	0	0	0	0
	Driver only operation systems	35	36	0	0	0
	Voice recorders	0	0	0	0	0

Table 4.40 continued: Operational telecom renewals (number of units) in CP4 by operating route						
Kent	Large concentrators	0	0	0	0	1
	Small concentrators	3	1	0	0	8
	Public Emergency Telephone Systems	0	0	0	0	0
	Driver only operation systems	0	84	0	0	0
	Voice recorders	0	0	0	0	0
London North Eastern	Large concentrators	0	0	0	1	0
	Small concentrators	1	3	7	12	6
	Public Emergency Telephone Systems	0	0	4	32	1
	Driver only operation systems	8	0	83	0	0
	Voice recorders	3	13	-	21	21
London North Western	Large concentrators	1	0	1	0	0
	Small concentrators	11	4	17	5	0
	Public Emergency Telephone Systems	0	0	0	0	0
	Driver only operation systems	0	0	0	0	0
	Voice recorders	0	0	-	8	0
Scotland	Large concentrators	0	0	1	0	0
	Small concentrators	0	6	0	0	2
	Public Emergency Telephone Systems	0	0	0	7	0
	Driver only operation systems	0	0	0	0	0
	Voice recorders	5	0	1	0	0
Sussex	Large concentrators	0	0	0	1	0
	Small concentrators	0	1	0	0	0
	Public Emergency Telephone Systems	0	0	0	0	0
	Driver only operation systems	0	0	0	0	0
	Voice recorders	0	0	0	0	0
Wales*	Large concentrators	-	-	-	-	-
	Small concentrators	-	-	-	-	-
	Public Emergency Telephone Systems	-	-	-	-	-
	Driver only operation systems	-	-	-	-	-
	Voice recorders	-	-	-	-	-
Wessex	Large concentrators	1	1	0	1	0
	Small concentrators	6	0	0	4	0
	Public Emergency Telephone Systems	0	0	0	0	0
	Driver only operation systems	0	0	0	0	0
	Voice recorders	0	0	0	0	0
Western	Large concentrators	0	1	0	0	0
	Small concentrators	2	11	0	1	0
	Public Emergency Telephone Systems	0	0	0	0	6
	Driver only operation systems	0	0	34	53	5
	Voice recorders	0	0	-	7	0

Table 4.40 continued: Operational telecom renewals (number of units) in CP4 by operating route				
Large concentrators Network Total	**3**	**2**	**3**	**1**
Small concentrators Network Total	**28**	**24**	**23**	**16**
Public Emergency Telephone Systems Network Total	**14**	**12**	**47**	**7**
Driver only operation systems Network Total	**120**	**117**	**53**	**5**
Voice recorders Network Total	**13**	**1**	**36**	**21**

Notes:
*Data for operational telecoms is not split for Wales Route. Data for Wales Route is included within data for Western Route. Data for Wales Route will be available in CP5.

Public emergency telephone systems (PETS)

Seven of the planned 13 PETS were delivered. The variance from plan was caused by the PETS Automatic Half Barrier Crossing System Renewals being deferred into 2014/15 as a result of the identification of legacy cable faults which need to be resolved before the project can be progressed.

Driver only operation systems (DOOS)

Five driver only operation systems were delivered in 2013/14 against a plan of 39. The variance was primarily caused by delays in the tendering process associated with one project which has meant that the delivery of 33 DOOS has been deferred into 2014/15.

Voice recorders

21 of the planned 43 voice recorders were delivered. The remainder of the voice recorders were incorrectly applied to the DPu12 baseline for delivery in 2013/14 and were actually delivered in 2012/13 (with one voice recorder being de-scoped).

Station information and surveillance systems (SISS)

SISS consists of customer information screens, public address systems, closed circuit television and clocks.

SISS renewal, and in particular the installation of public address systems, formed a significant proportion of the telecoms renewals activity in 2013/14.

Network Rail forecast future volume delivery based upon the asset data in our Decision Support Tool. Actual delivery can differ from the plan due to changes in technology or design, standards, and legislation, configuration and placement of physical assets.

Customer information screens (CIS)

421 CIS were delivered in 2013/14 against a plan of 371. The over delivery against plan was primarily driven by the acceleration of CP5 planned volumes into the last year of CP4. In particularly on the London North Western route were we able to commission 43 screens ahead of the scheduled CP5 completion date.

Public address (PA) speakers

4,771 public address speakers were delivered in 2013/14 against a plan of 3,794. This variance against plan was due to changes in the following projects:

- Northern Rail LLPA – as a result of extreme weather in February and March 2013, the commissioning of 259 PA speakers was delayed in to early 2013/14
- Paddington Station Public Address & Voice Alarm (PAVA) System Renewal) increased the number of PA speakers delivered by 117 due to the inclusion of Intelligent Speakers that were not previously included in the calculation
- LNW Mersey Rail Sub Surface PA added 557 PA speakers that were omitted when establishing the DPu12 baseline. The omission was corrected early in 2013/14 and all 557 volumes that should have been included in the plan were delivered
- LNE Telecoms SISS 2011/12 accelerated the delivery of 267 PA speakers into 2013/14 that were originally planned to be delivered in CP5. 17 of these were subsequently removed from scope following detailed design work
- East Croydon Re-development SISS delayed the delivery of 200 PA speakers from 2013/14 into 2014/15 due to the impact of other projects at East Croydon (in particular Platform Canopy Renewals) preventing completion and commissioning as planned
- LNE Retail Telecoms delayed the delivery of 20 PA speakers from 2013/14 into 2014/15 due to delays in the delivery of SIM cards which was required to install the new GPRS solution and preventing commissioning as planned.

Closed circuit television (CCTV)

93 installations were completed in 2013/14 against a plan of 59 volumes. This increase is due to the London Midland CCTV Renewal where the project volumes were not correctly applied to the DPu12 baseline for 2013/14.

Clocks

All 14 volumes were delivered as planned.

Table 4.41: Station Information and Surveillance Systems telecom renewals (number of units) in CP4								
	2009/10*	***2010/11***	***2011/12***	***2012/13***	***2013/14***	***Plan 2013/14***	***CP4 Actual***	***CP4 Plan***
Customer Information Screens (CIS) (monitors)								
England & Wales	587	662	449	123	395	342	2,216	1,891
Scotland	53	0	0	5	26	29	84	53
Network Total	640	662	449	128	421	371	2,300	1,944
Public address (speakers)								
England & Wales	287	1,574	1,975	3,299	3,861	2,884	10,996	8,366
Scotland	521	1,723	470	1,192	910	910	4,816	3,181
Network Total	808	3,297	2,445	4,491	4,771	3,794	15,812	11,547
Closed Circuit Television (CCTV) (cameras)								
England & Wales	89	748	229	472	93	59	1,631	1,710
Scotland	0	0	0	0	0	0	0	48
Network Total	89	748	229	472	93	59	1,631	1,758
Clocks								
England & Wales	0	127	11	38	14	14	190	210
Scotland	3	6	0	0	0	0	9	13
Network Total	3	133	11	38	14	14	199	223

Notes:
*2009/10 data for Customer Information Screens and Public Address has been updated to align with the published Delivery Plan update 2011.

Table 4.42: Station Information and Surveillance Systems telecom renewals (number of units) in CP4 by operating route						
Route	***System***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	Customer information screens (monitors)	0	0	0	0	0
	Public address (speakers)	0	0	900	0	0
	Closed Circuit Television (CCTV)	0	0	0	0	0
	Clocks	0	0	0	0	0
East Midlands	Customer information screens (monitors)	0	0	107	0	0
	Public address (speakers)	0	0	228	0	0
	Closed circuit television	0	0	0	0	0
	Clocks	0	0	0	0	0
Kent	Customer information screens	0	0	0	0	0
	Public address (speakers)	0	239	0	205	333
	Closed Circuit Television (CCTV)	0	0	0	0	0
	Clocks	0	0	0	0	7
London North Eastern	Customer information screens (monitors)	22	4	47	5	43
	Public address (speakers)	59	280	0	104	715
	Closed Circuit Television (CCTV)	0	0	0	97	59
	Clocks	0	0	0	0	0

Table 4.42 continued: Station Information and Surveillance Systems telecom renewals (number of units) in CP4 by operating route

Route	*System*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
London North Western	Customer information screens (monitors)	0	52	14	13	49
	Public address (speakers)	516	541	0	1407	1,119
	Closed Circuit Television (CCTV)	89	0	0	299	34
	Clocks	0	15	2	38	0
Scotland	Customer information screens (monitors)	53	0	0	5	26
	Public address (speakers)	521	1,723	470	1192	910
	Closed Circuit Television (CCTV)	0	0	0	0	0
	Clocks	3	6	0	0	0
Sussex	Customer information screens (monitors)	38	12	36	0	303
	Public address (speakers)	0	0	0	0	1205
	Closed Circuit Television (CCTV)	0	0	0	0	0
	Clocks	0	0	0	0	7
Wales	Customer information screens (monitors)	0	0	0	0	0
	Public address (speakers)	0	0	0	0	0
	Closed Circuit Television (CCTV)	0	0	0	0	0
	Clocks	0	0	0	0	0
Wessex	Customer information screens (monitors)	0	474	0	0	0
	Public address (speakers)	0	0	0	1222	0
	Closed Circuit Television (CCTV)	0	0	0	0	0
	Clocks	0	43	0	0	0
Western	Customer information screens (monitors)	0	120	245	105	0
	Public address (speakers)	0	514	847	361	489
	Closed Circuit Television (CCTV)	0	748	229	76	0
	Clocks	0	69	9	0	0
Customer information screens (monitors) Network Total			**662**	**449**	**128**	**421**
Public address (speakers) Network Total			**3,297**	**2,445**	**4,491**	**4,771**
Closed Circuit Television (CCTV) Network Total			**748**	**229**	**472**	**93**
Clocks Network Total			**133**	**11**	**38**	**14**

CP4 summary

Over CP4, Network Rail has over delivered against plan on the total number of SISS and operational telecoms renewals.

However, it is noted that there have been variances, up and down, in individual asset renewal volumes. These changes have been subject to Change Control and have been reported in previous Annual Returns, but the key differences against plan over the course of CP4 are summarised below.

Large Concentrators

The total number of large concentrators delivered in CP4 was 11, nine less than plan. This was due to two factors. The first was a change of policy to only renew the Human-Machine Interfaces (HMIs) rather than the whole concentrator, where asset condition allowed implementation of this policy. The second was the alignment with the Network Operating Strategy (NOS) which supported our decision not to renew some sites, thereby reducing the number of large concentrators to be renewed in CP4.

Small Concentrators

The total number of small concentrators delivered in CP4 was 118, 73 less than plan. This was mainly due to alignment with the National Operating Strategy (NOS) and also due to asset condition assessments, which supported our decision not to renew, thereby reducing the number of small concentrators to be renewed in CP4.

Public emergency telephone systems (PETS)

85 PETS were delivered in CP4 against a plan of 170. This is due to delays in the development of PETS 3 which caused deferrals and scope reduction in CP4. Due to these delays, the strategy changed to continue deployment of PETS 2 and also, where possible the introduction of a different solution, Kestrel Emergency Telephone System (KETS).

Driver only operation systems (DOOS)

542 DOOS were delivered in CP4 against a plan of 497. This was because, following asset inspection, additional DOOS were identified as requiring replacement after the plan has been established.

Voice recorders

79 voice recorders were delivered in CP4 against a plan of 56. This was because additional voice recorders were deemed as requiring renewal following asset inspection after the plan was established.

Customer Information System (CIS)

2,300 CIS monitors were delivered in CP4 against a plan of 1,944. This was mainly due to an acceleration of planned activity from CP5 following asset inspections.

Public Address (PA)

15,812 PA speakers were delivered in CP4 against a plan of 11,547. The significant increase in PA volumes during the control period is attributed to the fact that Public Address and Voice Alarm volumes were not included in the original CP4 PA volume measure.

Closed Circuit Television (CCTV)

1,631 CCTV installations were delivered in CP4 against a plan of 1,758. This follows a review of asset ownership where a number of cameras were identified as TOC assets and therefore not a Network Rail renewal responsibility.

Clocks

199 clocks were delivered in CP4 against a plan of 223. This is due to assets being condition assessed as not requiring renewal before CP5.

Telecoms renewal variance

Table 4.43 and 4.44 provide a summary of variances due to deferral of work from 2012/13, slippage of work from 2013/14 to 2014/15, accelerated volumes from 2014/15 to 2013/14 and other removals and additions of volumes during 2013/14, for Station Information Surveillance Systems telecoms and operational telecoms respectively.

Table 4.43: Station Information and Surveillance Systems telecoms volume overview

		Slippage into year (from 2012/13)		*Volume increase / decrease*		*Slippage out of the year*		*Acceleration into the year (from 2014/15)*	
		Vol	***Project code***	***Vol***	***Project code***	***Vol***	***Project code***	***Vol***	***Project code***
SISS	CIS			(9)	123488 Mersey Rail Sub Surface PA				
	PA	259	119795 Northern Rail LLPA	6	131662 SISS Newcastle Carlisle	(200)	131634 East Croydon Re-development SISS	513	123084 LNE Telecoms SISS 2011/12
				(19)	123486 Liverpool Lime Street PA/VA	(20)	118808 LNE Retail Telecoms 2011/12		
				27	118839 North West PA System Renewals	(246)	123084 LNE Telecoms SISS 2011/12		
				117	127890 Paddington Station PA/VA System Renewal				
				(17)	123084 LNE Telecoms SISS 2011/12				
				557	123488 Mersey Rail Sub Surface PA				
	CCTV			34	134043 London Midland CCTV Renewal				
	Clocks								

Table 4.44: Operational telecoms volume overview

		Slippage into year (from 2012/13)		*Volume increase / decrease*		*Slippage out of the year*		*Acceleration into the year (from 2014/15)*	
		Vol	*Project code*	*Vol*	*Project code*	*Vol*	*Project code*	*Vol*	*Project code*
Operational	Large concentrators			(1)	123487 Telecoms Concentrators Renewal - Stoke				
	Small concentrators	1	119943 Scotland Zone SPT Concentrator Renewals 2011/12	(1)	131658 LNE Concentrator Renewals 2013/14	(3)	131658 LNE Concentrator Renewals 2013/14		
				(1)	131665 York ECR Telephone Renewal	(3)	123087 LNE Concentrator Renewals 2012/13		
	PETS			1	131658 LNE Concentrator Renewals 2013/14	(7)	131611 PETS AHB Crossing System Renewals		
	DOO CCTV			(1)	118833 Western DOO Mirrors, Heaters and Structures Renewal	(33)	130485 SEA DOO CCTV GE		
	Voice Recorders			(22)	123085 LNE Voice Recorder, Earthing, Power and Alarm Renewals				

Civils activity volumes

The civils activity volumes measures are used to monitor delivery compared to plan.

Reporting method

Volumes are measured in accordance with Network Rail standards, which ensure a consistent measurement to enable future benchmarking for volumes.

Results

Table 4.45 shows the civils activity volumes delivered in CP4, variances between assets and DPu12, for England & Wales, Scotland and the network as a whole.

Table 4.46 shows how the planned workbank changed during 2013/14, both as a result of scheme reprioritisation and to meet emerging needs and knowledge.

Table 4.47 shows the civils activity volumes delivered in CP4, and variances from DPu12.

Commentary

This year the continued implementation of agreed sustainable asset management policies for both structures and earthworks was applied resulting in reviews of the work bank after the delivery plan update 2012 had been published. This led to changes to the work profile, with additional costs arising from works that did not deliver measureable volume, for example on additional inspections for key assets.

Re-prioritisation of schemes during the year in response to new asset information and the impact of severe weather are shown in Table 4.46.

Structures changes were most significant for major structures. The variance was driven by a combination of scope change and re-programming necessitated by external factors. Selby Swing Bridge

was postponed for 12 months as the planned diversionary route was blocked to rail traffic as a result of the Hatfield colliery landslip. The programme for Royal Albert Bridge was extended due to the impact of extreme weather and the emergence of unforeseen defects revealed by intrusive investigation.

Impacts across other assets were largely due to a combination of reasons including access constraints and severe weather conditions.

Environmental issues have had a major impact upon earthworks, resulting in 126,623 square metres being cancelled or deferred. There have also been significant additions to the plan as a result of reactive works, largely due to the impact of adverse weather conditions.

Later tables for bridge renewals and remediation (M23), culvert renewals and remediation (M26), retaining walls remediation (M27), earthwork remediation (M28) and tunnel remediation (M29) on Civils activity volumes in subsequent sections of this Annual Return provide a summary of projects completed during 2013/14.

CP4 overview

Actuals volumes delivered are compared to the Delivery Plan update 2012 baseline.

Table 4.47 shows the delivered CP4 volumes compared against our Delivery Plan update 2012 baseline.

Table 4.45: Civils renewal activity volumes delivered in CP4 compared to 2013/14 plan

		2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*Plan 2013/14*
England & Wales	Overbridges (sq ms)	5,235	11,707	7,420	4,278	7,649	6,274
	Underbridges (sq ms)	70,559	79,042	57,453	66,315	36,174	39,196
	Bridgeguard 3 (sq ms)	2,985	6,276	7,562	683	1,596	3,975
	Footbridges (sq ms)	1,225	1,198	1,548	1,055	549	1,180
	Tunnels (sq ms)	11,434	15,798	27,848	5,204	10,500	11,074
	Culverts (sq ms)	1,165	2,145	1,976	452	984	1,761
	Retaining walls (sq ms)	2,153	2,466	12,281	901	1,756	2,334
	Earthworks (sq ms)	335,205	280,947	279,658	327,211	427,257	321,245
	Coastal/estuary defence (ms)	541	1,185	833	30	2,438	3,318
	Other (including major structures) (sq ms)	0	5,920	20,412	19,970	5,316	10,172
Scotland	Overbridges (sq ms)	0	159	0	2,363	1,412	1,627
	Underbridges (sq ms)	4,739	8,872	14,045	12,514	32,058	30,793
	Bridgeguard 3 (sq ms)	0	0	1,320	103	2,407	2,407
	Footbridges (sq ms)	46	26	304	42	42	222
	Tunnels (sq ms)	230	3,923	1,150	245	509	209
	Culverts (sq ms)	251	195	154	209	79	79
	Retaining walls (sq ms)	0	143	170	25	30	0
	Earthworks (sq ms)	70,693	105,801	194,537	198,838	255,120	167,198
	Coastal/estuary defence (ms)	0	0	410	0	110	0
	Other (including major structures) (sq ms)	-	16,368	6,307	3,080	2,984	2,984
Network Total	**Overbridges (sq ms)**	**5,235**	**11,866**	**7,420**	**6,641**	**9,061**	**7,901**
	Underbridges (sq ms)	**75,298**	**87,914**	**71,498**	**78,829**	**68,232**	**69,989**
	Bridgeguard 3 (sq ms)	**2,985**	**6,276**	**8,882**	**786**	**4,003**	**6,382**
	Footbridges (sq ms)	**1,271**	**1,224**	**1,852**	**1,097**	**591**	**1,402**
	Tunnels (sq ms)	**11,664**	**19,721**	**28,998**	**5,449**	**11,009**	**11,283**
	Culverts (sq ms)	**1,416**	**2,340**	**2,130**	**661**	**1,063**	**1,840**
	Retaining walls (sq ms)	**2,153**	**2,609**	**12,451**	**926**	**1,786**	**2,334**
	Earthworks (sq ms)	**405,898**	**386,748**	**474,195**	**526,049**	**682,377**	**488,443**
	Coastal/estuary defence (ms)	**541**	**1,185**	**1,243**	**30**	**2,548**	**3,318**
	Other (including major structures) (sq ms)	**-**	**22,288**	**26,719**	**23,050**	**8,300**	**13,156**

Table 4.46: Civils renewal activity volumes: changes compared to planned workbank in 2013/14

	New item added	*Cancelled*	*Scope change*	*Work slipped from last year*	*Work deferred to next year*	*Accelerated from future years*
Overbridges	5,144	(1,632)	0	0	(2,352)	0
Underbridges	10,985	(5,232)	3,709	(559)	(12,246)	1,586
Overbridge BG3	0	(216)	0	0	(2,249)	86
Footbridge	0	(226)	(197)	0	(480)	92
Tunnel	0	100	(282)	190	(4,257)	3,975
Culvert	132	0	24	30	(963)	0
Retaining wall	230	(258)	0	0	(520)	0
Earthworks	300,696	(74,082)	19,314	(6,193)	(52,541)	6,740
Coastal and estuary defences	1,860	(2,520)	0	0	(110)	0
Other (including major structures)	330	(285)	(1,675)	2	(3,228)	0
Total	**319,377**	**(84,351)**	**20,893**	**(6,530)**	**(78,946)**	**12,479**

Table 4.47: Civils renewal activity volumes delivered in CP4 compared to DPu12

	DPu12 published target	*Delivered*	*Variance*	*Variance percentage*
Overbridges (sq ms)	39,810	40,223	413	1
Underbridges (sq ms)	424,372	381,771	(42,601)	(10)
Bridgeguard 3 (sq ms)	22,965	22,932	(33)	0
Footbridges (sq ms)	8,100	6,035	(2,065)	(25)
Tunnels (sq ms)	71,034	76,841	5,807	8
Culverts (sq ms)	6,985	7,610	625	9
Retaining walls (sq ms)	14,755	19,925	5,170	35
Earthworks (sq ms)	2,450,724	2,475,267	24,543	1
Coastal/estuary defence (ms)	5,585	5,547	(38)	(1)
Other (including major structures) (sq ms)	112,860	80,357	(32,503)	(29)

Bridge renewals and remediation (M23)

For the control period there has been under delivery on footbridges by 25 per cent and underbridges by ten per cent.

The main driver for the under delivery on footbridges was the non delivery of Doncaster Plant footbridge which equated to 1,445 square metres. This was due to the scheme being re-aligned with the wider Doncaster station enhancement programme to realise efficiencies that would be attained by delivering these together.

The main driver for the under-delivery on underbridges was caused by a prioritised focus on CP5 scheme development which did not deliver yields in CP4.

Culvert renewals and remediation (M26)

Despite the adverse weather conditions in recent years, culvert volume delivery came in above the agreed revised CP4 (DPu12) baseline target by 625 square metres which equates to a nine per cent over delivery. The DPu12 baseline was understated and more work was planned and delivered following the receipt of further information.

Retaining walls remediation (M27)

For the control period retaining wall volumes exceeded the agreed CP4 baseline (DPu12) by 5,170 square metres which equates to a 35 per cent over delivery. This is predominantly due to the completion of further works associated with one scheme on the LNE route that increased the volume of work delivered by 4,555 square meters to 9,355.

Earthworks (M28)

For the control period earthworks volumes exceeded the agreed CP4 baseline (DPu12) by 24,543 square metres which equates to a one per cent over delivery.

Tunnel remediation (M29)

Tunnel volume delivery came in above the revised CP4 (DPu12) baseline target by 5,807 square metres as a result of emerging work as described within the section on tunnel remediation. This equates to eight per cent over delivery in comparison to DPu12.

Major structures

There has been a significant under delivery on major structures equating to 32,503 square metres, or 29 per cent shortfall. Many of the factors that have contributed to this have been due to scope changes, re-programming and the impact of inclement weather. Key examples are as follows:

- Royal Albert Swing Bridge painting and repairs were only part achieved (13,000 square metres shortfall). This was due to adverse weather conditions and structural defects impacting on progress
- Arnside Kent Viaduct (3,520 square metres shortfall) has been impeded by winter tidal and environmental constraints which lead to productivity and consent delays in the installation of scour protection works
- Ouseburn Viaduct strengthening (2,000 square metres shortfall) was initially over estimated on the DPu12 volume and the shortfall is due to revised scope.

Bridge renewals and remediation (M23)

Definition

The total number and area in square metres of bridge decks that have been subject to renewal or remediation, with total cost per work item greater than £50,000. The term bridge includes over and under-bridges, side of line bridges and footbridges.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network is shown as follows:

- Table 4.48 shows the different types of bridge renewals and remediation work undertaken in 2013/14
- Table 4.50 provides the square area of bridge renewals and remediation work undertaken in CP4.

Operating route results

Data for each operating route, for each year of CP4, is shown as follows:

- Table 4.49 shows the different types of bridge renewals and remediation work undertaken
- Table 4.51 provides the square area of bridge renewals and remediation work undertaken.

Commentary

Overall the amount of remediation (in terms of intervention activities) through preventative repair, replace, strengthening and waterproofing work is in keeping with recent years.

There has been a continued focus on under bridge assets with a predominance of repair and strengthening works in line with policy.

Table 4.48: Bridge renewals and remediation in 2013/14: number by task category

	Preventative	*Repair*	*Strengthen*	*Replace*	*Waterproofing*	*Total*
England & Wales	27	49	31	33	10	150
Scotland	26	22	12	17	2	79
Network Total	**53**	**71**	**43**	**50**	**12**	**229**

Table 4.49: Bridge renewals and remediation in CP4: number by task category and operating route

Route	*System*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	Preventative	n/a	4	3	1	0
	Repair	n/a	8	3	2	0
	Strengthen	n/a	3	6	0	2
	Replace	n/a	3	5	6	2
	Waterproofing	n/a	0	1	0	0
East Midlands	Preventative	n/a	0	2	0	0
	Repair	n/a	12	4	4	2
	Strengthen	n/a	0	5	3	0
	Replace	n/a	5	4	1	2
	Waterproofing	n/a	1	1	0	0

Table 4.49 continued: Bridge renewals and remediation in CP4: number by task category and operating route						
Route	***System***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Kent	Preventative	n/a	2	3	2	2
	Repair	n/a	7	4	1	7
	Strengthen	n/a	0	0	1	2
	Replace	n/a	0	3	3	2
	Waterproofing	n/a	0	0	0	0
London North Eastern	Preventative	n/a	11	7	1	7
	Repair	n/a	28	12	4	13
	Strengthen	n/a	14	9	2	12
	Replace	n/a	18	16	13	11
	Waterproofing	n/a	1	1	0	3
London North Western	Preventative	n/a	36	20	21	10
	Repair	n/a	41	32	17	12
	Strengthen	n/a	17	10	8	8
	Replace	n/a	20	17	15	6
	Waterproofing	n/a	6	6	7	4
Scotland	Preventative	n/a	14	20	16	26
	Repair	n/a	9	12	7	22
	Strengthen	n/a	5	10	12	12
	Replace	n/a	18	10	10	17
	Waterproofing	n/a	1	1	0	2
Sussex	Preventative	n/a	1	2	5	1
	Repair	n/a	4	3	2	6
	Strengthen	n/a	0	0	2	2
	Replace	n/a	6	2	1	6
	Waterproofing	n/a	0	0	0	0
Wales	Preventative	n/a	0	4	4	2
	Repair	n/a	0	5	4	2
	Strengthen	n/a	0	1	0	1
	Replace	n/a	0	3	11	2
	Waterproofing	n/a	0	0	0	2
Wessex	Preventative	n/a	4	1	3	4
	Repair	n/a	3	5	8	3
	Strengthen	n/a	3	0	1	1
	Replace	n/a	3	1	7	2
	Waterproofing	n/a	1	0	0	0
Western	Preventative	n/a	9	2	2	1
	Repair	n/a	12	1	1	4
	Strengthen	n/a	2	1	3	3
	Replace	n/a	5	1	3	0
	Waterproofing	n/a	3	2	0	1
Preventative Network Total		**n/a**	**81**	**64**	**55**	**53**
Repair Network Total		**n/a**	**124**	**81**	**50**	**71**
Strengthen Network Total		**n/a**	**44**	**42**	**32**	**43**
Replace Network Total		**n/a**	**78**	**62**	**70**	**50**
Waterproofing Network Total		**n/a**	**13**	**12**	**7**	**12**
Network Total		**n/a**	**340**	**261**	**214**	**229**

Notes:
2009/10 results are not recorded at route level as this was prior to devolution.

Table 4.50: Bridge renewals and remediation in CP4: square area of deck replacement (actual square metres)					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
England & Wales	12,976	8,672	9,765	19,649	3,817
Scotland	1,722	1,263	1,127	614	2,673
Network Total	**14,698**	**9,935**	**10,892**	**20,263**	**6,490**

Table 4.51: Bridge renewals and remediation in CP4: square area of deck replacement (actual square metres) by operating route					
	2009/10	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	n/a	157	378	915	525
East Midlands	n/a	0	1,038	492	292
Kent	n/a	2,571	2,888	1,570	1,406
London North Eastern	n/a	2,909	3,127	1,039	574
London North Western	n/a	661	657	75	144
Scotland	n/a	1,263	1,127	614	2,673
Sussex	n/a	985	1,273	75	507
Wales	n/a	0	199	14,667	303
Wessex	n/a	1,048	77	213	0
Western	n/a	341	128	603	66
Network Total	**14,698**	**9,935**	**10,892**	**20,263**	**6,490**
Notes: 2009/10 results are not recorded at route level as this was prior to devolution.					

Culvert renewals and remediation (M26)

Definition

The total number of culverts that have been subject to renewal or where major components have been replaced, with total cost per scheme greater than £50,000.

Results

England & Wales, Scotland and overall network results

- Table 4.52 shows the different types of culvert renewals and remediation work undertaken in 2013/14 for England & Wales, Scotland and the overall network.

Operating route results

- Table 4.53 shows the different types of culvert renewals and remediation work undertaken in CP4 for each operating route.

Commentary

The number of individual culverts remediated has reduced compared with previous years, however substantial programmes of maintenance works have been undertaken where the cost does not exceed £50,000.

The adverse weather impacted remediation activity during 2013/14 due to access issues and culverts being submerged under flood water.

Table 4.52: Culvert renewals and remediation in 2013/14: : number by task category				
	Preventative	***Repair***	***Replace***	***Total***
England & Wales	1	3	6	10
Scotland	1	0	2	3
Network Total	**2**	**3**	**8**	**13**

Table 4.53: Culvert renewals and remediation in CP4: number by task category and operating route

Route	*System*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	Preventative	n/a	0	0	0	0
	Repair	n/a	0	1	1	0
	Replace	n/a	0	1	1	1
	Total	n/a	0	2	2	1
East Midlands	Preventative	n/a	0	0	0	0
	Repair	n/a	0	0	0	1
	Replace	n/a	2	1	1	0
	Total	n/a	2	1	1	1
Kent	Preventative	n/a	0	0	0	0
	Repair	n/a	0	0	0	0
	Replace	n/a	0	0	0	0
	Total	n/a	0	0	0	0
London North Eastern	Preventative	n/a	0	0	0	0
	Repair	n/a	1	2	0	0
	Replace	n/a	7	14	1	0
	Total	n/a	8	16	1	0
London North Western	Preventative	n/a	0	0	0	1
	Repair	n/a	1	1	0	1
	Replace	n/a	3	1	2	1
	Total	n/a	4	2	2	3
Scotland	Preventative	n/a	0	0	0	1
	Repair	n/a	0	0	0	0
	Replace	n/a	8	8	8	2
	Total	n/a	8	8	8	3
Sussex	Preventative	n/a	0	0	0	0
	Repair	n/a	0	0	0	0
	Replace	n/a	2	0	0	0
	Total	n/a	2	0	0	0
Wales	Preventative	n/a	0	0	0	0
	Repair	n/a	0	0	0	0
	Replace	n/a	0	0	0	0
	Total	n/a	0	0	0	0
Wessex	Preventative	n/a	0	0	0	0
	Repair	n/a	1	1	1	1
Wessex	Replace	n/a	0	0	0	3
	Total	n/a	1	1	1	4
Western	Preventative	n/a	0	0	0	0
	Repair	n/a	0	1	0	0
	Replace	n/a	0	0	1	1
	Total	n/a	0	1	1	1
Preventative Network Total		**2**	**0**	**0**	**0**	**2**
Repair Network Total		**3**	**3**	**6**	**2**	**3**
Replace Network Total		**8**	**22**	**25**	**14**	**8**
Network Total		**13**	**25**	**31**	**16**	**13**

Notes:
2009/10 results are not recorded at route level as this was prior to devolution.

Retaining walls remediation (M27)

Definition

The total number and area in square metres of retaining walls subject to renewal or remediation, with a scheme value greater than £50,000.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network is shown as follows:

- Table 4.54 shows the different types of retaining wall renewals and remediation work undertaken in 2013/14
- Table 4.55 provides the square area of retaining wall renewals and remediation work undertaken in CP4.

Operating route results

- Table 4.56 provides the square area of retaining wall renewals and remediation work undertaken in CP4 for each operating route.

Commentary

During 2013/14 the total number of retaining walls remediated or renewed and their associated delivered volumes was higher than the previous year but lower than plan by 548 square metres.

The shortfall was driven by deferral of activity for South Hampstead Station. The largest part of the job has been delivered with the remaining 500 square metres of work being re-planned as a result of access constraints around the station platform.

Table 4.54: Retaining wall renewals and remediation in 2013/14: number by task category

	Preventative	*Repair*	*Replace*	*Total*
England & Wales	0	2	1	3
Scotland	0	1	0	1
Network Total	**0**	**3**	**1**	**4**

Table 4.55: Retaining wall renewed in CP4: area (actual square metres)

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
England & Wales	1,737	1,534	738	900	1,400
Scotland	0	0	0	0	0
Network Total	**1,737**	**1,534**	**738**	**900**	**1,400**

Table 4.56: Retaining wall renewed in CP4: area (actual square metres) by operating route

	2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	n/a	0	0	0	0
East Midlands	n/a	0	0	0	0
Kent	n/a	170	120	0	0
London North Eastern	n/a	512	558	0	0
London North Western	n/a	128	60	900	1,400
Scotland	n/a	0	0	0	0
Sussex	n/a	0	0	0	0
Wales	n/a	0	0	0	0
Wessex	n/a	0	0	0	0
Western	n/a	724	0	0	0
Network Total	**n/a**	**1,534**	**738**	**900**	**1,400**

Notes:
2009/10 results are not recorded at route level as this was prior to devolution.

Earthwork remediation (M28)

Definition

This is the total number of earthwork schemes that have been subject to remediation, with total cost per scheme greater than £50,000.

The Civil's business plan contains project repeatable work items (work categories), volumes and costs that formed the CP4 Maintenance & Renewals Programme. The spreadsheet is managed and maintained through periodic change control with costs and volumes being updated through the project lifecycle.
Indentifying jobs to include in the report was undertaken as follows:

- identify and select jobs with a volume greater than zero in 2013/14
- of these jobs, select only those with budget of >= £50,000.

Results

England & Wales, Scotland and overall network results

Data for England & Wales, Scotland and for the overall network, is shown as follows:

- Table 4.57 shows the numbers of different types of earthwork remediation works for 2013/14 by task category
- Table 4.58 shows the square metre area for different types of work greater than £50,000.

Operating route results

Data for each operating route, from 2010/11, is shown as follows:

- Table 4.59 shows the numbers of different types of earthwork remediation works by task category
- Table 4.60 shows the square metre area for different types of work greater than £50,000.

Commentary

The total volume confirmed as delivered by the routes was 682,377 square metres. This comprised 598,816 square metres of planned (or preventative) work together with 83,561 square metres of reactive (or repair) work mainly due to repairing failures on the network.

In 2013/14 the greatest annual volume of earthworks in CP4 were delivered. Overall volume for 2013/14 was 30 per cent greater than for 2012/13 and 44 per cent greater than 2011/12.

In 2013/14 44 per cent of the volume delivered was on rock cuttings, 30 per cent on soil cutting and 26 per cent on embankment assets.

Scotland delivered 37 per cent of the total volume in 2013/14. This is due to the Scotland ten year rock cutting remediation programme.

CP4 overview

The total actual volume delivered in CP4 is 2,475,267 square metres which exceeds our target volume of 2,450,724 by one per cent.

Over the last three years of the control period volumes delivered have increased by 30 per cent, eleven per cent and ten per cent year respectively. This shows a continuous improvement in delivery capability.

Table 4.57: Earthworks remediation projects 2013/14 (number by task category)

	Preventative	*Repair*	*Total*
England & Wales	70	43	113
Scotland	68	1	69
Network Total	**138**	**44**	**182**

Table 4.58: Earthworks remediation projects 2013/14 (total volume (m^2) for works greater than £50,000)

	Preventative	*Repair*	*Total*
England & Wales	344,096	83,161	427,257
Scotland	254,720	400	255,120
Network Total	**598,816**	**83,561**	**682,377**

Table 4.59: Earthworks remediation projects 2013/14 (number by task category) for CP4					
		2010/11	***2011/12***	***2012/13***	***2013/14***
Anglia	Preventative	-	1	0	4
	Repair	-	2	2	1
	Total	-	3	2	5
East Midlands	Preventative	0	10	1	3
	Repair	0	1	1	2
	Total	0	11	2	5
Kent	Preventative	-	3	7	4
	Repair	-	1	1	5
	Total	-	4	8	9
London North Eastern	Preventative	13	14	23	30
	Repair	3	1	14	7
	Total	16	15	37	37
London North Western	Preventative	11	7	13	19
	Repair	3	3	7	10
	Total	14	10	20	29
Scotland	Preventative	20	48	49	68
	Repair	2	4	4	1
	Total	22	52	53	69
South East*	Preventative	8	-	-	-
	Repair	13	-	-	-
	Total	21	-	-	-
Sussex	Preventative	-	3	0	3
	Repair	-	1	5	3
	Total	-	4	5	6
Wales	Preventative	0	1	1	0
	Repair	0	1	2	3
	Total	0	2	3	3
Wessex	Preventative	7	2	4	1
	Repair	23	2	8	3
	Total	30	4	12	4
Western	Preventative	0	11	2	6
	Repair	0	1	4	9
	Total	0	12	6	15
Preventative Network Total		**59**	**100**	**100**	**138**
Repair Network Total		**44**	**17**	**48**	**44**
Network Total		**103**	**117**	**148**	**182**

Notes:
***As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.

Table 4.60: Earthworks remediation projects 2013/14 (total volume (m²) for works greater than £50,000) for CP4					
		2010/11	***2011/12***	***2012/13***	***2013/14***
Anglia	Preventative	-	5,011	0	7,547
	Repair	-	1,848	3,695	2,275
	Total	-	6,859	3,695	9,822
East Midlands	Preventative	0	45,111	927	7,443
	Repair	0	2,800	1,140	1,140
	Total	0	47,911	2,067	8,583
Kent	Preventative	-	13,388	17,405	18,937
	Repair	-	3,997	1,245	3,731
	Total	-	17,385	18,650	22,668
London North Eastern	Preventative	58,828	60,881	160,965	142,357
	Repair	1,085	893	10,015	6,907
	Total	59,913	61,774	170,980	149,264
London North Western	Preventative	55,092	9,843	23,881	60,755
	Repair	6,146	615	9,755	15,610
	Total	61,238	10,458	33,636	76,365
Scotland	Preventative	58,259	190,905	194,215	254,720
	Repair	2,120	3,090	4,070	400
	Total	60,379	193,995	198,285	255,120
South East	Preventative	33,375	-	-	-
	Repair	29,326	-	-	-
	Total	62,701	-	-	-
Sussex	Preventative	-	14,667	0	33,000
	Repair	-	693	5590	2,250
	Total	-	15,360	5,590	35,250
Wales	Preventative	0	6,555	200	0
	Repair	0	140	785	6,503
	Total	0	6,695	985	6,503
Wessex	Preventative	81,873	7,033	77,536	1,067
	Repair	22,930	1,233	680	16,000
	Total	104,803	8,266	78,216	17,067
Western	Preventative	0	104,592	10,800	72,990
	Repair	0	900	3145	28,745
	Total	0	105,492	13,945	101,735
Preventative Network Total		**287,427**	**457,986**	**485,929**	**598,816**
Repair Network Total		**61,607**	**16,209**	**40,120**	**83,561**
Network Total		**349,034**	**474,195**	**526,049**	**682,377**

Notes:
*****As for route devolution and the creation of ten routes data prior to 2012 for the routes Anglia, Kent, Sussex and Wessex are recorded under South East. Post 2012 data is recorded under the four separate routes.

Tunnel remediation (M29)

Definition

The total number of tunnels that have been subject to renewal or remediation, with total cost per work item greater than £50,000.

Results

Table 4.61 shows the different types of tunnel renewals and remediation work undertaken in 2013/14 for England & Wales, Scotland and the overall network.

Commentary

Tunnel renewals in 2013/14 were 5,560 square metres higher than 2012/13 as a result of emerging works. For example, 3,975 square metres of work was accelerated into 2013/14 due to preventative and repair work on shafts two, three and seven of Standedge Tunnel, on the LNE route.

Despite the increase in comparison with the previous year, a shortfall of 274 square metres was reported against the 2013/14 plan as a result of the deferral of two large schemes:

- 3,240 square metres were deferred into 2014/15 on Whiteball Tunnel phase 2. Whilst the initial phase 1 works were delivered (the installation of structural mesh), the phase 2 activity was delayed due to the size of the programme and constraints to site access
- 500 square metres were deferred into 2014/15 on Balcombe Tunnel after the original track access was used for urgent remediation works following partial structural failure of water catchment trays.

Electrification and plant renewal activity volumes

Definition

These volume measures are defined in the Network Rail Asset Reporting Manual. The volumes are only declared as delivered and reported each period when commissioned into operational use.

Results

Table 4.62 shows the electrification and plant renewal volumes for 2013/14 in England & Wales, Scotland and for the overall network, along with the 2013/14 and CP4 plan. Table 4.63 shows the network total electrification and plant renewal volumes in CP4, for England & Wales, Scotland and the overall network.

Commentary

The main reasons for the variances on volumes delivered compared to plan are described below for each individual measure.

AC Distribution

HV AC Switchgear (circuit breakers)

In 2013/14 no circuit breakers were delivered compared to the planned 31, due to:

- contractor issues and operational constraints preventing the by-pass of the substation for changeover (26)
- delays caused by delivery of new substations from a contractor (four)
- internal issues associated with works delivery (one).

During CP4 the primary driver for reductions / alterations of actual renewals by 104 is related to the following key issues:

- the emergence of proposals to electrify routes in North West England which led to changes and reduced requirements for renewals by two
- the development of the West Coast Power Supply Project scope and design which led to a reduction of 26
- the revised asset policy promoting condition information to inform renewal activities rather than just asset age had the effect of reducing the level of intervention by 76.

Booster Transformers

In 2013/14 six booster transformers were delivered compared to the planned eight.

Two were de-scoped due to work being carried out by the Edinburgh – Glasgow Improvement Project (EGIP) taking the booster transformers into their scope of works. The remaining six were delivered as planned.

Table 4.61: Tunnel renewals in 2013/14: number by task category

	Preventative	*Repair*	*Total*
England & Wales	13	19	32
Scotland	1	2	3
Network Total	**14**	**21**	**35**

During CP4 the primary driver for reductions / alterations of actual renewal volumes is related to the following key issues:

- removal of two transformers that were not required due to the approval of a future electrification scheme
- three transformers de-scoped from one project as these were completed in CP3 but not reported
- two projects were totally de-scoped leading to a reduction of 43 as part of a change in policy from asset age replacement to asset condition.

Limited access arrangements have also affected the amount of time available to renew assets.

OLE & Conductor Rail

OLE Rewiring (wire runs)

In 2013/14 14 wire runs were delivered compared to the planned 22.

The following were deferred from plan due to:

- key structure removals not being completed over Christmas 2013 (two)
- high winds (one).

The following wire runs were cancelled due to:

- an Overhead Line Equipment (OLE) incident meaning that the wiring train and resources were diverted to assist (one)
- a high level condition assessment and review of early CP5 works (one).

Three volumes were added to the plan incorrectly, causing an error in the baseline. From Period four, these volumes were excluded from the forecast.

51 wire runs were added to the plan in Period 11 of 2013/14, forming the creation of a new project for thin wire renewals. These volumes did not form part of the original 2013/14 plan. However, none of these were completed before year end.

The bad weather in the autumn and winter of 2013/14 together with the re-direction of wiring trains in its aftermath meant that there was a shortfall in OLE re-wiring in the year against the original plan. Four of the wire runs will be completed in the first quarter of 2014/15.

During CP4 the overall variance against plan is related to:

- slippage from CP3 into the current control period
- work prioritisation exercises identifying work that is no longer required to deliver CP4 outputs
- deferral of the Great Eastern (GE) project into CP5 due to changes in track access allowing weekend access to be given to the Train Operating Company (TOC).

OLE Campaign changes (wire runs)

In 2013/14 427 wire runs were delivered compared to the planned 566. 139 wire runs were deferred due to:

- procurement / contracting issues, which resulted in a delay to works on site (72)
- access restrictions (45)
- delivery being moved to the first quarter of 2014/15 (12)
- cancellation and transfer to another project for delivery in 2014/15 (four)
- the small works delivery team being delayed by lack of resource. This project is now with an alternative supplier to be delivered in 2014/15 (six).

15 wire runs have been added into the plan following the addition of a new project to deliver OLE performance improvement initiatives for Leeds North West. This project arose following a condition survey and the subsequent need to rectify all identified defects and prioritise campaign changes. However, none of these were completed and were deferred to 2014/15.

During CP4 the overall variance against plan is related to:

- work prioritisation exercises identifying campaign changes that are no longer required to deliver CP4 outputs
- additional 359 wire runs were identified as being required in Scotland.

Conductor Rail

In 2013/14 18 kilometres of conductor rail was delivered compared to the planned 57 kilometres.

The following were not delivered from the plan due to:

- alignment with available delivery resources (19.7 kilometres deferred to 2014/15)
- depot resourcing issues (20 kilometres deferred to 2014/15)
- issues with access for rail drop and installation (3.2 kilometres).

3.3 kilometres were over delivered against the plan due to site surveys indicating extra sites that needed renewing.

The delivery of conductor rail renewals in 2013/14 was impacted by access issues and lack of specialist plant availability. A number of renewals were also deferred into 2014/15 to better align with resource availability.

During CP4 the overall variance compared to plan is primary related to delivery issues and the availability/double booking of specialist re-railing vehicles have also had an impact in Wessex.

DC Distribution

DC HV Switchgear (circuit breakers)

In 2013/14 39 circuit breakers were delivered compared to the planned 164. 17 were de-scoped from the plan due to reporting errors and the serviceable condition of the assets.

The following circuit breakers were not delivered due to:

- uncompleted works (45)
- poor planning and late requests for information from the delivery contractor (5)
- transfer to a new route specific project for delivery in 2014/15 (6)
- problems in providing resources for booked train haulage, cranes and wagons (46)
- access restrictions (six).

The variance between the 2013/14 planned delivery and full year actuals is primarily due to the correction of reporting errors where a number of DC LV breakers were counted in the 2013/14 budget for DC HV switchgear and delivery difficulties due to network access constraints, and a lack of specialist plant and contractors.

The main reason for volume reductions in CP4 was programme slippage. The work will now be completed in the first year of CP5. Other reductions were realised as part of a change in policy from asset age replacement to asset condition.

DC HV Cables

In 2013/4 73 kilometres were delivered compared to the planned 148 kilometres.

The following kilometres of cable were not delivered due to:

- a significant increase in cable cost (leading to a re-evaluation and approval of the project) and issues with possessions (57 kilometres deferred to 2014/15)
- design and possession issues caused by switchgear works taking priority (four kilometres)
- difficulties in delivery of high level sub surface works which will now be commissioned in CP5 (four kilometres)
- difficulties in providing resources for booked train haulage, cranes and wagons (ten kilometres deferred to 2014/15).

The variance between the 2013/14 planned delivery and full year actuals is due to large increases in unit rates, delivery difficulties due to network access constraints, and lack of specialist plant and contractors.

During CP4 the overall variance was due to many schemes not delivering their expected volumes, some of which was due to the change of electrical power asset policy from asset age replacement to asset condition. However, the majority was due to under delivery of volumes in 2012/13 and 2013/14.

DC LV Switchgear (circuit breaker)

In 2013/14 271 circuit breakers were delivered compared to the planned 363. The 92 circuit breakers not delivered were deferred to 2014/15 due to possession issues and significant increases in asset costs together with a large number of significant possession related issues.

During CP4 the overall variance was due to the changes in asset policy allowing southern routes to reduce volumes based on asset condition.

Transformer / Rectifiers

In 2013/14 six transformers were delivered compared to the planned 22.

The following transformers were not delivered due to:

- poor weather conditions delaying works on site (two deferred to 2014/15)
- the late receipt of instructions (three)
- issues in providing resources for booked train haulage, cranes and wagons and a lack of contractor resource (11).

In addition, as for other assets in the DC distribution group, the lack of specialist plant and resource availability also hindered delivery. Projects impacted by delays in 2013/14 are due for delivery in 2014/15.

During CP4 the primary driver for reductions / alterations of actual renewal volumes is related to the following key issues:

- a scheme on the Isle of Wight for 19 transformers was cancelled at the request of the train operator. This was an incorrect line in the original plan and so the work was cancelled as it was not required
- the application of the revised asset condition based policy.

DC LV Cables

In 2013/14 16 kilometres were delivered compared to the planned 280 kilometres.

The main reason for the variance between the plan and the actual kilometres delivered is that the plan contained a provision for 176 kilometres for reactive renewals. This planned activity was included in the baseline in error.

The following kilometres were not delivered due to:

- delays caused by rising cables costs and possession issues (37 deferred to 2014/15)
- a review of work required following detailed cable conditioning survey reports (four)

- problems getting access to the work site through possessions and requirement for re-authority (six).

During CP4 the overall variance from plan has been driven by delays due to higher than expected cable costs and the consequential impact of possession errors. Other reductions were the result of condition survey reports that identified that the work was no longer required.

Fixed Plant

Point End Heaters

In 2013/14 134 point end heaters were delivered compared to the planned 415 point end heaters.

The following point end heaters were not delivered primarily due to:

- cable routing issues (32)
- delays relating to procuring Distribution Network Operator (DNO) supplies and availability of site access (49)
- internal delays in issuing designs (128)
- a lack of DNO provision as a result of wayleave issues and contractor delays in completing the works (19 deferred into 2014/15)
- possession issues (14).

11 point end heaters were cancelled due to supplier issues and obsolete equipment. 25 point end heaters were completed but not released into operational use, therefore we are unable to claim the associated volume for these sites in this control period.

Two additional sites were added to the plan as a result of site surveys and have both been completed.

During CP4, the majority of planned point end heater works were completed. Where works were not completed this was primarily due to:

- cable routing issues
- lead times for new / updated DNO supplies and site access
- clearance of legal documents
- not being released into operational usage in time for volume to be counted
- cancelled works due to asset becoming obsolete.

CP4 overview

The final year of CP4 was a challenging year for the Electrification and Plant asset base. Volume delivery in 2013/14 was impacted by a number of issues which included poor weather and lack of availability of key specialist plant items and resources. Despite this, three of the four asset condition measures in 2013/14 remained better than target whilst the condition of the conductor rail contact system was slightly adverse to target.

During CP4, a number of factors caused reductions or alterations to renewal volumes. The main change was a revision in asset policy which took place in June 2011 and promoted condition information to inform renewal activities rather than just asset age. This led to the reduction in a large number of volumes across a range of reportable volume activities.

Table 4.62: Electrification and plant renewal activity volumes in 2013/14

	England & Wales	*Scotland*	*Network Total*	*Plan 2013/14*	*CP4 Actual*	*CP4 Plan*
AC Distribution						
HV Switchgear (circuit breakers)	0	0	0	31	163	320
AC GSP transformer (no.)	0	0	0	1	1	2
AC GSP cable (km)	0	0	0	0	0	4
Booster transformers (no.)	0	6	6	8	99	226
OLE and conductor rail						
OLE re-wiring (wire runs)	14	0	14	22	238	365
OLE campaign changes (wire runs)	101	326	427	566	3,482	5,697
Conductor rail (km)	18	0	18	57	39	124
DC distribution						
HV Switchgear (no.)	39	0	39	164	216	747
HV cables (km)	73	0	73	148	210	346
LV Switchgear (no.)	271	0	271	363	425	593
Transformers / rectifiers (no.)	6	0	6	22	109	208
LV cabling (km)	16	0	16	280	29	358
Plant & Machinery						
Points heaters (no.)	134	0	134	413	1,458	1,767

Table 4.63: Electrification and plant renewal activity volumes in CP4

		2009/10	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*CP4 Actual*
England & Wales	**AC Distribution**						
	HV Switchgear (circuit breakers)	41	39	32	26	0	138
	AC GSP transformer (no.)	0	1	0	0	0	1
	AC GSP cable (km)	0	0	0	0	0	0
	Booster transformers (no.)	25	5	0	0	0	30
	OLE and conductor rail						
	OLE re-wiring (wire runs)	60	68	49	37	14	228
	OLE campaign changes (wire runs)	490	667	750	522	101	2,530
	Conductor rail (km)	0	2	17	2	18	39
	DC distribution						
	HV Switchgear (no.)	64	69	14	30	39	216
	HV cables (km)	65	22	20	30	73	210
	LV Switchgear (no.)	69	55	13	17	271	425
	Transformers / rectifiers (no.)	27	39	32	5	6	109
	LV cabling (km)	0	0	7	6	16	29
	Plant & Machinery						
	Points heaters (no.)	N/A	641	531	146	134	1,452
Scotland	**AC Distribution**						
	HV Switchgear (circuit breakers)	0	16	0	9	0	25
	AC GSP transformer (no.)	0	0	0	0	0	0
	AC GSP cable (km)	0	0	0	0	0	0
	Booster transformers (no.)	28	22	2	11	6	69
	OLE and conductor rail						
	OLE re-wiring (wire runs)	4	3	0	3	0	10
	OLE campaign changes (wire runs)	0	117	377	132	326	952
	Conductor rail (km)	0	0	0	0	0	0
	DC distribution						
	HV Switchgear (no.)	0	0	0	0	0	0
	HV cables (km)	0	0	0	0	0	0
	LV Switchgear (no.)	0	0	0	0	0	0
	Transformers / rectifiers (no.)	0	0	0	0	0	0
	LV cabling (km)	0	0	0	0	0	0
	Plant & Machinery						
	Points heaters (no.)	N/A	0	0	6	0	6
Network Total	**AC Distribution**						
	HV Switchgear (circuit breakers)	**41**	**55***	**32**	**35**	**0**	**163**
	AC GSP transformer (no.)	**0**	**1**	**0**	**0**	**0**	**1**
	AC GSP cable (km)	**0**	**0**	**0**	**0**	**0**	**0**
	Booster transformers (no.)	**53**	**27**	**2**	**11**	**6**	**99**
	OLE and conductor rail						
	OLE re-wiring (wire runs)	**64**	**71**	**49**	**40**	**14**	**238**
	OLE campaign changes (wire runs)	**490**	**784**	**1,127**	**654**	**427**	**3,482**
	Conductor rail (km)	**0**	**2**	**17**	**2**	**18**	**39**
	DC distribution						
	HV Switchgear (no.)	**64**	**69**	**14**	**30**	**39**	**216**
	HV cables (km)	**65**	**22**	**20**	**30**	**73**	**210**
	LV Switchgear (no.)	**69**	**55**	**13**	**17**	**271**	**425**
	Transformers / rectifiers (no.)	**27**	**39**	**32**	**5**	**6**	**109**
	LV cabling (km)	**0**	**0**	**7**	**6**	**16**	**29**
	Plant & Machinery						
	Points heaters (no.)	**N/A**	**641**	**531**	**152**	**134**	**1,458**

Notes:
No data was collected for points heaters prior to 2010/11.
*Data for AC HV Switchgear (circuit breakers) for 2010/11 has been updated to correct a reporting error.

A secondary factor was the clarification of reporting volumes which affected a number of asset intervention activities notably OLE campaign changes and OLE re-wires. Previously these items were measured as a mix of components and wire runs rather than just the correct unit of measure of wire runs.

Whilst we have not delivered as many renewals as assumed in CP4 and some renewals have been deferred into CP5 we have maintained our assets in a sustainable way over the course of the control period.

There are a number of action plans in place to address delivery of both our CP5 rollover together with delivery of our CP5 workbank. These plans are progressing.

Operational Property volumes

Definition

Operation property expenditure covers the entire maintenance and renewal activity carried out to Network Rail's operational property. The majority of the investment was delivered by our Infrastructure Projects teams through large, complex renewals. Whilst our Maintenance Property Works teams delivered a much greater number of smaller planned and reactive programme of works.

Results

Table 4.64 provides the operational property expenditure for 2013/14 as a proxy for renewal volumes and provides a comparison with the DPu12 forecast. We will be able to record and subsequently report physical volumes for work types starting in CP5. Table 4.65 provides the operational property expenditure uplifted to 2013/14 prices for CP4 as a proxy for renewal volumes and provides a comparison with the DPu12 forecast.

Commentary

The main variances between planned and actual volumes (expenditure) for 2013/14 are explained below:

Managed Stations

Compared to the 2013/14 budgets, there was an over spend of £84 million at managed stations in England & Wales. However, the reported over spend includes an additional £85 million of funding approved by the ORR for the Birmingham Gateway Project.

A number of planned activities re-phased from 2012/13 were delivered in 2013/14. However, planned refurbishment works on Paddington station train shed spans one to three have been re-phased for delivery in CP5. This is because:

- The specification for work on the roof spans fabric, lighting and mechanical and electrical equipment was revised based on findings from exhaustive condition surveys and structural assessments of all three spans
- Delays due to Olympic embargo and Crossrail monitoring works at the station.

In Scotland there was a variance in planned volumes at Glasgow Central and Edinburgh Waverley. Whilst the 2013/14 volumes were delivered broadly to plan, the variance identified is based on efficiencies achieved on delivery of planned work items. The efficiency savings were reinvested in the Scotland portfolio.

Franchised Stations

The variance in planned volumes for franchised stations is largely due to the delivery of CP4 work items which have been re-phased or deferred from previous years into 2013/14.

The deferment of these projects followed additional planning and analysis time expended to review whole life financial analysis. The integration of Network Rail projects with the TOC Alliances and with Access for All schemes to achieve optimal efficiencies also had an impact.

In Scotland, franchised stations works were delivered broadly according to plan.

LMD & Depot Plant

There was a combined over spend of £8 million on LMDs and depot plant across the network. This is due to increased renewal works identified at various LMDs across the network including previously deferred works completed in 2013/14. Some examples of these works are:

- heating Installation at Norwich CP LMD
- new Syphonic Drainage System at Ilford LMD
- renewal of fuelling system at Derby Etches
- refurbishment of high mast lighting at Shoeburyness LMD
- increased scope of works delivered at Perth LMD
- repairs to Stores Roof at Swansea Landore LMD.

Line-side Buildings (LSB), Maintenance Delivery Unit (MDU) and National Delivery Service (NDS)

There was an increase in expenditure on the MDU portfolio compared to budget as a result of an unplanned increase in minor works activity and extensive refurbishment works carried out in 2013/14 at various MDUs e.g. Slough Super Depot. New MDUs (e.g. Carstairs) were delivered in 2013/14 along with additional works on car park and access routes at various sites including Sheffield & Holbeck MDU.

NDS buildings volumes were broadly delivered to plan in 2013/14.

Lineside buildings form the major part of reduced volumes of work executed across these asst types. The reduced volumes were associated with creating delivery efficiencies, re-scoping and aligning with other planned works. A lineside buildings data acquiring program was commissioned in 2013/14 and will locate and detail current condition of all lineside operational assets.

CP4 overview

Compared to DPu12 forecast, national expenditure summary indicates a three per cent or £41 million over delivery in CP4, as shown in Table 4.65 Analysis of the data indicates that various projects deferred during the earlier years of CP4 were delivered in the final year thereby reconciling the variances from previous years.

Franchised station volumes were under delivered by £14 million in CP4 across England & Wales. The reduced volumes are believed to be associated with delivery efficiencies within the control period.

Whilst expenditure has been used as a proxy for reporting operational property renewal volumes in CP4, actual delivered volumes will be reported in CP5.

Table 4.64: Operational property expenditure in 2013/14 in £ million and 2013/14 prices

	Plan 2013/14			***2013/14***			***Variance***		
	Overall	Scotland	England & Wales	Overall	Scotland	England & Wales	Overall	Scotland	England & Wales
Managed stations	61	21	40	142	18	124	(81)	3	(84)
Franchised stations	117	11	106	145	11	134	(28)	0	(28)
LMDs	9	1	8	18	3	15	(9)	(2)	(7)
Depot Plant	3	1	2	3	1	2	0	0	0
LSBs	22	2	20	17	2	15	5	0	5
MDUs	7	1	6	21	1	20	(14)	0	(14)
NDS	2	0	2	3	0	3	(1)	0	(1)
Total	**223***	**39***	**184**	**350***	**37***	**313**	**(127)***	**2***	**(129)**

Notes:
***Difference in total due to rounding.**

Table 4.65: Operational property expenditure in CP4 in £ million and 2013/14 prices

	CP4 Plan			***CP4 Actual***			***Variance***		
	Overall	Scotland	England & Wales	Overall	Scotland	England & Wales	Overall	Scotland	England & Wales
Managed stations	339	137	202	388	120	268	(49)	17	(66)
Franchised stations	755	71	684	753	83	670	2	(12)	14
LMDs	78	9	69	84	11	73	(6)	(2)	(4)
Depot Plant	25	4	21	17	3	14	8	1	7
LSBs	91	6	85	87	7	80	4	(1)	5
MDUs	63	9	54	67	9	58	(4)	0	(4)
NDS	13	1	12	11	1	10	2	0	2
Total	**1,364**	**237**	**1,127**	**1,407**	**234**	**1,173**	**(43)**	**3**	**(46)**

Notes:
Values for the CP4 Plan have been taken from DPu12 and uplifted to 2013/14 prices.

Section 5 – Network capability and network availability

Introduction

This section reports on the capability of the network through our linespeed, gauge, route availability and electrified track measures (C1 – C4). We also include information on Network Change, platform length and the availability of the network through our possession management.

Network Capability

Data on the four capability measures, and an explanation of changes during the year, are reported for:

- C1 – linespeed
- C2 – gauge
- C3 – route availability value
- C4 – electrified track.

The information contained within this section is derived from around a quarter of a million GEOGIS records (GEOGIS is a major database of railway infrastructure assets containing information on the physical location and type of track).

The capability data presented in this section includes actual changes to the network as well as changes as a result of data cleansing (review and subsequent amendment to data where necessary).

As part of reporting the capability of the network, we report on Network Changes (changes which are likely to have a material effect on the operation of the network or on the operation of trains operated on the network). We also report on platform lengths to illustrate the maximum length of train that may use each of the platforms at passenger stations on the network.

For the four capability measures it should be noted that small discrepancies in the totals are due to rounding.

Linespeed Capability (C1)

Definition

This is a measure of the length of running track in kilometres in the following speed bands:

- up to 35 miles per hour
- 40 to 75 miles per hour
- 80 to 105 miles per hour
- 110 to 125 miles per hour.

The measure includes running lines and loops but excludes sidings and depots. Where differential speeds apply to a section of track, the highest line speed is reported for that section.

Results

Tables 5.1 to 5.4 show linespeed capability for England & Wales, Scotland and the whole network including the breakdown by operating route for 2013/14 compared to previous years.

Commentary

In 2013/14 the length of operational lines on the total network increased by 17 track kilometres.

During the year there were many small lengths of track throughout the whole network which were added, removed or which experienced line speed changes. The significant track changes are highlighted below. In addition data cleansing throughout the year has accounted for some smaller changes.

Significant additions are:

- just over eight kilometres of new track on the South Wales Main Line due to redoubling the single line railway between Cockett and Duffryn
- just under five kilometres of new track on the East Coast Main Line due to the provision of the new flyover at Cambridge Junction (Hitchin)
- just under six and a half kilometres of new track due to remodelling of Nottingham and Mansfield Junction.

Significant linespeed increases include:

- just over 61 kilometres of track on the West Coast Main Line increasing from the speed band 40-75mph to 80-105mph
- just over 85 kilometres of track on the Midland Main Line increasing from the speed band 80-105mph to 110-125mph
- just over 35 kilometres of track between Edge Hill Junction and Manchester Victoria increasing from the speed band 40-75mph to 80-105mph
- although consisting of mainly small changes there is approximately eight kilometres of track on the South West Main Line increasing from the speed band 0-35mph to 40-75mph.

Table 5.1: Linespeed capability (km of track in each speed band) England & Wales

Speed Band (mph)	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
Up to 35	3,223	3,194	3,124	3,125	3,104
40 – 75	14,426	14,422	14,365	14,348	14,309
80 – 105	6,375	6,403	6,496	6,512	6,503
110 – 125	2,860	2,857	2,857	2,854	2,936
Total	**26,884**	**26,876**	**26,842**	**26,839**	**26,852**

Table 5.2: Linespeed capability (km of track in each speed band) Scotland

Speed Band (mph)	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
Up to 35	461	459	437	452	454
40 – 75	2,403	2,384	2,363	2,363	2,356
80 – 105	1,104	1,168	1,200	1,200	1,209
110 – 125	221	221	221	221	221
Total	**4,189**	**4,232**	**4,221**	**4,236**	**4,240**

Table 5.3: Linespeed capability (km of track in each speed band) Network-wide

Speed Band (mph)	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
Up to 35	3,684	3,653	3,561	3,577	3,558
40 – 75	16,829	16,806	16,728	16,711	16,665
80 – 105	7,479	7,571	7,696	7,712	7,712
110 – 125	3,081	3,078	3,078	3,075	3,157
Total	**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Table 5.4: Linespeed capability (km of track in each speed band) by operating route

Operating Route	*Speed Band (mph)*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	0 - 35	253	251	240	247	248
	40 – 75	1,396	1,394	1,403	1,403	1,401
	80 – 105	626	626	626	626	626
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
East Midlands	0 - 35	189	186	180	180	175
	40 – 75	711	697	700	701	701
	80 – 105	538	554	554	554	471
	110 – 125	316	313	313	313	398
	over 125	0	0	0	0	0
Kent	0 - 35	192	192	186	187	188
	40 – 75	1,030	1,029	1,032	1,033	1,035
	80 – 105	533	533	525	525	524
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
London North Eastern	0 - 35	705	707	699	695	690
	40 – 75	3,211	3,224	3,221	3,221	3,227
	80 – 105	829	829	829	829	830
	110 – 125	933	933	933	933	933
	over 125	0	0	0	0	0

Table 5.4 Continued: Linespeed capability (km of track in each speed band) by operating route						
Operating Route	***Speed Band (mph)***	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
London North Western	0 - 35	883	863	840	829	820
	40 – 75	3,697	3,694	3,604	3,607	3,547
	80 – 105	1,008	1,013	1,109	1,109	1,179
	110 – 125	1,119	1,119	1,119	1,119	1,119
	over 125	0	0	0	0	0
Scotland	0 - 35	461	459	437	452	454
	40 – 75	2,403	2,384	2,363	2,363	2,356
	80 – 105	1,102	1,168	1,200	1,200	1,209
	110 – 125	221	221	221	221	221
	over 125	0	0	0	0	0
Sussex	0 - 35	116	115	114	114	116
	40 – 75	754	754	754	754	751
	80 – 105	257	257	257	256	257
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
Wales	0 - 35	371	369	357	355	357
	40 – 75	1,539	1,542	1,542	1,523	1,532
	80 – 105	550	551	551	569	569
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
Wessex	0 - 35	168	167	171	173	173
	40 – 75	1,033	1,033	1,029	1,028	1,028
	80 – 105	880	885	883	883	884
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
Western	0 - 35	346	343	338	345	337
	40 – 75	1,055	1,055	1,080	1,078	1,087
	80 – 105	1,155	1,155	1,161	1,161	1163
	110 – 125	492	492	492	489	486
	over 125	0	0	0	0	0
Network Total		**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Gauge Capability (C2)

Definition

This is a measurement of the length of route in kilometres capable of accepting different freight vehicle types and loads by reference to size (gauge). This measurement is reported against six standard gauges listed in the Railway Group Standard: 'Requirements for the Application of Standard Vehicle Gauges', which are:

- W6 – the freight vehicle gauge for freight wagons
- W7 – a gauge for ISO 8' 0" (2438mm) high containers, up to 2438mm wide
- W8 – a gauge for ISO 8' 6" (2590mm) high containers, up to 2500mm wide
- W9 – a gauge for UIC-S containers 9' 0" (2743mm) high, up to 2600mm wide
- W10 – a gauge for up to ISO 9' 6" (2590mm) high containers, up to 2500mm wide
- W12 – a gauge for up to ISO 9' 6" (2590mm) high containers, up to 2600mm wide.

A definition of these individual freight gauges can be found in the Railway Group Standard referred to above. Reference to W6 in this report is actually to the W6A profile in the Standard.

Results

Tables 5.5 to 5.8 show gauge capability for England & Wales, Scotland and the whole network including the breakdown by operating route for 2013/14 compared to previous years.

Commentary

The changes in the extent of the network reported in the linespeed capability measure are also reflected in gauge capability. Gauge capacity is in route kilometres rather than track kilometres so these numbers are not directly correlated to the linespeed capability measure.

With regards to the existing track:

- 2 kilometres of track at Carmuirs has been restored from W8 to W9
- 3 kilometres of track on the Bat and Ball loop (Sevenoaks) has been corrected from W6 to W7
- 14 kilometres of track between Swinton Junction and South Kirby Junction via Moorthorpe has been gauge enhanced to W12
- 17 kilometres of track at Soham has been gauge enhanced to W10
- 25 kilometres of track between Castlefield Junction and Newton le Willows Junction and Lowton Junction via Ordsall Lane Junction has been gauge enhanced to W12
- 27 kilometres of track between Temple Hirst Junction and Sherburn Junction to Selby Potters siding (including Selby Canal Curve) has been gauge enhanced to W12
- 31 kilometres of track between Darlington South Junction and Shell Junction (Teesside) has been gauge enhanced to W12
- 33 kilometres of track on the South Yorkshire Joint Line from Dinnington Junction to Kirk Sandal Junction, Decoy South Junction and Potteric Carr Junction has been gauge enhanced to W12
- 127 kilometres of track between Canonbury Junction and Fletton via the Herford Loop has been gauge enhanced to W10
- 181 kilometres of track between Water Orton and Doncaster (including Litchfield to Wichnor Junction) via Toton and Beighton has been gauge enhanced to W12.

Other works include one kilometre of new chord at Hitchin to W12.

CP4 has seen an increase in W12 and W10 capability. The Gauge Capability Programme closed at the end of CP4 with the majority of gaps between 'baseline' and 'published' capability addressed; remaining foul sites will be addressed by normal track renewal processes.

Notable changes to Gauge Capability in CP4 include:

- 2009/10 – reductions in W9 and W8 capability as a result of recalculation for Sectional Appendix publication
- 2011/12 – Felixstowe to Nuneaton gauge enhancement work added 88 kilometres of W10
- 2012/13 – gauge to routes reduced in 2009 restored between Sheet Stores and Stenson, and between Lincoln Pyewipe Junction and Gainsborough Trent East. South Yorkshire Joint Line upgraded to W8.

Table 5.5: Gauge capability (km of route in each gauge band) England & Wales					
Gauge Band	***March-10***	***March-11***	***March-12***	***March-13***	***March-14***
W6	5,284	5,479	5,461	5,451	5,448
W7	2,313	2,258	2,188	2,120	2,126
W8	3,187	2,974	2,997	3,075	2,806
W9	1,057	1,023	947	947	771
W10 and W6	0	0	0	0	0
W10 and W8	74	114	163	162	178
W10 and W9	1,039	1,105	1,178	1,178	1,290
W12	130	135	135	136	448
Total	**13,084**	**13,088**	**13,069**	**13,069**	**13,067**

Table 5.6: Gauge capability (km of route in each gauge band) Scotland					
Gauge Band	***March-10***	***March-11***	***March-12***	***March-13***	***March-14***
W6	122	118	101	115	117
W7	942	933	896	896	897
W8	1,131	1,110	1,147	1,147	1,145
W9	303	358	359	359	360
W10 and W6	0	0	0	0	0
W10 and W8	0	0	0	0	0
W10 and W9	171	170	170	171	171
W12	0	0	0	0	0
Total	**2,669**	**2,689**	**2,673**	**2,688**	**2,690**

Table 5.7: Gauge capability (km of route in each gauge band) Network-wide					
Gauge Band	***March-10***	***March-11***	***March-12***	***March-13***	***March-14***
W6	5,406	5,597	5,562	5,566	5,565
W7	3,255	3,191	3,084	3,016	3,023
W8	4,318	4,084	4,144	4,222	3,951
W9	1,360	1,381	1,306	1,306	1,131
W10 and W6	0	0	0	0	0
W10 and W8	74	114	163	162	178
W10 and W9	1,210	1,275	1,348	1,349	1,461
W12	130	135	135	136	448
Total	**15,753**	**15,777**	**15,742**	**15,757**	**15,757**

Table 5.8: Gauge capability (km of route in each gauge band) by operating route

Operating Route	*Gauge Band*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	W6	286	279	279	279	279
	W7	5	5	5	5	5
	W8	508	468	467	467	450
	W9	131	109	63	64	63
	W10 and W6	0	0	0	0	0
	W10 and W8	74	114	115	115	132
	W10 and W9	184	206	251	251	249
	W12	0	5	5	5	5
East Midlands	W6	247	246	247	247	247
	W7	225	225	162	150	150
	W8	227	227	247	259	158
	W9	0	0	0	0	0
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	42	42	42
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	101
Kent	W6	552	551	550	550	546
	W7	129	129	129	129	132
	W8	92	92	92	92	93
	W9	43	43	41	41	41
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
London North Eastern	W6	816	812	804	792	792
	W7	323	300	300	246	246
	W8	869	906	904	969	838
	W9	625	626	610	610	458
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	5	5	4
	W10 and W9	13	13	29	29	156
	W12	46	46	46	46	205
London North Western	W6	803	883	881	882	881
	W7	690	657	651	648	652
	W8	485	396	403	403	383
	W9	166	153	140	140	117
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	842	886	898	898	885
	W12	84	84	84	85	137

Table 5.8 Continued: Gauge capability (km of route in each gauge band) by operating route

Operating Route	*Gauge Band*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Scotland	W6	122	118	100	115	117
	W7	941	933	896	896	897
	W8	1,131	1,110	1,147	1,147	1,145
	W9	303	358	359	359	360
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	171	171	171	171	171
	W12	0	0	0	0	0
Sussex	W6	342	342	340	341	342
	W7	88	88	88	88	88
	W8	40	40	40	40	39
	W9	41	41	41	41	41
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
Wales	W6	772	893	889	888	888
	W7	259	259	259	259	259
	W8	435	314	313	313	313
	W9	30	30	30	30	30
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
Wessex	W6	573	574	574	574	574
	W7	286	286	285	285	285
	W8	170	170	170	170	170
	W9	11	11	11	11	11
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
Western	W6	897	898	897	898	899
	W7	309	309	309	310	309
	W8	361	361	361	362	362
	W9	10	10	10	10	10
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
Network Total		**15,754***	**15,777**	**15,742**	**15,757**	**15,757**

Notes:
***Difference in total due to rounding.

Route Availability (RA) Value (C3)

Definition

The route availability (RA) measure is used to check the compatibility of the weight of trains with the strength of underline bridges.

The RA measure is a measurement of the length of track in kilometres capable of accepting different loaded vehicle types. The results are reported by individual RA value (since the Annual Return 2010).

For infrastructure, the RA number represents the lesser of the maximum single axle weight or the maximum equivalent load effect of a whole vehicle for the capability of the underline bridges on a route. The RA number for a route is specified in the National Electronic Sectional Appendix.

Vehicles are able to utilise the capability of the infrastructure where the vehicle RA is less than or equal to the route RA. If not, it is necessary to consider more detailed information on the loading characteristics of the vehicle and detailed information on the strength of individual bridges to check compatibility.

This measure includes running lines on our infrastructure but excludes sidings and depots.

Results

Tables 5.9 to 5.13 show the route availability for England & Wales, Scotland and the whole network including the breakdown by operating route for 2013/14 compared to previous years.

Commentary

Increases in RA together with network size alterations and the result of data cleansing as reported for the linespeed capability C1 measure are the principal reason for changes in RA tables.

The principal changes resulting from the increase in the extent of the network are the following:

- two kilometres of RA4 for the remodelling of the approaches to Blackfriars station
- one kilometre of RA6 for a new loop at Tir-Phil
- nine kilometres of RA7 for Gowerton re-doubling
- two kilometres of RA8 for works between Sleaford Station Junction and Greetwell West Junction.

The principal changes resulting from the reduction in the extent of the network are the following:

- one kilometre of RA8 for double tracking and change of boundary on the Thameshaven branch
- one kilometre of RA8 for modification of lines approaching London Bridge station
- two kilometres of RA7 for modifications on the Bamfurlong Sidings Junction to Ince Moss Junction line.

Table 5.9: Structures route availability (km of track) for England & Wales

Route availability band	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
.(-1)	86	78	60	66	65
RA1	19	19	19	18	17
RA2	36	7	0	0	0
RA3	72	32	32	32	32
RA4	670	273	273	237	239
RA5	464	469	475	475	477
RA6	845	871	867	867	869
RA7	1,759	1,873	1,907	1,906	1,914
RA8	20,721	21,042	21,000	21,020	21,022
RA9	2,146	2,145	2,142	2,151	2,151
RA10	66	67	67	67	66
Total	**26,884**	**26,876**	**26,842**	**26,839**	**26,852**

Notes:

1. RA value not reported, line out of use, leased or status being checked.

Table 5.10: Structures route availability (km of track) for Scotland

Route availability band	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
.(1)	3	3	3	10	11
RA1	0	0	0	0	0
RA2	0	0	0	0	0
RA3	118	38	37	37	38
RA4	0	0	0	0	0
RA5	939	934	934	934	934
RA6	7	7	7	7	7
RA7	210	223	228	77	77
RA8	873	899	882	890	891
RA9	4	4	4	4	4
RA10	2,035	2,124	2,126	2,277	2,278
Total	**4,189**	**4,232**	**4,221**	**4,236**	**4,240**

Notes:

1. RA value not reported, line out of use, leased or status being checked.

Table 5.11: Structures route availability (km of track) for Network

Route availability band	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
.(1)	89	81	63	76	76
RA1	19	19	19	18	17
RA2	36	7	0	0	0
RA3	190	70	69	69	70
RA4	670	273	273	237	239
RA5	1,403	1,403	1,409	1,409	1,411
RA6	852	878	874	874	876
RA7	1,969	2,096	2,135	1,983	1,991
RA8	21,594	21,941	21,882	21,910	21,913
RA9	2,150	2,149	2,146	2,155	2,155
RA10	2,101	2,191	2,193	2,344	2,344
Total	**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Notes:

1. RA value not reported, line out of use, leased or status of line being checked.

Table 5.12: Structures route availability (km of track) by operating route

	Gauge Band	2009/10	2010/11	2011/12	2012/13	2013/14
Anglia	.(1)	1	1	1	2	2
	RA1	1	1	1	0	0
	RA2	0	0	0	0	0
	RA3	57	27	27	27	27
	RA4	43	21	21	21	21
	RA5	0	0	0	0	0
	RA6	83	89	89	89	89
	RA7	415	431	431	431	432
	RA8	1,624	1,650	1,648	1,655	1,654
	RA9	50	50	50	50	50
	RA10	0	0	0	1	0
East Midlands	.(1)	1	7	3	3	3
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	0	0	0	0	0
	RA5	9	9	10	10	10
	RA6	0	0	0	0	0
	RA7	7	7	7	6	6
	RA8	1,734	1,725	1,726	1,726	1,723
	RA9	3	3	3	3	3
	RA10	0	0	0	0	0
Kent	.(1)	0	0	0	5	5
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	129	69	69	54	56
	RA5	0	0	0	0	1
	RA6	25	25	25	25	25
	RA7	29	56	56	56	56
	RA8	1,572	1,603	1,593	1,605	1,604
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
London North Eastern	.(1)	27	33	26	26	26
	RA1	0	0	0	0	0
	RA2	36	7	0	0	0
	RA3	10	0	0	0	0
	RA4	0	0	0	0	0
	RA5	5	5	11	11	11
	RA6	134	134	134	135	135
	RA7	164	194	194	193	193
	RA8	3,143	3,161	3,160	3,149	3,151
	RA9	2,094	2,092	2,090	2,098	2,098
	RA10	67	67	67	66	66

Table 5.12 Continued: Structures route availability (km of track) by operating route

	Gauge Band	2009/10	2010/11	2011/12	2012/13	2013/14
London North Western	.(1)	47	25	22	23	22
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	0	0	0	0	0
	RA5	0	0	0	0	0
	RA6	9	9	9	9	9
	RA7	495	492	494	494	493
	RA8	6,156	6,163	6,146	6,138	6,141
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
Scotland	.(1)	3	3	3	10	11
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	118	38	37	37	38
	RA4	0	0	0	0	0
	RA5	939	934	934	934	934
	RA6	7	7	7	7	7
	RA7	210	223	228	77	77
	RA8	873	899	882	890	891
	RA9	4	4	4	4	4
	RA10	2,035	2,124	2,126	2,277	2,278
Sussex	.(1)	0	0	0	0	0
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	261	110	110	89	89
	RA5	0	0	0	0	0
	RA6	45	28	28	28	28
	RA7	23	23	23	23	23
	RA8	797	965	963	984	984
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
Wales	.(1)	5	5	2	2	2
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	0	0	0	0	0
	RA5	380	384	385	384	385
	RA6	264	263	260	260	261
	RA7	192	192	192	192	200
	RA8	1,618	1,618	1,611	1,609	1,610
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0

Table 5.12 Continued: Structures route availability (km of track) by operating route						
	Gauge Band	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Wessex	.(1)	3	3	3	3	3
	RA1	18	18	18	18	17
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	196	32	32	32	32
	RA5	6	6	6	6	6
	RA6	135	175	175	174	175
	RA7	69	113	113	113	113
	RA8	1,655	1,738	1,738	1,738	1,739
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
Western	.(1)	2	3	2	2	2
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	5	5	5	5	5
	RA4	41	41	41	41	41
	RA5	63	64	64	64	64
	RA6	149	147	147	147	147
	RA7	366	366	398	398	398
	RA8	2,423	2,419	2,415	2,416	2,416
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
Network Total		**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Notes:

1. RA value not reported, line out of use, leased or status being checked.
2. Historic data for Western was incorrect based on last years submission by CaRRT.

Table 5.13: Gauge - Length of track (km) by operating route												
	Route Availability	***RA0***	***RA1***	***RA2***	***RA3***	***RA4***	***RA5***	***RA6***	***RA7***	***RA8***	***RA9***	***RA10***
	Gauge Band											
Anglia	W6	1	0	0	27	9	0	41	299	56	19	0
	W7	0	0	0	0	0	0	0	0	10	0	0
	W8	0	0	0	0	12	0	48	108	638	31	0
	W9	1	0	0	0	0	0	0	0	126	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	24	205	0	0
	W10 and W9	0	0	0	0	0	0	0	0	614	0	0
	W12	1	0	0	0	0	0	0	0	5	0	0

Table 5.13 Continued: Gauge - Length of track (km) by operating route

	Route Availability	RA0	RA1	RA2	RA3	RA4	RA5	RA6	RA7	RA8	RA9	RA10
	Gauge Band											
East Midlands	W6	3	0	0	0	0	10	0	7	500	0	0
	W7	0	0	0	0	0	0	0	0	374	0	0
	W8	0	0	0	0	0	0	0	0	498	0	0
	W9	0	0	0	0	0	0	0	0	0	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	85	3	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	265	0	0
Kent	W6	5	0	0	0	56	1	25	56	1,027	0	0
	W7	0	0	0	0	0	0	0	0	279	0	0
	W8	0	0	0	0	0	0	0	0	173	0	0
	W9	0	0	0	0	0	0	0	0	125	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
London North Eastern	W6	13	0	0	0	0	11	135	183	902	105	2
	W7	0	0	0	0	0	0	0	0	499	2	0
	W8	7	0	0	0	0	0	0	10	1,279	405	15
	W9	1	0	0	0	0	0	0	0	136	1,056	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	10	0
	W10 and W9	0	0	0	0	0	0	0	0	35	447	1
	W12	5	0	0	0	0	0	0	0	299	73	49
London North Western	W6	15	0	0	0	0	0	9	86	1,507	0	0
	W7	0	0	0	0	0	0	0	237	1,042	0	0
	W8	0	0	0	0	0	0	0	83	685	0	0
	W9	1	0	0	0	0	0	0	87	160	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	6	0	0	0	0	0	0	0	2,465	0	0
	W12	0	0	0	0	0	0	0	0	282	0	0
Scotland	W6	11	0	0	0	0	32	7	0	30	0	74
	W7	0	0	0	11	0	319	0	31	310	0	656
	W8	0	0	0	27	0	578	0	46	388	0	651
	W9	0	0	0	0	0	5	0	0	120	4	557
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	43	0	340
	W12	0	0	0	0	0	0	0	0	0	0	0

Table 5.13 Continued: Gauge - Length of track (km) by operating route

	Route Availability	RA0	RA1	RA2	RA3	RA4	RA5	RA6	RA7	RA8	RA9	RA10
	Gauge Band											
Sussex	W6	0	0	0	0	89	0	28	1	613	0	0
	W7	0	0	0	0	0	0	0	22	161	0	0
	W8	0	0	0	0	0	0	0	0	81	0	0
	W9	0	0	0	0	0	0	0	0	129	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
Wales	W6	0	0	0	0	0	348	231	138	547	0	0
	W7	0	0	0	0	0	0	4	60	407	0	0
	W8	2	0	0	0	0	1	26	2	654	0	0
	W9	0	0	0	0	0	36	0	0	2	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
Western	W6	3	0	0	5	41	64	129	301	1,074	0	0
	W7	0	0	0	0	0	0	18	53	674	0	0
	W8	0	0	0	0	0	0	0	44	655	0	0
	W9	0	0	0	0	0	0	0	0	12	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
Wessex	W6	3	18	0	0	32	6	175	101	725	0	0
	W7	0	0	0	0	0	0	0	12	558	0	0
	W8	0	0	0	0	0	0	0	0	422	0	0
	W9	0	0	0	0	0	0	0	0	33	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
Network Total	**W6**	**54**	**18**	**0**	**32**	**227**	**472**	**780**	**1,172**	**6,981**	**124**	**76**
	W7	**0**	**0**	**0**	**11**	**0**	**319**	**22**	**415**	**4,314**	**2**	**656**
	W8	**9**	**0**	**0**	**27**	**12**	**579**	**74**	**293**	**5,473**	**436**	**666**
	W9	**3**	**0**	**0**	**0**	**0**	**41**	**0**	**87**	**843**	**1,060**	**557**
	W10 and W6	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	W10 and W8	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**290**	**13**	**0**
	W10 and W9	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3,157**	**447**	**341**
	W12	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**851**	**73**	**49**

Electrified Track Capability (C4)

Definition

This is a measure of the length of electrified track in kilometres in the following bands:

- overhead line at 25kV A.C.
- overhead line at 1,500V D.C.
- third rail 650/750V D.C.

The measurement includes the length of running track, including loops but excluding sidings and depots.

Lengths of track with dual electrification are separately identified. In addition, line that is not energised and permanently earthed is counted as non-electrified.

Results

Tables 5.14 to 5.17 show electrification capability for England & Wales, Scotland and the whole network including the breakdown by operating route for 2013/14 compared to previous years.

Commentary

There has been rationalisation of track asset and the associated electrification asset, as well as data validation and updates, resulting in 29 kilometres net overall loss in capability of the network-wide asset base compared to 2012/13, before taking account of the new electrification schemes. These factors have affected the electrification capability reported for 25kV AC overhead assets as shown in Table 5.17.

Historically network size alterations as reported for the linespeed capability measure were the principal reason for changes in electrification data. However, Network Rail entered a period of significant network electrification in 2013/14.

In 2013/14, 58 kilometres of new electrification was bought into service as part of the North West Electrification Programme in England and Wales and in Scotland 44 kilometres was commissioned between Springburn and Cumbernauld as part of the wider Edinburgh to Glasgow Improvement Programme. This has resulted in a 73 kilometre net gain in capability across the network of 25kV overhead assets (when new electrification is taken into account) as shown in Table 5.16.

There have been no material changes to the third rail 650/750V DC network in 2013/14.

Across CP4 there has been a relatively modest increase in 25kV AC overhead line (OHL) capability while the third rail 650/750V DC electrification system capability has remained broadly static.

As noted earlier, 2013/14 saw the completion of the first significant phases of Network Rail's electrification programme for CP4 and CP5. Other notable changes to the electrification capability during CP4 were as follows:

- 2009/10 – completion of the West Coast Route modernisation project which was the principal contributor to the increase in OLE
- 2010/11 – the opening of the Airdrie – Bathgate line added 45 kilometres of new OHL
- 2011/12 – the Paisley corridor improvements and North London Line works added new OHL
- 2012/13 – works were completed at Paisley Canal and Paisley corridor (circa 19 kilometres).

Table 5.14: Electrification capability (km of electrified track) England & Wales

	March-10	*March-11*	*March-12*	*March-13*	*March-14*
25 kV AC overhead	6,761	6,757	6,739	6,750	6,777
Third rail 650/ 750V DC	4,475	4,470	4,469	4,473	4,476
Dual AC, overhead/third rail DC	37	37	35	34	35
1500V DC overhead	39	39	39	39	39
Total electrified	11,312	11,303	11,282	11,296	11,327
Non-electrified	15,572	15,573	15,560	15,543	15,525
Total	**26,884**	**26,876**	**26,842**	**26,839**	**26,852**

Table 5.15: Electrification capability (km of electrified track) Scotland					
	March-10	***March-11***	***March-12***	***March-13***	***March-14***
25 kV AC overhead	1,255	1,302	1,495	1,514	1,560
Third rail 650/ 750V DC	0	0	0	0	0
Dual AC, overhead/third rail DC	0	0	0	0	0
1500V DC overhead	0	0	0	0	0
Total electrified	1,255	1,302	1,495	1,514	1,560
Non-electrified	2,934	2,930	2,726	2,722	2,680
Total	**4,189**	**4,232**	**4,221**	**4,236**	**4,240**

Table 5.16: Electrification capability (km of electrified track) Network-wide					
	March-10	***March-11***	***March-12***	***March-13***	***March-14***
25 kV AC overhead	8,016	8,059	8,234	8,264	8,337
Third rail 650/ 750V DC	4,475	4,470	4,469	4,473	4,476
Dual AC, overhead/third rail DC	37	37	35	34	35
1500V DC overhead	39	39	39	39	39
Total electrified	12,567	12,605	12,777	12,810	12,887
Non-electrified	18,506	18,503	18,286	18,265	18,205
Total	**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Table 5.17: Electrification track capability (km of electrified track) by operating route						
	Gauge Band	***2009/10***	***2010/11***	***2011/12***	***2012/13***	***2013/14***
Anglia	AC OHL	1,451	1,449	1,453	1,457	1,456
	AC / DC	15	15	13	13	13
	DC	21	21	20	20	20
	DC OHL	0	0	0	0	0
	None	788	787	783	786	787
East Midlands	AC OHL	347	346	343	343	341
	AC / DC	0	0	0	0	0
	DC	0	0	0	0	0
	DC OHL	0	0	0	0	0
	None	1,406	1,405	1,405	1,405	1,404
Kent	AC OHL	9	9	2	9	9
	AC / DC	11	12	11	11	11
	DC	1,647	1,644	1,644	1,645	1,646
	DC OHL	0	0	0	0	0
	None	89	89	87	80	80
London North Eastern	AC OHL	2,024	2,021	2,019	2,019	2,016
	AC / DC	0	0	0	0	0
	DC	9	9	9	9	9
	DC OHL	39	39	39	39	39
	None	3,608	3,624	3,614	3,611	3,616

Table 5.17 Continued: Electrification track capability (km of electrified track) by operating route

	Gauge Band	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
London North Western	AC OHL	2,827	2,828	2,817	2,817	2,851
	AC / DC	9	8	8	8	8
	DC	292	292	290	292	293
	DC OHL	0	0	0	0	0
	None	3,580	3,562	3,555	3,547	3,513
Scotland	AC OHL	1,255	1,302	1,495	1,514	1,560
	AC / DC	0	0	0	0	0
	DC	0	0	0	0	0
	DC OHL	0	0	0	0	0
	None	2,933	2,931	2,726	2,722	2,680
Sussex	AC OHL	1	1	1	1	1
	AC / DC	2	2	2	2	2
	DC	1,032	1,032	1,032	1,032	1,032
	DC OHL	0	0	0	0	0
	None	91	91	89	89	89
Wales	AC OHL	0	0	0	0	0
	AC / DC	0	0	0	0	0
	DC	0	0	0	0	0
	DC OHL	0	0	0	0	0
	None	2,459	2,462	2,450	2,447	2,458
Wessex	AC OHL	0	0	0	0	0
	AC / DC	0	0	0	0	0
	DC	1,475	1,473	1,474	1,475	1,475
	DC OHL	0	0	0	0	0
	None	606	610	609	609	609
Western	AC OHL	103	104	104	104	103
	AC / DC	0	0	0	0	0
	DC	0	0	0	0	0
	DC OHL	0	0	0	0	0
	None	2,945	2,941	2,968	2,969	2,970
Network Total		**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Network Change

Definition

A Network Change is a change which is likely to have a material effect on the operation of the network or on trains operated on the network.

Network Changes can either be physical (e.g. changes to the layout, configuration or condition of the network) or operational (e.g. the introduction of a speed restriction on a section of track or a change to the way Network Rail maintains track). Operational changes are only classed as Network Changes if they last, or are likely to last, for more than six months.

Reporting Method

This information is taken from the internal processes used for monitoring the establishment of Network Changes and covers the period from 1 April 2013 to 31 March 2014.

Results

Table 5.18 provides the number of Network Changes consulted, established and withdrawn in the past year.

Commentary

Summary numbers of permanent Network Changes consulted and established during 2013/14 are detailed for each route in Table 5.18.

In 2013/14 there were a total of 235 permanent Network Changes, 223 established changes and 17 withdrawn changes. By way of comparison, in 2012/13 there were 155 permanent changes, 127 established changes and 11 withdrawn changes.

Where the previous Infrastructure Capability Programme (ICP) Short Term Network Changes have resulted in a permanent change of capability, the corresponding Network Change consultation is reflected in the numbers reported here.

In the Kent, London North Western (LNW) and Western Routes the number of Network Changes has fallen from the previous year. This is a result of the CP4 workbank having completed the majority of required Network Changes earlier in the control period.

Conversely, the number of Network Changes has increased in the majority of the routes as a result of more enhancement and renewals works being carried out in the final year of the control period.

The combined number of Network Changes for London North East (LNE) and East Midlands (EM) has increased by 74 permanent and established Network Changes from 2012/13, partly because of the Network Optimisation programme (a specialist programme dedicated to the process of rationalising assets), for which 22 Network Changes were issued in 2013/14.

Table 5.18: Network Changes (2013/14)

	Permanent Network Changes	***Established***	***Withdrawn***
Anglia	9	6	1
LNE/EM	81	66	7
Kent	8	10	2
LNW	29	48	1
Scotland	41	32	2
Sussex	18	15	1
Wales	19	14	2
Wessex	17	17	1
Western	13	15	0
Total	**235**	**223**	**17**

Notes:

Major projects can also generate Network Changes, where this is the case, details of these can be found on our website using this link.

Discrepancies between actual and published capability

Definition

This information is taken from the Discrepancy Register, which is published alongside the National Electronic Sectional Appendix (NESA). The Discrepancy Register was established as part of the Infrastructure Capability Programme (ICP) to provide a comprehensive list of the differences between our published and actual capability.

Results

There are three discrepancies remaining from the ICP, as detailed in Table 5.19.

Commentary

This is the fifth year in which this data has been published in the Annual Return.

CP4 started with a sizeable number of capability discrepancies, brought to light by the verification activity supporting the publication of capability measures such as gauge (in some cases for the first time) in the Sectional Appendix. These discrepancies were summarised on a Discrepancy Register which was then used to track the progress to their resolution. An industry consultation exercise led to these discrepancies being temporarily addressed through the issuing of Short Term Network Change Notices which committed restoration by various end dates to 'short', 'medium' or 'long' timescales. The number of discrepancies fell to a handful each year, reported in successive Annual Returns.

Gauge recovery work has proceeded through CP4, bolstered by the CP4 enhancement programme.

For the reasons set out in Table 5.19 three of the discrepancies identified as part of the ICP remained to be cleared at the end of CP4 and have not been fully resolved through the establishment of Network Change or the restoration of the original capability.

Two of these are previously reported gauge discrepancies (Tapton Junction to Sheffield North and Thornhill Junction to Leeds, Holbeck East) on sections for future electrification, where it would be wasteful to restore for W8 gauge and then revisit for electrification: extensions to these Short Term Network Changes (STNCs) will be consulted when timescales for completion of the works have been confirmed.

A further section (Smethwick-Stourbridge) has had the STNC expire without the former capability status being reinstated. In this case a sizeable engineering effort will be needed to recover gauge capability (through Old Hill tunnel) and a new STNC will be consulted, with works to take place in CP5.

We are taking action to resolve these discrepancies. Pending resolution, current operative capability of the network is stated in the National Electronic Sectional Appendix.

Ongoing Short Term Network Change proposals

Definition

This information is taken from the internal processes used for monitoring STNCs issued in connection with the ICP and the Network Change process.

Results

Table 5.20 provides the number of STNCs for each operating route, and the dates by which they are due to expire.

Commentary

In Scotland the number of STNCs has decreased from previous years. This is due to a large amount of the network capability STNCs being restored and a reduction in STNC extensions.

For eight out of ten of the routes, the number of STNCs has decreased due to expiring STNCs or the issue being resolved.

Table 5.19: Discrepancies between actual and published capability identified by the Infrastructure Capability Programme

Route	*Line of route*	*Section*	*Capability measure*	*Published status*	*Current status*
LNE	LN804	Tapton Junction to Sheffield North	G	W6a W7(S) W8(S)	STNC extension is in consultation, to ease available clearances using a routing restriction via Down Passenger Loop, and integrate remaining clearance with electrification
LNE	LN860	Thornhill Junction to Leeds, Holbeck East Junction	G	W6a* W7(S) W8(S)	A new STNC will be consulted to ease available clearances resulting from works and provide remaining clearance simultaneous with electrification
LNW	MD435	Smethwick Junction - Stourbridge	G	W6a W7 W8(S)	Was subject to Short Term Network Change which has expired and will be reissued with easements. Old Hill Tunnel will see W8 clearance in 2016 through track lowering

Notes:

G = Gauge capability.

T = Track and route mileage.

W6a* refers to the existing wagon types listed in the header notes to Table D5 – Route Clearance of Freight Vehicles.

W7(S) refers to specific wagon/container combinations which are permitted to run, but the section does not offer full W7 gauge.

W8(S) refers to specific wagon/container combinations which are permitted to run, but the section does not offer full W8 gauge.

Table 5.20: Number of Short Term Network Changes

	Total	*2014*	*2015*	*2016*	*2017*	*2018*
Anglia	2	1	0	0	1	0
EM / LNE	7	4	2	1	0	0
Kent	6	3	1	1	1	0
LNW	4	1	1	1	1	0
Scotland	32	12	17	3	0	0
Sussex	5	0	0	2	3	0
Wales	2	0	1	1	0	0
Western	2	1	1	0	0	0
Wessex	5	1	1	2	1	0
Network Total	**65**	**23**	**24**	**11**	**7**	**0**

Platform lengths

Definition

The operational platform lengths represent the combined maximum length of train that may use each of the platforms at the passenger stations on the network. The length of each platform is added together to provide a total length of operational platforms for each route, including England & Wales, Scotland and for the network as a whole.

Individual station platform lengths are available on the Network Rail website, under the Timetable Planning Rules.

Results

Table 5.21 shows the combined lengths of all platforms at stations for England & Wales, Scotland, and for the whole network. Platforms at stations not on the Network Rail owned, operated and maintained network are not included. These include the international platforms at Ebbsfleet and London St Pancras, International stations which are on the High Speed 1 network and Heathrow International Airport. A number of 'double counts' have been identified where platforms were found to be included in more than one route calculation. As a result there was a significant correction reported in last year's Annual Return.

Commentary

This information coincides with a programme of work Network Rail is currently undertaking to allow the operation of longer trains at a number of stations across the network. This has required platform extensions along with associated signalling, track, power supply and level crossing works at a number of stations. However, for some stations there have been minimal alterations to platforms with Selective Door Operation (SDO) enabling longer trains (up to twelve cars) to operate.

Table 5.22 provides a sample of stations at which one or more platforms have been lengthened in 2013/14 as part of train and platform lengthening programmes.

Table 5.21 Platform lengths (metres) Network-wide

	2011/12	*2012/13*	*2013/14*
England & Wales	823,628	811,456	816,860
Scotland	110,770	110,217	110,217
Network total	**934,398**	**921,673**	**927,077**

Table 5.22: Stations with platforms lengthened in 2013/14

Station	*Platform Number*	*Route*	*New Operational Length (metres)*	*Old Operational Length (metres)*	*Change in Operational Length (metres)*
Acton Central	Eastbound	Anglia	133	83	50
	Westbound	Anglia	117	90	27
Brondesbury	Eastbound	Anglia	107	83	24
	Westbound	Anglia	107	83	24
Brondesbury Park	Eastbound	Anglia	127	108	19
	Westbound	Anglia	107	83	24
Caledonian Road & Barnsbury	Westbound	Anglia	140	88	52
Camden Road	Westbound	Anglia	109	9	100
Dagenham Dock	Down	Anglia	243	185	58
	Up	Anglia	247	184	63
Dalston Kingsland	Westbound	Anglia	103	83	20
East Tilbury	Down	Anglia	245	172	73
	Up	Anglia	247	172	75
Finchley Road & Frognal	Eastbound	Anglia	129	106	23
	Westbound	Anglia	107	83	24
Gospel Oak	Westbound	Anglia	106	83	23
Grays	1	Anglia	246	163	83

Table 5.22 Continued: Stations with platforms lengthened in 2013/14

Station	*Platform Number*	*Route*	*New Operational Length (metres)*	*Old Operational Length (metres)*	*Change in Operational Length (metres)*
Hampstead Heath	Eastbound	Anglia	107	83	24
	Westbound	Anglia	109	98	11
Homerton	Eastbound	Anglia	104	87	17
	Westbound	Anglia	103	87	16
Ipswich	1	Anglia	135	95	40
Kensal Rise	Eastbound	Anglia	122	108	14
	Westbound	Anglia	104	85	19
Kentish Town West	Eastbound	Anglia	109	88	21
	Westbound	Anglia	109	88	21
Marks Tey	Up	Anglia	237	177	60
Ockendon	Down	Anglia	248	165	83
	Up	Anglia	248	167	81
Purfleet	Down	Anglia	246	184	62
	Up	Anglia	266	183	83
Rainham	Down	Anglia	242	167	75
	Up	Anglia	247	167	80
South Acton	Eastbound	Anglia	106	83	23
	Westbound	Anglia	116	85	31
Stanford-Le-Hope	Down	Anglia	243	172	71
	Up	Anglia	257	176	81
Stratford	11	Anglia	231	174	57
	12	Anglia	182	167	15
Tilbury Town	Down	Anglia	247	166	81
	Up	Anglia	249	166	83
West Hampstead	Eastbound	Anglia	118	107	11
	Westbound	Anglia	106	83	23
Willesden Junction High Level	Eastbound	Anglia	120	93	27
	Westbound	Anglia	128	104	24
Balham	1	Sussex	201	183	18
	2	Sussex	203	183	20
Battersea Park	2	Sussex	201	150	51
	3	Sussex	201	154	47
Carshalton	1	Sussex	201	173	28
	2	Sussex	201	179	22
Cheam	1	Sussex	201	183	18
Clapham Junction	17	Sussex	166	108	58
Crystal Palace	1	Sussex	202	163	39
	2	Sussex	206	161	45
	4	Sussex	219	192	27
	6	Sussex	199	193	6
Epsom Downs	Epsom Downs Single	Sussex	205	167	38

Table 5.22 Continued: Stations with platforms lengthened in 2013/14

Station	*Platform Number*	*Route*	*New Operational Length (metres)*	*Old Operational Length (metres)*	*Change in Operational Length (metres)*
Gipsy Hill	1	Sussex	201	157	44
	2	Sussex	201	158	43
Imperial Wharf	2	Sussex	172	85	87
	1	Sussex	172	85	87
London Bridge	14	Sussex	252	165	87
	15	Sussex	239	167	72
Mitcham Eastfields	1	Sussex	200	160	40
	2	Sussex	200	160	40
Norwood Junction	3	Sussex	205	184	21
Purley	6	Sussex	208	205	3
Selhurst	1	Sussex	203	197	6
Shepherds Bush	2	Sussex	163	150	13
	1	Sussex	207	94	113
Streatham Common	1	Sussex	201	169	32
	2	Sussex	201	167	34
Streatham Hill	2	Sussex	205	184	21
Sutton	3	Sussex	203	183	20
	4	Sussex	205	184	21
Thornton Heath	2	Sussex	202	186	16
Waddon	1	Sussex	201	161	40
	2	Sussex	201	160	41
Wallington	1	Sussex	202	161	41
	2	Sussex	201	161	40
Wandsworth Common	1	Sussex	201	181	20
	2	Sussex	201	181	20
West Brompton	3	Sussex	163	90	73
	4	Sussex	163	90	73
Barnes Bridge	1	Wessex	205	160	45
	2	Wessex	204	160	44
Brentford	1	Wessex	205	168	37
	2	Wessex	204	168	36
Chiswick	1	Wessex	204	173	31
	2	Wessex	204	173	31
Clapham Junction	11	Wessex	205	204	1
Epsom	1	Wessex	210	199	11
	2	Wessex	208	199	9
	3	Wessex	206	199	7
	4	Wessex	208	199	9
Kew Bridge	1	Wessex	204	186	18
	2	Wessex	205	153	52
Kingston	2	Wessex	207	172	35

Table 5.22 Continued: Stations with platforms lengthened in 2013/14

Station	*Platform Number*	*Route*	*New Operational Length (metres)*	*Old Operational Length (metres)*	*Change in Operational Length (metres)*
Raynes Park	1	Wessex	220	193	27
	2	Wessex	222	193	29
	3	Wessex	207	193	14
	4	Wessex	207	187	20
Stoneleigh	1	Wessex	207	157	50
	2	Wessex	206	157	49
Strawberry Hill	1	Wessex	214	160	54
	2	Wessex	207	184	23
Teddington	1	Wessex	207	183	24
	2	Wessex	205	163	42
Thames Ditton	1	Wessex	207	178	29
	2	Wessex	213	178	35
Tolworth	1	Wessex	205	167	38
	2	Wessex	207	167	40
Vauxhall	7	Wessex	205	191	14
	8	Wessex	205	191	14
Worcester Park	1	Wessex	207	164	43
	1	Wessex	205	164	41
Ascott-Under-Wychwood		Western	71	60	11
Abbey Wood	1	Kent	242	207	35
	2	Kent	244	207	37
Charlton	1	Kent	242	210	32
	2	Kent	244	209	35
Dartford	1	Kent	246	225	21
	2	Kent	246	225	21
	3	Kent	248	225	23
	4	Kent	245	225	20
Eltham	1	Kent	246	213	33
	2	Kent	242	213	29
Erith	1	Kent	242	206	36
	2	Kent	242	207	35
Greenhithe	1	Kent	243	207	36
	2	Kent	242	205	37
Mottingham	1	Kent	243	206	37
	2	Kent	243	206	37
New Cross	B	Kent	243	230	13
Northfleet	1	Kent	247	208	39
	2	Kent	245	207	38
Plumstead	1	Kent	244	207	37
	2	Kent	243	206	37
Slade Green	1	Kent	242	207	35
	2	Kent	242	207	35
Swanscombe	1	Kent	242	208	34
	2	Kent	243	207	36
Westcombe Park	1	Kent	242	206	36
	2	Kent	242	206	36

Network availability

Possession Disruption Index – Passenger (PDI-P)

Definition

The PDI-P quantifies the excess journey time passengers experience when possessions are taken.

PDI-P is calculated as:

(excess journey time x busyness factor) x (no. of passengers x time of day weighting x economic value of time) divided by (total scheduled passenger km), baselined against 2007/08 values.

Possession Disruption Index – Freight (PDI-F)

Definition

The PDI-F measures the proportion of track kilometre available for freight operators to run freight services.

PDI-F is calculated as:

(average freight tonne km per Strategic Route Section divided by average freight tonne km for network) x (track km available divided by total track km), baselined against 2007/08 values.

Results

Table 5.23 compares the performance of the PDI-P and PDI-F in control period against the delivery plan.

Commentary – (PDI-P and PDI-F)

In Control Period 4 (CP4) we made progress on meeting the twin challenge of reducing the levels of disruption to passenger and freight services whilst delivering a £24 billion programme of investment in the network. Passenger disruption levels were reduced by 31 percentage points compared to Control Period 3 (CP3). However, the PDI-P exited CP4 at 0.69, missing the 0.63 target.

Disruptions to freight services were further reduced by 13 percentage points compared to CP3 with the PDI-F exiting the control period at 0.87, against a CP4 target of 1.00.

Whilst we narrowly missed out PDI-P target, disruption to passenger train services as a result of planned engineering works was reduced by 35 per cent over CP4 whilst disruption to freight services was reduced by 12 per cent. Over the course of CP4 disruptive possessions have been significantly reduced.

PDI-P was substantially ahead of target for the first four years of CP4. The upward pressure on the PDIs in the final year of CP4 is related to the deferral of some of the CP4 workbank from the early part of CP4. However, for CP4 as a whole, the volume of possessions taken is 29 per cent less than the levels targeted. The average PDI-P period actual in CP4 is 0.25 lower than the average period target.

The overall improvement delivered has been supported by the CP4 Network Availability Implementation Plan and a programme of works utilising the seven day railway fund.

Significant network availability improvements were delivered during this control period including:

- disruptions to services operating on the West Coast Main Line (WCML) at weekends reduced by more than 31 per cent in 2013/14 compared to the previous year and by over 83 per cent across CP4
- passengers travelling on the East Coast Main Line also experienced 20 per cent fewer disruptions in CP4 compared to CP3
- initiatives were put in place in 2013/14 to reduce disruption by running as many services as possible where it was deemed safe and practical to do so. This helped to minimise the disruption from schemes such as the nine day blockade to deliver improvements between Warrington and Preston and the rebuild of London Bridge station as part of the Thameslink programme. Delivering schemes such as this in CP3 would have meant long-term disruption for passengers with the railway shut to services over many weekends and bank holidays.

Challenges in delivering network availability improvements over CP4 include:

- significant increase in access requirements in 2013/14 to deliver works deferred from the earlier part of the control period coupled with increased work volumes to deliver other outputs. The result was an increase in disruption to passenger services in the latter half of 2013/14, effectively reducing the gains delivered over the last four years, culminating in the PDI-P missing the CP4 target. The overall effect of the increase in disruption levels was reduced by the introduction of improvements in management processes and efficient work delivery methods. This helped to reduce weekend access requirements, freeing up the network for more services to run at weekends in CP4.

Table 5.23: Disruptions to passengers and freight as a result of planned engineering possessions

	2009/10 Actual	*2010/11 Actual*	*2011/12 Actual*	*2012/13 Actual*	*2013/14 Actual*	*2013/14 Planned*
Possession disruption index (Passenger) – (PDI- P)	0.63	0.52	0.54	0.64	0.69	0.63
Possession disruption index (freight) – (PDI-F)	0.82	0.89	0.85	0.79	0.87	1.00

Supporting initiatives

Seven Day Railway Fund

The overarching aim of the £220 million seven day railway fund in CP4 was to reduce the levels of disruption passengers and freight operators experienced when planned engineering work was being carried out. The fund was invested in schemes that contributed positively to network availability improvements, as measured through the possession disruption indices for passenger and freight.

The key consideration for investment was the delivery of benefits that minimised disruption, such as:

- increases in the number of trains operated during times of disruption
- improved service diversionary capabilities
- more efficient use of access
- improved operator resilience to planned disruption
- a reduction in the number of bus replacement services required.

Over the course of CP4, most of the fund was allocated to capital expenditure schemes, although a number of operating expenditure schemes that improved network availability were also delivered.

In CP4, a total of 146 projects were identified based on their ability to deliver network availability benefits in this control period and beyond.

Benefits delivered by seven day railway funded schemes in 2013/14 include:

- the Northfleet turn back installation minimised the need for disruptive access during the recent blockade at Gravesend. In future renewal works on the North Kent Line will require fewer disruptive possessions
- the work to improve the layout of a number of junctions on the West Coast Main Line (WCML) enabled planned disruptive maintenance possession requirements to be reduced from 29 to eight hours.

Benefits delivered by schemes completed this control period include:

- Loughborough Platform 3 extension enables East Midlands Trains to call at platform 3 on the slow line, when the Up and Down fast lines are blocked, minimising disruption
- Cambridge driver route learning enabled the diversion of Cambridge to London Liverpool Street via Stratford when major work took place at Hackney Downs during 2012 keeping passengers on trains rather than buses during times of disruption
- the Peak Forest diversion scheme enabled freight operators to run full length 22 wagon trains during Peak Forest diversions this control period
- operation of South Staffordshire signal box at weekends enables the maintenance of the diversionary route to keep passengers on trains.

Supporting metrics

Working timetable weekend compliance

The actual number of services operated at weekends increased by over 100,000 between 2009/10 and 2013/14, with 1.6 million out of 1.9 million weekend train services operating as planned in the published timetable of 2013/14. The moving annual average for the Weekend Working Timetable Compliance measure at the end of 2013/14 was 83.8 per cent, a drop of 2.5 percentage points when compared to 2012/13.

The major contributory factor for the drop was the unavailability of parts of the network due to wide spread flooding and landslip caused by the extreme weather conditions experienced in the last quarter of 2013/14.

Rail replacement bus hours

The number of rail replacement bus hours increased in 2013/14 as bus services were deployed in areas such as Dawlish, where landslides from the recent storm and floods caused extensive track damage.

At the end of CP4, the moving annual average number of rail replacement bus hours was 166,000 hours, worsening by 45 percentage points when compared to 2012/13.

Possession notification discount factor

The percentage of late possession notifications payments, made less than twelve weeks in advance, increased from five per cent in 2012/13 to nine per cent in 2013/14. The number of payments notified prior to the first working timetable and the publication

of the informed traveller also rose by two percentage points when compared against the same period. The rise was mainly due to the extensive use of amended timetables in 2013/14 as adverse weather and flooding incidents such as the landslips at Dawlish and Stainforth caused considerable damage to parts of the network.

Late and very late notice disruptive possessions

The average number of late notice disruptive possessions planned was reduced from 104 in 2012/13 to 93 in 2013/14. Improvements in the late notice changes authorisation and data collation process was a major contributory factor to the reduction even as work delivery activities increased during the period.

The reporting of very late notice changes to possessions was discontinued in 2013/14 following analysis of the data from previous years which demonstrated that unplanned changes to passenger services was not a significant contributory factor to very late notice possessions.

The reporting of late changes to possession (i.e. a new, cancelled, curtailed or extended possession) was extended to include all possessions in the detailed programme of proposed engineering works issued 26 weeks in advance as authorised by the Engineering Access Planning (EAP).

Possessions involving single line working

Overall, fewer single line working and bi-directional single line interventions were used in 2013/14 when compared to the first year of the control period. The reason for the drop is the delivery of works with use of alternative delivery methods to minimise disruption where single line working was not a practical option.

Delay minutes due to possession overruns

The average number of delay minutes to services resulting from possession overruns increased from three minutes per 10,000 train kilometres between 2009/10 and 2012/13 to five minutes at the end of 2013/14. The increase is attributable to incidents such as the overrunning engineering work which affected busy morning services into and out of London Bridge, causing severe disruption, cancellations and diversions affecting busy commuter services around London. The impact of incidents such as this is magnified by the frequency of such services.

Cancellation minutes due to possession overruns

The average number of cancellation minutes due to possession overruns rose from 1.7 minutes per 10,000 train kilometres in 2012/13 to 2.6 minutes by the end of 2013/14.

The increase in the last year of the control period is the cumulative effect of increased levels of engineering activities and incidents such as the signalling commissioning overrun between Alexandra Palace and Finsbury Park and the London Bridge overrun affecting peak services during the period.

National unplanned TSRs actual vs. target

The average number of unplanned Temporary Speed Restrictions (TSR) increased from 105 in 2012/13 to 156 by the end of Control Period 4. The number of unplanned TSRs has risen each year in the Control Period. The primary reason for the increase is due to the wet weather. Other contributory factors include improvements in the accuracy of the TSR data collation process and better detection of critical rail defects following the introduction of the Ultrasonic Testing Unit (UTU) on the network.

Section 6 – Enhancement programme

Introduction and summary of progress in the year and CP4

We have progressed delivery of the enhancement schemes that we have committed to deliver during CP4.

Some highlights in 2013/14 include:

Crossrail: the Crossrail project is to deliver infrastructure enhancements to enable the operation of 24 trains per hour through central London to destinations such as Heathrow Airport, West Drayton and Maidenhead in the west and Abbey Wood and Shenfield in the east. Network Rail is providing the 'on network works' for Crossrail Limited (CRL) which includes enhancements to the existing railway network, on either side of the central tunnels.

Work is now underway at five major Crossrail sites: Old Oak Common, Acton, Stockley, Maidenhead and Abbey Wood. A new entrance to Acton Yard was successfully commissioned during Christmas 2013, the eastern half of the Acton dive under has been completed and the western section is on programme. A further five major GRIP 5-8 contracts have been let including West Inner Track Infrastructure and Old Oak Common and Paddington Approaches.

Thameslink: the Thameslink programme will provide the stations and railway infrastructure to enable modern twelve-car trains to travel from Bedford, Peterborough and Cambridge to destinations including Brighton, Horsham, East Grinstead, Sevenoaks and Maidstone East through a central London core at a peak rate of up to 24 trains per hour.

Completed works in CP4 include:

Key Output One, which delivered the infrastructure to enable the operation of twelve-car trains between Bedford and Brighton. Improved infrastructure capacity also enabled up to 16 train paths per hour between St Pancras International (low level) and Blackfriars stations.

At Farringdon a new ticket hall dedicated to Thameslink and future Crossrail passengers opened, platforms extensions enabled twelve-car trains, the train shed roof was extended and a new concourse on Turnmill Street was built to increase passenger capacity.

At Blackfriars longer platforms and new track systems have enabled longer, more frequent trains, an enhanced Underground station, new lifts and escalators have enabled better connections and over 4,400 photovoltaic panels were installed on the station roof.

During 2013/14, significant works were undertaken on Key Output Two, which delivers a rebuilt London Bridge Station and infrastructure capability for 24 trains per hour, including:

- progress on rail systems to deliver additional track at Tanners Hill, approaches at London Bridge and a turn back facility at South Bermondsey. Additionally a new train describer system at London Bridge Area Signalling Centre was commissioned
- at London Bridge**,** enabling works were completed and the first new low level platforms (14 and 15) were brought into use on 31 March 2014 and a further two old platforms (12 and 13) were taken out of use for redevelopment
- works on the Canal Tunnels fit out has progressed well and works to accommodate the new train fleet have been completed at Cricklewood, Three Bridges and Brighton.

London King's Cross station: following the opening of the new western concourse in March 2012, extra passenger circulating capacity and new retailing opportunities have arisen. Other enhancements as part of the project include:

- a new platform beneath the eastern range offices
- a new square to the south of the station
- a new access road and service yard for station deliveries in conjunction with the adjacent King's Cross central property development.

Birmingham New Street station redevelopment: this redevelopment provides an upgrade to the station in order to enhance station facilities and provide greater capacity to support passenger growth over the next 30 years. During 2013/14 significant progress was made including the completion of and 'switchover' to the western concourse, substantial completion of façade installation and progression of Phase 2 concourse works.

Reading station: the completed Reading station area redevelopment has delivered the following enhancements in CP4:

- new platforms and platform extensions
- a new train maintenance facility
- grade separation to allow trains to cross the Great Western Main Line
- extensive track layout reconfiguration and resignalling throughout the area
- provision for a possible future extension of Crossrail and the introduction of train services from the west to London Heathrow Airport.

North West electrification: This programme delivers AC electrification at 25 kV OLE of various routes in North West England. The programme facilitates the introduction of electric train operation on passenger and freight services on the following routes for completion in 2016:

- Liverpool to Manchester
- Huyton to Wigan
- Preston to Blackpool
- Manchester to Preston.

During 2013/14, implementation works have been successfully completed on the main works package (OLE, signalling, distribution) for the first phase of the scheme from Manchester to Newton-le-Willows, which was commissioned in December 2013. This enables the operation of electric passenger services between Manchester and Scotland. Implementation works have progressed on the main works package for the second phase (Liverpool to Newton-le-Willows and Wigan), advance civil works have completed on the third phase (Preston to Blackpool North) and outline designs have been progressed for the fourth phase (Manchester to Preston).

Northern Hub: this programme consists of a series of journey time improvement projects on radial routes from Manchester and capacity schemes at various locations across the north of England. During 2013/14, the Transport and Works Act applications for Huyton Stage 2 and Ordsall Chord have been submitted with civil works at Manchester Airport advancing early due to a collaboration with Transport for Greater Manchester Metrolink contractor.

Barry to Cardiff Queen Street corridor: this project facilitates an increase in capacity and capability on key lines to provide an additional four trains per hour by March 2015. Works include new platforms at Cardiff Central and Queen Street stations, renewal of signalling and improved track capacity. The second commissioning of the Valley Lines was successfully delivered in 2013/14 and progress made on the installation and testing required for the Barry Lines.

Edinburgh Glasgow Improvements Programme (EGIP) Electrification project: EGIP will deliver more frequent and faster rail services between Edinburgh and Glasgow. The outputs from this phase of the project were the completion of advance route clearance works and electrification of the route between Springburn and Cumbernauld. The 2012 advance route clearance works project has delivered 28 structures on schedule, prior to the June 2013 delivery milestone. The electrification of the route between Springburn and Cumbernauld has also been completed and ScotRail driver training commenced in March 2014, on schedule for the start of electric passenger services which started running on the route from May 2014.

North London/East London Line: improvements to these routes have enabled more frequent passenger services to be operated by London Overground around the periphery of Central London, while maintaining the existing loading gauge and capacity for freight traffic. As an example, a passenger may now make a journey from Highbury and Islington to West Croydon in less than an hour on one train.

Nottingham resignalling: This project enhances capacity in the Nottingham area through the remodelling, resignalling and redesign of the platform layout at the west end of Nottingham station. In 2013/14 the project completed successfully, including delivery of all civil, switches and crossings and track works, commissioning of an additional platform face and implementation of post works timetable.

The Gatwick Airport remodelling and passenger capacity scheme: has delivered improved performance, reduced journey times and removed a capacity constraint at Gatwick caused by the Gatwick Express services crossing four running lines. The scheme completed in February 2014 with the scope including the construction of a seventh platform, with associated track and signalling infrastructure. Enhancements were also made to the passenger facilities on Platforms 5 and 6 (for Gatwick Express) to improve passenger circulation and station concourse access.

Line Speed Improvements – Wrexham to Marylebone: as an integral part of the Evergreen 3 project which includes linespeed improvements, journey times and travel opportunities between London (Marylebone) and Birmingham (Moor Street) have been improved, with Chiltern Railways now able to offer a 100-minute fastest journey time between these two cities.

Strategic Freight Network (SFN): this programme is designed to add capacity and capability allowing an increase in the number of freight trains on the network in addition to enhanced gauge and the capability for longer trains.

Active schemes during 2013/14 include:

- the Ipswich chord, a 1.4 kilometre double track chord line, was completed in March 2014
- completion of a number gauge clearance schemes including Water Orton to Doncaster, Teesport to the East Coast Main Line and Swinton to South Kirkby
- redoubling of Manton Junction as part of the Peak Forest and Hope Valley to London Train Lengthening project.

In addition we successfully delivered the £250 million fiscal stimulus package on projects, providing additional maintenance and renewal works for civil

engineering assets. Works were completed at a total of 1,017 sites, which consisted of 217 bridge painting schemes, 174 earthworks schemes, 217 spandrel walls schemes, 132 scour schemes and 277 hidden critical elements schemes. Key examples include earthworks at Warmsworth Cutting, spandrel wall stabilisation at Frodingham Viaduct and bridge painting at Bourne End. The fiscal stimulus provided by this programme resulted in approximately 1,000 jobs being created or retained.

During 2013/14, delay to a small number of schemes required rollover of delivery and funds into CP5. Following ORR agreement through the change control process, projects moved into CP5 include:

- Strategic Freight Network – Southampton to West Coast Main Line W10/W12 Diversionary Route via Andover, Felixstowe to Nuneaton via London (Ipswich Yard) and Southampton to West Coast Main Line Train Lengthening
- Southern train lengthening package seven – ten-car south west
- North Doncaster Chord
- station security
- Westerleigh Junction to Barnt Green line speed enhancement.

A summary of the progress of all enhancement programmes for CP4 can be found in Table 6.1.

Guide to Railway Investment Projects (GRIP)

Within this section we frequently refer to GRIP. There are eight stages in the GRIP lifecycle reflecting significant business and technical milestones within investments as follows:

- GRIP 1 – output definition – this stage follows the project's validation and securing the authority to initiate. This stage is about identifying what the outputs of the project will be and how they may be achieved
- GRIP 2 – pre feasibility – this stage follows the formal appointment of a Project Manager and addresses the detailed strategy of how to deliver the project outputs
- GRIP 3 – option selection – this stage examines the different engineering options available for delivering the project and selects a single option to be developed
- GRIP 4 – single option development – this stage follows the selection of a single design/engineering option, develops it at a high level and initiates the tendering process to procure suppliers
- GRIP 5 – detailed design – this stage awards contracts and develops a detailed design and implementation plan
- GRIP 6 – constructing, testing and commissioning – this stage focuses on the physical work associated with delivering a project, and ends with completion/commissioning
- GRIP 7 – scheme hand back – this stage follows commissioning and concerns handing back the asset to the asset owner, operator or maintainer
- GRIP 8 – project closeout – this stage follows the successful commissioning/completion of all work packages to meet the client's requirements and the project's success criteria. It covers a controlled closeout, which is achieved by updating, finalising and archiving all project documentation and capturing the lessons learned.

Change control

The CP4 enhancement programme is funded through the ORR's final determination for CP4 as well as through subsequent agreement to fund additional schemes (such as the 'on network' works for Crossrail, the electrification programme and the Edinburgh to Glasgow improvement programme). Each of the projects and funds described in this Annual Return has a defined set of outputs and key dates that we have committed to meet.

Material changes to these can only be implemented after consultation and through a formal change control process. The changes agreed by the ORR during the year are given below in Table 6.2.

Enhancement Expenditure

Actual expenditure incurred on each enhancement programme in 2013/14 and the cumulative total for the first four years of CP4 is shown in Table 6.3.

The table groups expenditure separately for those schemes that were funded by the 2008 Periodic Review settlement (PR08) and those that were agreed after the review was determined.

Table 6.1: Enhancement Programmes Summary

No.	*Title*	*Project Completion*	*Status*
1.00	Network Rail Discretionary Fund	n/a	n/a
2.00	National Stations Improvement Plan	n/a	n/a
3.00	Strategic Freight Network	-	-
3.01	Felixstowe to Nuneaton Freight capacity scheme	Mar-14	Complete
3.02	Southampton to Basingstoke W10 diversionary route	Mar-14	*Mar-15 (ES003)*
3.03	Channel Tunnel south of London route fund	Mar-14	Complete
3.04	In-fill gauge projects fund	-	-
	1. Doncaster to Water Orton	Mar-14	Complete
	2. ECML South	Mar-14	*Dec-14 (F006)*
	3. Barking	Jul-11	Complete
	4. Swinton to South Kirby	Mar-14	Complete
	5. ECML North (Carstairs)	Mar-14	*Jul-15 (SC013)*
	6. ECML North (Yorkshire Diversionary Routes)	n/a	n/a
	7. Teesport ECML	Mar-14	Complete
3.05	Train lengthening projects fund	-	-
	1. Peak Forest & Hope Valley to London	Mar-14	*Nov-14 (F006)*
	2. Southampton to West Coast	Mar-14	*Jan-16 (F006)*
	3. F2N via London	Mar-14	*Aug-14 (F006)*
4.00	Performance fund	n/a	n/a
5.00	7 Day Railway fund	n/a	n/a
6.00	CP5 development fund	n/a	n/a
7.00	Safety & Environment fund	n/a	n/a
8.00	Access for All	n/a	n/a
9.00	King's Cross	Mar-12	Complete
10.00	West Coast Main Line committed schemes	-	-
10.01	Bletchley remodelling	Sep-13	*Apr-15 (CR003)*
10.02	WCML traction power supply upgrade project	Feb-17	Feb-17 (LNW004)
10.03	Stafford / Colwich re-modelling project	Dec-17	Dec-17 (LNW003)
11.00	Thameslink Programme	Dec-18	Dec-18 (CR004)
12.00	Intercity Express Programme	Dec-17	Dec-17 (W002)
12.01	WCML IEP	Dec-17	Dec-17 (W002)
12.02	IEP ECML	Aug-17	Aug-17 (LNE002)
12.03	IEP – ECML Traction Power Supply Upgrade	Aug-17	Aug-17 (LNE002)
13.00	Crossrail and Reading	-	-
13.01	Crossrail	Dec-19	Dec-19 (CR001)
13.02	Reading station area redevelopment	Sep-15	Sep-15 (CR002)
13.03	Reading station southern platforms	Jan-12	Complete
14.00	Birmingham New Street Gateway Project	Sep-15	Sep-15 (LNW005)
	Train lengthening - southern	-	-
15.20	0: Twelve-car capability on the Tilbury Loop and Ockendon Branch	Dec-11	Complete
15.21	1: Cambridge Island Platform.	Dec-11	Complete
15.22	11: West Anglia Outer Twelve-car Trains	Dec-11	Complete
15.23	4: Gravesend	Jan-14	Complete
15.24	15: Kent DOO-only stations	Dec-11	Complete
15.25	18: Charing Cross Station	Mar-13	Complete
15.26	8: Kent & Sydenham Train lengthening.	Sep-13	Complete
15.27	2: East Grinstead station	Dec-11	Complete

Table 6.1 Continued: Enhancements Programme Summary

No.	*Title*	*Project Completion*	*Status*
15.28	16: East Grinstead Line	Dec-11	Complete
15.29	3: 10-car Sussex Suburban Railway	Dec-13	Complete
15.30	17: Battersea Park station	Dec-13	Complete
15.31	7: South West Suburban railway	Dec-13	*June-14 (WX005)*
15.32	9: Windsor Line	Mar-14	Complete
15.33	Waterloo International Integration	Mar-14	Complete
15.34	Wessex ADSO	Nov-13	*Apr-14 (WX006)*
16.00	Power supply upgrade	-	-
16.01	Route 1 - power supply enhancements	Jun-16	Jun-16 (K002)
16.02	Route 1 - New Cross grid connection enhancement to power supply	Dec-16	Sep-16 (K004)
16.03	Route 2 - power supply enhancements	Dec-13	Complete
16.04	Route 3 - power supply enhancements	Jul-14	Jul-14 (WX008)
16.05	Route 5 - power supply enhancements	Dec-11	Complete
16.06	Route 6 - power supply enhancements	Dec-11	Complete
16.07	Route 7 - power supply enhancements	Dec-11	Complete
16.08	DC regeneration	Aug-17	Aug-17 (WX007)
17.00	Southern capacity package	-	-
17.01	Gatwick Airport remodelling and passenger capacity scheme	Jan-14	Complete
17.02	East Croydon passenger capacity scheme	Dec-13	Complete
17.03	Seven Sisters improved access	Mar-14	Complete
18.00	East Coast Main Line improvements	-	-
18.01	Capacity relief to the ECML (GN/GE Joint Line)	Nov-14	Nov-14 (LNE005)
18.02	Peterborough station area capacity enhancements	Mar-14	Complete
18.03	Alexandra Palace to Finsbury Park 3rd Up line	Dec-13	Complete
18.04	Alexandra Palace to Finsbury Park Down line improvements	Dec-13	Complete
18.05	ECML level crossings	Oct-13	Complete
18.06	Hitchin grade separation	Jun-13	Complete
18.07	York Holgate Junction 4th line	Dec-11	Complete
18.08	Doncaster North Chord	Apr-14	*Jun-14 (LNE006)*
18.10	FCC train lengthening	Nov-11	Complete
19.00	East Coast Main Line overhead line electrification	Mar-15	Mar-15
20.00	St Pancras - Sheffield linespeed improvements	Dec-13	*Dec-14 (EM002)*
21.00	Nottingham resignalling	Jan-14	Complete
22.00	Midlands improvements	-	-
22.01	Bromsgrove electrification	Jul-16	Jul-16 (LNW009)
22.02	Redditch	Aug-14	Aug-14 (LNW010)
22.03	Line speed improvements: Wrexham to London Marylebone	Dec-11	Complete
22.04	Route 16 - South Ruislip Loop	Dec-11	Complete
22.05	Route 17 - train lengthening	Dec-12	Complete
22.06	East Midlands train lengthening	Feb-12	Complete
23.00	Northern urban centres - Yorkshire	-	-
23.01	Capacity improvements (Leeds area)	Oct-12	Complete
23.02	South Yorkshire - train lengthening	Mar-13	Complete
23.03	South Yorkshire - stabling for Northern	Cancelled	Cancelled
24.00	Northern urban centres - Manchester	-	-

Table 6.1 Continued: Enhancements Programme Summary

No.	*Title*	*Project Completion*	*Status*
24.01	Route 20 - platform lengthening	Sep-12	Complete
24.02	Route 20 - stabling for Northern	Oct-12	Complete
24.03	Salford Crescent station redevelopment	Dec-13	Complete
24.04	Route 20 - capacity enhancements	Dec-11	On-hold
25.00	Northern urban centres - Liverpool - Leeds linespeed improvements	Mar-14	*Aug-14* (CR005)
26.00	Western improvements	-	-
26.01	Barry - Cardiff Queen Street corridor	Nov-16	Nov-16 (WL002)
26.02	Cotswold line redoubling	Aug-11	Complete
26.03	Westerleigh Junction to Barnt Green speed increases	Apr-15	Apr-15 (W011)
26.04	Maidenhead and Twyford (relief lines)	Cancelled	Cancelled
27.00	North London Line capacity improvements	May-11	Complete
28.00	FTN/GSM-R inclusion of freight only branch lines	May-14	May-14 (CR009)
29.00	Station Security	Mar-14	Various (CR008)
30.00	Scotland: Tier 3 project development fund	Mar-14	Completed
31.00	Scotland Small projects fund	Mar-14	Completed
32.00	Scotland projects	-	-
32.01	Airdrie - Bathgate	Dec-10	Complete
32.02	Paisley corridor improvements	Dec-12	Complete
32.03	Borders new railway	Jun-15	Jun-15 (SC007)
32.04	Glasgow to Kilmarnock	Dec-09	Complete
33.00	Other Transport Scotland Tier 3 schemes	-	-
33.01	Aryshire and Inverclyde infrastructure enhancements for Class 380 Train introduction	Dec-13	Complete
33.02	Waverley steps redevelopment	Jul-12	Complete
33.03	EGIP Gogar	Mar-17	Mar-17 (SC004)
33.04	EGIP Haymarket North	May-11	Complete
33.05	EGIP Infrastructure works	Mar-17	Mar-17 (SC002)
33.06	EGIP Edinburgh to Glasgow electrification	May-14	May-14 (SC001)
33.07	EGIP Haymarket Station Capacity	Apr-14	Complete
33.08	Paisley Canal line electrification	Mar-13	Complete
33.10	EGIP Newton North Connecting Line	Dec-13	Complete
33.13	Rutherglen & Coatbridge (R&C) Electrification	Aug-14	Aug-14 (SC014)
100.00	Network Electrification programme	-	-
100.01	Great Western Main Line electrification	Dec-17	Dec-17 (W001a)
100.02	North West electrification	Dec-16	Dec-16 (LNW001)
100.03	Trans-Pennine Electrification	Dec-18	Dec-18 (LNW002)
101.00	Northern Hub	Dec-18	Dec-18 (CR005)
102.00	Swindon to Kemble redoubling	Aug-14	Aug-14 (W010)
103.00	East London Line (Old Kent Rd - Clapham Junction)	Dec-12	Complete
104.00	Gating and car parks (SCPF)	Various	Various (F013)

Notes:

Complete – project completed.

N/A – fund issued for multiple programmes/projects.

Italicised project status – project rolled over into CP5.

CP5 project codes are given in the project status column where appropriate i.e. (F006).

Table 6.2 Changes approved by the ORR

ID no.	*Project*	*Change*
03.05	Felixstowe to Nuneaton train Lengthening (Peak Forest to London)	Milestones
03.05	Felixstowe to Nuneaton train Lengthening (Peak Forest to London)	Milestones
03.05	Felixstowe to Nuneaton train Lengthening (Ipswich Yard capacity enhancements)	Milestones
03.05	Felixstowe to Nuneaton train Lengthening (Southampton to WCML)	Milestones
10.02	WCML traction power supply upgrade	Milestones
12.01	IEP Great Western Main Line	Milestones
12.03	ECML Traction Power Supply Upgrade	Scope and milestones
12.03	IEP (ECML)	Scope and milestones
13.01	Crossrail	Scope
13.02	Reading	Scope and outputs
13.02	Reading	Outputs and milestones
15.26	Train Lengthening - Southern - Package 8 - Kent & Sydenham train lengthening	Scope and milestones
15.31	Train Lengthening - Southern - Package 7 - 10 car south west suburban railway	Milestones
15.31	Train Lengthening - Southern - Package 7 - 10 car south west suburban railway	Milestones
15.34	Wessex ASDO	Milestones
16.01	Route 1 power supply	Milestones
16.04	Route 3 - power supply enhancements (Wessex)	Milestones
17.03	Seven Sisters improved access	Milestones
18.01	Capacity relief to the ECML (GN/GE Joint Line)	Milestones
18.08	North Doncaster Chord	Milestones
18.08	North Doncaster Chord	Milestones
19.00	ECML OLE Performance Improvements	Milestones
25.00	Liverpool - Leeds journey time improvements	Milestones
25.00	Liverpool - Leeds journey time improvements	Outputs, scope and milestones
25.00	Liverpool - Leeds journey time improvements	Outputs, scope and milestones
26.01	Barry - Cardiff Queen Street Corridor	Milestones
26.03	Westerleigh Junction to Barnt Green line speed increase	Milestones
26.03	Westerleigh Junction to Barnt Green line speed increase	Scope and milestones
28.00	FTN/GSM-R	Milestones
29.00	Franchised station security project	Milestones
33.03	Edinburgh Gateway Intermodal Transport Interchange	Outputs scope and milestones
33.06	EGIP - Electrification	Milestones
33.09	EGIP - Glasgow to Cumbernauld Electrification	New entry
33.12	EGIP - Initial Phase Advance Works	New entry
33.13	Rutherglen and Coatbridge electrification	Milestones
100.01	GWML electrification	Milestones
102.00	Swindon to Kemble Redoubling	Milestones

Table 6.3 Enhancement expenditure in 2013/14 (£ million at 2013/14 prices)		
	2013/14	***Cumulative***
Schemes covered by a tailored protocol or fixed price agreement		
Thameslink	371	2,540
Airdrie to Bathgate	-8	246
Total Schemes covered by a tailored protocol or fixed price agreement	**363**	**2786**
Funds		
CP5 development fund	3	63
NRDF (Network Rail Discretionary Fund)	102	273
Access for All	82	289
NSIP (National Stations Improvement Programme)	44	186
Performance fund (HLOS)	86	253
SFN (Strategic Freight Network)	101	212
Seven day railway fund	126	207
Safety and environment fund	34	135
Tier 3 project development	6	13
Small projects fund	13	25
Adjustment due to change of funding from the DfT	-52	-196
Total Funds	**545**	**1,460**
Other PR08 funded schemes		
Intercity express programme	24	62
King's Cross	17	383
Birmingham New Street gateway project	26	73
East Coast Mainline overhead line enhancement	5	32
St Pancras - Sheffield line speed improvements	31	62
Nottingham Resignalling	5	12
North London Line capacity enhancement	0	80
GSM-R on freight routes	0	0
Station security	0	13
Crossrail and Reading	91	526
Platform Lengthening - Southern	87	301
Southern Capacity	17	42
ECML improvements	174	436
Power supply upgrade	58	143
Western Improvements Programme	10	81
WCML Committed Schemes	77	272
Midlands Improvement Programme	9	37
Northern Urban Centres - Leeds	0	15
Northern Urban Centres - Manchester	5	40
Trans Pennine Express linespeed improvements	8	11
Paisley Corridor Improvement	8	169
Borders railway	2	2
Glasgow to Kilmarnock	0	18
Unallocated Overheads	8	46
Total Other PR08 funded schemes	**662**	**2,856**
CP4 Delivery Plan	**1,570**	**7,102**
Schemes carried over from CP3		
WCRM	0	47
ERTMS	0	23
Cab fitment	0	15
Total Schemes carried over from CP3	**0**	**85**
Total PR08 funded enhancements	**1,570**	**7,187**

England and Wales

Programme ID 1.00 Network Rail Discretionary Fund (NRDF)

Current Project Stage: Various

The NRDF is a mechanism for funding schemes up to £5 million which have an appropriate industry business case. The schemes may be either linked to renewals or standalone schemes. The fund was primarily aimed at interventions that result in an increase in the capacity or capability of the network. However, it now also seeks opportunities to reduce the short and medium term cost of the railway. Our obligation is to work with our customers and stakeholders to make the best use of the funds available.

The NRDF CP4 budget was £263 million (2013/14 prices).

We have conducted an analysis of the NRDF business cases, in part to inform the discussion around the case for the continuation of the fund in CP5. Our conclusions were that the overall benefit cost ratio of the fund is six, well in excess of the DfT's 'very high' value for money threshold of four. This assessment looked at NRDF schemes completed in CP3 and CP4. The ORR has agreed that the fund should continue in CP5 and has established a fund of £103 million.

A detailed list of NRDF schemes can be found within our 'CP4 Delivery Plan 2013 Enhancements Programme' publication.

Programme ID 2.00 National Stations Improvement Programme (NSIP)

Current Project Stage: Various

The National Stations Improvement Programme (NSIP) is a joint rail industry initiative involving Network Rail, train operating companies (TOCs) and the DfT. The programme is funded primarily by the DfT and aims to deliver £179 million (2013/14 prices) of station improvements to a minimum of 150 medium sized stations in England and Wales during CP4 with the Twickenham, Chelmsford and Darwin schemes rolling into CP5.

The programme adopts a new approach to the working partnership between Network Rail and the TOCs. Through the formation of 17 Local Delivery Groups (LDGs) the programme encourages and empowers the LDGs to make decisions at a local level. The LDGs are jointly chaired by Network Rail and the TOCs. LDGs integrate their plans with other programmes of work, and deliver the right solution in the most efficient manner complementing all the interfaces for each station.

Our obligation is to work with stakeholders to make the best use of available funds and to deliver the proposed programme of station works. Projects can also be delivered by the TOCs or third parties where agreed by the LDGs.

The core objective is to achieve a noticeable improvement in passenger perception by focusing on stations with high footfall density and low passenger satisfaction. A wider aim of the programme is to develop a more effective, co-ordinated approach for the planning and delivery of activities at stations by all stakeholders, thereby improving efficiency and value for money in station investments.

As the programme has developed, the scope of NSIP works has evolved beyond the initial 'high street' type works to more complex projects. For completed projects, the scope has included new customer information screens, cycle facilities, seating, signage, waiting shelter improvements, new canopies, new station buildings, booking hall refurbishments, subway improvements and improvements to station retail outlets.

175 projects were completed in the first four years of CP4 and 170 projects were completed in 2013/14 benefiting 450 stations overall.

Progress in 2013/14

The projects completed in 2013/14 are listed by Station Facility Owner (SFO) in Table 6.4.

Table 6.4: Programme ID 2.00 Completed projects	
Station Facility Owner (SFO)	***Stations***
Arriva Trains Wales	Various Customer Information Systems (CIS) screens involving three phases of works over numerous stations, Shrewsbury, Llandudno, Neath, and shelters in various locations
c2c	Basildon, Barking, Westcliffe on sea, Standford-le-hope, West Horndon and cycle parking at various stations
Chiltern Railways	Bicester North, Maryleborne, Haddenham and Thame, Banbury, Wendover, station seating at a number of locations
East Coast	Berwick, Doncaster, York
East Midlands Trains	Spalding, Chesterfield, Nottingham, Market Harborough, Hinckley, Lincoln, station frontage works at three locations, Kidsgrove CCTV, Kettering
First Capital Connect	West Hampstead, waiting shelters at five stations, Tooting and Loughborough Junction, CIS at twenty seven locations, Leagrave and Flitwick, Alexandra Palace, Royston, Letchworth, Mill Hill Broadway, Radlett, Letchworth, Stevenage, Elephant and Castle, Luton
First Great Western	Burnham, West Drayton, Plymouth, Theale, Bath Spa, Melksham, Exeter Stations, St Austall
Greater Anglia	Seven Sisters, Bishops Stortford, Chelmsford, Cambridge, Enfield Town
London Midland	Kidderminster, Milton Keynes, Hemel Hampstead, Litchfield, Birmingham Snow Hill, Sutton Coldfield, Redditch, Leighton Buzzard
Merseyrail	Ellesmere Port, Network wide help points, Bidston, Hunts Cross, Orrell Park, Birkenhead Park
Northern	Eccles, Merseyrail CIS – various stations operated by Northern, Sandbach, Worksop, Guide Bridge, Burnley Manchester Road, Widnes, Leyland
South West Trains	Clapham Junction Canopies, Wokingham, Byfleet and New Haven, Fleet, Twickenham, Clapham Junction Platform 13/14 and CIS improvements at Clapham Junction
Southeastern	Dover, Hastings, Chatham, Grove Park, Denmark Hill Canterbury West, Swanley, Dartford, Orpington, Blackheath, Strood, various CIS locations at stations, Folkestone West Dartford, Margate
Southern	Hassocks, Ashstead, East Grinstead, Battersea Park, Falmer, Sutton, Leatherhead, Chichester, Cheam, Horsham, East Croydon, Queens road Peckham, Selhurst, additional seating at various stations, Horsham, Peckham Rye, East Grinstead and Crystal Palace
TransPennine Express	Brough, Birchwood, Northallerton, Thornaby
Virgin Trains	Warrington, Macclesfield, Stockport, Penrith, Crewe

Programme ID 3.00 Strategic Freight Network (SFN)

The DfT announced in its High Level Output Specification (HLOS) (July 2007) funding to facilitate the implementation of a Strategic Freight Network. This would add capacity and capability to the network in CP4 to allow an increase in the number of freight trains, along with larger loading gauges and longer trains. This will be delivered by the schemes (detailed below), each of which provides an enhancement for freight customers. These schemes have been developed with the SFN Steering Group, comprising of:

- Association of Train Operating Companies (ATOC)
- Colas Rail
- the DfT
- Freightliner
- Freight Transport Association (FTA)
- DB Schenker
- Direct Rail Services (DRS)
- GB Railfreight
- Network Rail
- Passenger Transport Executive Group (PTEG)
- Rail Freight Group (RFG)
- Transport for London (TfL)
- Transport Scotland
- Welsh Government.
- the ORR (as an observer).

Programme ID 3.01 Felixstowe to Nuneaton Freight Capacity Project

Current Project Stage: GRIP 5-6

The provision of two key physical interventions was identified in the option selection study completed in March 2009, as follows:

- the provision of a 1.4 kilometre double track chord line between the East Suffolk Line and Great Eastern Main Line known as the 'Ipswich Chord' to enable cross-country intermodal trains to bypass Ipswich Yard
- the provision of two 775 metre loops on the east side of Ely station (towards Soham) for regulation of intermodal freight trains heading towards Peterborough over Ely North Junction and towards Ipswich over the single line section to Soham.

During 2012/13 the SFN Steering Group agreed to the deferral of the works at Ely due to cost escalation and programme delays. The work is now planned for CP5 when it can be delivered alongside the Ely-Soham doubling project (subject to funding availability).

Progress in 2013/14

The Ipswich Chord project was completed on programme by March 2014.

Programme ID 3.02 Southampton to West Coast Main Line W10/W12 Diversionary Route via Andover

Current Project Stage: GRIP 6

This project delivers a W12 diversionary route between Southampton and Basingstoke to enable intermodal traffic to run without disruption whilst maintenance and renewal takes place on the core route via Eastleigh. The identified scope of the project includes an increased number of bridges compared to the information recorded in last year's Annual Return. The revised scope therefore now includes:

- the reconstruction of 17 overbridges with a standard 'Conarch' solution (16 overbridges reported in the Annual Return 2013)
- the demolition of three overbridges
- the demolition of two arched overbridges and replacement with a footbridge
- track lowering and slewing at nine overbridges
- the modification of four station canopy awnings
- the modification to eight platforms.

Progress in 2013/14

In 2013/14, the following works were delivered:

- canopy alterations completed at Romsey
- bridge demolitions and reconstructions were completed at Belvers, Foxdown and Church Acre, where the arched overbridge was replaced with a footbridge
- the planned track lowering at Wyke was cancelled in February 2014 due to a shortage of locomotive power. The work has been reprogrammed.

The project achieved W10 gauge clearance in January 2013 as planned, with the route operating successfully as a main and diversionary route by W10 diversionary traffic. Due to cancelled and subsequently reprogrammed work at Wyke, work will now continue to clear the route to W12 until March 2015. The milestones are shown in Table 6.5 below.

Table 6.5: Milestones for ID 3.02

Activity/Output	*Date*	*Date Met / Expected*
GRIP 6 Completion	March 2014	March 2015

Programme ID 3.03 Channel Tunnel South of London Route Fund

Current Project Stage: GRIP 1

Following closeout of the project to develop a Channel Tunnel second route during 2012, further studies to explore the feasibility of two alternative schemes intended to support tunnel freight traffic were commenced: Channel Tunnel to West Coast Main Line (WCML) W9 gauge Class 92 diversionary route (Swanley to Fawkham Junction) and Phase 2 of Channel Tunnel to London – Barking and Dagenham European gauge clearance.

The output of the WCML W9 gauge Class 92 diversionary route (Swanley to Fawkham Junction) would enable Class 92 electric hauled W9 gauge freight trains to join High Speed (HS1) at Southfleet Junction thereby enabling a diversionary route for the Channel Tunnel to Swanley via Maidstone East portion of the core route.

The output of Channel Tunnel to London – Barking and Dagenham European gauge clearance Phase 2 will be to identify and assess the physical infrastructure changes required to further develop the operational capability for freight to and from the Channel Tunnel terminating in the Barking area. It will make an assessment of the feasibility and cost associated with increasing the number of stabling opportunities and flexibility of movement available to GB2 gauge freight traffic in the Barking, Ripple Lane and Dagenham areas.

Progress in 2013/14

WCML W9 gauge Class 92 diversionary route (Swanley to Fawkham Junction) is currently being considered as part of a wider initiative to redevelop freight handling facilities in the area to provide wider regulating and capacity benefits for traffic on the North London Line.

Channel Tunnel to London – Barking and Dagenham European gauge clearance Phase 2 has been moved to Kent Route and will be taken forward as a tactical initiative to consider possible engineering access benefits.

Programme ID 3.04 In-Fill Gauge Projects Fund

The in-fill gauge projects fund currently has six component projects.

Water Orton to Doncaster Rail Gauge Enhancement

Current Project Stage: GRIP 6-8

This project provides W10 and W12 gauge between Water Orton and Doncaster via Castle Donington, the Erewash Valley and Beighton Junction. It connects South Yorkshire and the East Midlands to the existing and planned high gauge routes that extend to/from the West Midlands.

Progress in 2013/14

This project was completed in March 2014.

London to Peterborough via the Hertford Loop on the ECML ('ECML South')

Current Project Stage: GRIP 5-8

This project provides W10 and W12 gauge on the southern end of the East Coast Main Line (ECML), including the links to the North London Line in both an east and westbound direction. The main functionality of this project is to provide a high gauge diversionary route for intermodal traffic to/from Felixstowe when the route via March is unavailable.

Progress in 2013/14

In 2013/14, the following works were delivered:

- W10 gauge clearance between Peterborough and Canonbury West Junction was achieved in March 2014
- W10 gauge clearance via the North London Incline will be completed in June 2014
- W12 gauge clearance of both routes will be completed in December 2014.

Teesport to ECML Gauge Enhancement

Current Project Stage: GRIP 6-8

This project provides W10 and W12 gauge between Grangetown Junction and Darlington Up Sidings via Darlington South Junction.

Progress in 2013/14

The key intervention was the demolition and reconstruction of the overbridge at Dinsdale. This bridge effectively links the two halves of the village including a nearby school. It was critical that the works were completed safely and to programme to minimise the disruption to the residents. Both of these targets were met despite gale force winds.

Despite some delays in the middle of the control period, this project was completed within CP4 and met the target.

ECML North to WCML (Carstairs) Gauge Enhancement

Current Project Stage: GRIP 6-8

The project provides a W10 and W12 gauge route between Temple Hirst Junction and Carstairs via the ECML. The project will also investigate the potential for high gauge diversionary routes away from the ECML in Yorkshire.

Progress in 2013/14

In 2013/14, the following was delivered:

- to mitigate any affect of the delayed works in Scotland caused by the significant bridge reconstructions in Edinburgh, it was proposed to initially establish a W12 route south from Newcastle
- the enhancement works to gauge clear the route south of Newcastle were completed as per the target of the end of CP4. North of Newcastle a design challenge at Morpeth to accommodate both gauge and stepping distance requirements on a curved platform has delayed completion until July
- a number of fouls are being cleared by the route and once complete will enable the route from Temple Hirst to Newcastle to be declared as gauge cleared to W12
- due to complexity and cost the incremental options to clear Platform 3 at York and Platforms 7 and 8 at Newcastle were agreed to be further developed in CP5.

All enhancement works south of Newcastle are complete and work at Morpeth will take place in July 2014.

ECML North to WCML (Yorkshire Diversionary Routes)

Current Project Stage: GRIP 3

The project provides a W10 and W12 gauge diversionary route to the ECML between Doncaster and Colton Junction.

Progress in 2013/14

In 2013/14, the following was delivered:

- GRIP 3 complete
- preparation of estimate and access strategy for GRIP 4-8 for CP5 delivery.

This project was not a CP4 committed scheme.

Swinton to South Kirkby Gauge Enhancement

Current Project Stage: GRIP 6-8

This project provides W10 and W12 gauge on a nine mile track section in Yorkshire that will provide a more direct route to/from the intermodal terminals at Leeds Stourton and Wakefield Europort and avoid trains having to be routed through the busy ECML junctions at Doncaster.

Progress in 2013/14

This project was completed in March 2014.

Programme ID 3.05 Train lengthening Projects Fund

The train lengthening projects fund currently has three component projects which are outlined below:

Peak Forest and Hope Valley to London and the South East

Current Project Stage: GRIP 5-8

The project is to enable the operation of a standard hourly 2,600 tonne freight path from the Peak District quarries to London via the Midland Main Line.

Progress in 2013/14

The scope and outputs of the project were confirmed and the following infrastructure interventions were required:

- Chinley South Junction – redoubling of the junction to allow parallel moves for a loaded freight train towards Manchester at the same time as an empty freight train from Dore. This scheme was completed in April 2013
- Manton Junction – redoubling of the junction to eliminate the current wrong direction operation through Manton Tunnel for services travelling towards Corby. This scheme was completed in September 2013
- Sundon Loop – a new Up Loop between Bedford and Luton on the Midland Main Line enabling freight trains to be regulated amongst slow line passenger services. Due to issued establishing Network Change this scheme is scheduled to be completed in November 2014
- Carlton Road Junction – increase the speed of the junction from ten miles per hour to 15/20 miles per hour for freight trains to/from the Midland Main Line and the Gospel Oak to Barking line. In order to confirm that the proposed scheme design will deliver the timesaving benefits required, the scheme is due to be completed in November 2014.

Felixstowe to Nuneaton via London

Current Project Stage: GRIP 6

The project delivers infrastructure interventions to enable the operation of 662 metre long intermodal trains between Felixstowe Port and Nuneaton via London.

The scope and outputs of the project have been confirmed as modifications to the layout of Ipswich Yard.

Progress in 2013/14

The CP4 Delivery Plan Change Control has been submitted and approved.

Design work has been completed, and physical works have commenced on site to meet the revised target completion date of August 2014.

Table 6.6: Milestones for ID 3.05: Felixstowe to London

Activity/Output	*Date*	*Date Met / Expected*
Works commence	January 2014	January 2014
Works taken into use	August 2014	August 2014

Southampton to West Coast Main Line Train Lengthening

Current Project Stage: GRIP 5

This project will deliver an increase in freight train lengths up to 775 metres on the route from Southampton to the WCML via Eastleigh, Winchester, Reading, Didcot, Oxford, Leamington to Nuneaton via Tyesley and Coventry.

Progress in 2013/14

There has been further delay to the project due to late delivery of design information and lack of specialist signalling design capacity. Consequently, the completion date for sites at Southampton Maritime/Redbridge and Southampton Western Docks have slipped into CP5. Site work at Eastleigh has commenced and at the end of CP4 is 70 per cent complete. Progress was hampered by factors including engineering access difficulties and poor weather. A landslip at Botley, lead to the loss of a major possession opportunity in week 48. Availability of alternative engineering access opportunities has pushed the completion date of the works into the autumn of 2014.

Work on site at Oxford has made steady progress despite extended flooding of the new alignment over the winter period. Track will now be installed early in 2015 in advanced of the planned commissioning in May 2015.

On the LNW section of the project the scheme at Milverton has also slipped into CP5 (along with Hatton, Dorridge and Fenny Compton).

Works to extend loops at Wallers Ash and Washwood Heath have been competed as planned.

Milestones

Completion of the project is now programmed for January 2016 following a blockade over Christmas 2015 to alter layouts at Southampton.

Programme ID 4.00 Performance Fund

Current Project Stage: Various

The overall objective of the fund is to facilitate improvement activity to deliver performance levels beyond those anticipated to be achieved by our core asset management policies and enhancement projects.

A ‘programme approach’ is applied to authorisation of schemes for funding. The detailed control process provides funding by area, based on the measured challenge of delivery, whilst also maintaining a broad-based approach which:

- enables and focuses attention on performance by all parties which can influence good train performance
- is responsive to change in the challenge of overall delivery
- encourages innovation and the transfer of best practice
- brings consistency to business case consideration across all possible improvement activities to enable the sound prioritisation of projects.

Business cases are prepared based on the forecast benefits in core outputs of Public Performance Measure (PPM) and Cancellations and Significant Lateness (CaSL), with recognition of other performance benefits where appropriate.

Progress in 2013/14

Progress in 2013/14 was mostly focused on project delivery, the recognition of benefits from projects authorised from the original fund in the early years of CP4 and the delivery of further projects in the last year of CP4, as a response to falling performance.

In overall terms the greatest amount of work in CP4 took place in 2013/14. Specifically, projects for London South East (LSE) focused improvements have been created and delivered during the last two years of CP4.This included work on:

- asset reliability
- weather resilience work: additional vegetation work, further conductor rail heating, remote monitoring, flood management
- response to externally caused delays including fatality management, trespass reduction, cable theft
- improvements to rolling stock
- an extension of the GSM-R programme to enable acknowledgement of cautioning requirements
- introduction of the new performance planning process
- some projects designed to help the ‘flow’ of trains on the network including work at stations and GPS fitment to monitor train running.

Programme ID 5.00 Seven Day Railway

Current Project Stage: Nearing Completion

The seven day railway (7DR) fund was provided in CP4 to support the delivery of the regulated output measures for network availability. The regulated outputs are measured with the Possession

Disruption Indices for passenger and freight (PDI-P and PDI-F respectively).

In general terms, a seven day railway benefit is classified as a reduction in the level of planned disruption to train services. The primary expression of this benefit is in improvements to the PDIs. Other expressions of the benefit include running more trains, improved diversionary route capabilities, shortened possession limits or times, more efficient use of access, improved operator resilience to planned disruption and reduced rail replacement.

In identifying seven day railway fund investment opportunities, we worked with customers to understand their requirements.

Progress in CP4

A total of 146 projects were proposed in CP4, of which 89 are either completed or nearing completion. 28 schemes are still in implementation. A total of 26 projects were terminated, where the benefits to be delivered had been reassessed and deemed not sufficient enough to warrant completion. Three schemes were identified for completion in CP5. These are mobile maintenance systems, W12 gauge clearance to Carstairs and a bi-directional signalling upgrade on the Brighton Main Line.

A large proportion of the fund was allocated to capital expenditure (capex) schemes and a number of operating expenditure (opex) schemes were also funded.

Infrastructure enhancement schemes that improved network availability were also developed in CP4. For example, on a number of routes the fund was used to improve access points for employees and road rail vehicles for maximisation of working time. Looking to CP5, key junctions on the WCML were improved to enable less disruptive maintenance.

Capex schemes funded from the 7DR fund include:

- national maintenance initiatives which contributed toward improving network availability across the routes
- an additional platform at Chesterfield reducing rail replacement requirements and optimising access arrangements
- the acquisition of cembre clipping machines to enable a reduction in possession time required for clipping/de-clipping of rail
- a new stabling facility at Worcester which means empty coaching stock moves are reduced and possessions have become less disruptive
- mobile flash butt welder, automated site welds of rail are of higher quality and take less time improving network integrity and reducing access requirements
- Sheffield to Manchester diversion routes which provide viable diversionary route during disruption and allow trains to run. Route knowledge retention with Trans Pennine Express (TPE) is now a contractual obligation and a commitment moving forward in perpetuity
- Stalybridge diversionary route capabilities enabling diversion of services during planned and unplanned disruption
- Hemel Hempstead staircase works to reduce rail replacement, enables London Midland to operate a service when the WCML is blocked between Euston and Hemel Hempstead or Milton Keynes and Hemel Hempstead
- motorised trolleys to enable inspection during hours of darkness, delivering more efficient use of access and reducing access requirements
- Efficient Engineering Access (installation of road rail access points (RRAPs)) which help to reduce disruptive access with four tracks available south of Bedford on a Sunday from 12:00hrs as opposed to 14:00hrs
- Loughborough Platform 3 extension – reduction in disruptive access allowing East Midlands Trains to call at Loughborough Platform 3, on the Slow line, when the Up and Down fast lines are blocked
- South Staffordshire signal box opening at weekends to enable maintenance of diversionary route
- Peak Forest diversion – supports freight operators' aspirations and enabled freight operators to run full length 22 wagon trains during recent Peak Forest diversions.

Opex schemes funded from the 7DR fund include:

- initiatives to increase diversionary route capabilities, such as training to widen driver geographical route knowledge
- Selhurst drivers route knowledge, drivers trained on the diversionary route from Victoria via Herne Hill and Stewarts Lane. This enables enhanced services for passengers when engineering works result in fewer paths between Croydon and Victoria
- training for pilot working on the Sussex route allows the reintroduction of single line working and reduces the need for rail replacement services
- Cambridge driver route learning enabled the diversion of Cambridge to London Liverpool Street via Stratford when major work took place at Hackney Downs during 2012.

Programme ID 6.00 CP5 Development Fund

This funding in the CP4 settlement was specifically to support the early development of enhancement schemes to be included in the Initial Industry Plan for consideration within the HLOS for England and

Wales (specifically where such schemes were not funded elsewhere). The fund has been used with governance and overview provided by the Rail Industry Planning Group.

The CP5 Development Fund budget in CP4 was £63 million (2013/14 prices). A detailed list of CP5 Development Fund schemes can be found within our 'CP4 Delivery Plan 2013 Enhancements Programme' publication.

Programme ID 7.00 Safety and Environment Rollover Fund

Network Rail's funding in CP3 included a fund for safety and environment enhancements to meet legal requirements. As some of the schemes initiated would not complete until CP4, a roll-over of funds was provided in the CP4 Final Determination. Our objective was to deliver the schemes authorised from this fund. The following provides a summary of progress with these schemes during 2013/14.

Current Project Stage: Various

The fund is comprised of eleven categories and a summary of progress in 2013/14 for the relevant categories can be found below.

1. Energy efficiency

- on-train metering – the fitment of meters to measure the actual amount of electricity consumed on individual trains enables us better understand what measures can be adopted to improve and minimise consumption. During CP4 Network Rail made safety and environment funding available to facilitate the fitting of on-train electricity meters. It is estimated that approximately 50 per cent of traction electricity consumption will be metered by April 2015.

2. Environment protection

- London Overground Rail Operations Limited (LOROL) station environment improvements – station environment improvements were completed in 2013/14 at twelve LOROL stations including Hackney Wick and Dalston Kingsland
- sustainable lineside – this programme identified biological planting solutions and management options to mitigate/prevent risks to the operational railway.

3. Infrastructure failure

- on-going improvements to the design of switches and crossings was undertaken in 2013/14.

4. Level crossings, including closure

- Bayles and Wylies level crossing was closed and replaced with a footbridge in 2013/14
- Fishbourne level crossing was closed and replaced by a footbridge in 2013/14
- Kingknowe level crossing upgrade, with the installation of Manually Controlled Barriers with Obstacle Detection (MCB-OD), was brought to the detailed design stage in 2013/14. Funding will be sought in CP5 for the implementation stage
- Kirknewton level crossing upgrade with the installation of MCB-OD was completed in 2013/14
- Moors Gorse level crossing was closed and replaced with an overbridge in 2013/14
- Motts Lane level crossing was closed and replaced with a footbridge in 2013/14
- Stroud footpath crossings (Beards Lane and Downfield) were closed and replaced with a footbridge in 2013/14
- Whitebridge Lane level crossing was closed and replaced with a footbridge, which was substantially completed in 2013/14. Full completion was delayed to April 2014 due to adverse weather conditions
- Wareham level crossing was closed and replaced with a footbridge which was partially completed in 2013/14. Full completion is planned for November 2014. The delay is due to the timescales associated with obtaining the necessary closure permissions
- the Signalling and Electrification (S&E) funded element of the national level crossings closure programme was completed, having either closed or is in the process of closing approximately 780 level crossings.

5. Passenger safety

- partial funding for the removal of asbestos at Birmingham New Street station was provided and associated work completed in 2013/14
- the removal of a fire damaged railway building at Strood station, which contained asbestos, was substantially completed in 2013/14
- platform widening at East Worthing station was substantially completed in 2013/14.

6. Security

- improved connectivity to the CCTV Control Hub at the British Transport Police's (BTP) headquarters was completed in 2012/13
- enhancements to the Liverpool Street station CCTV system to cover blind areas at the top of the escalators and forecourt were completed in 2013/14
- additional improvements to BTP CCTV architecture to ensure readiness for new data feeds and new analytical software to be utilised, alongside additional new connections to the following stations: Blackfriars, King's Cross, Glasgow, Edinburgh and Birmingham New Street were substantially completed in 2013/14.

7. Workforce safety

- installation of a new staff footbridge between Gillingham Station and the new Route Operating Centre for Kent, was completed in 2013/14
- four mobile access platforms for East Midlands Trains train carriage cleaning staff at Neville Hill maintenance depot were provided in 2013/14
- an engineering solution to enable the remote isolation of third rail electrified equipment, removing the risk associated with the manual identification and fitment of short circuiting straps, was developed in 2013/14
- a national electric traction power supply safety engagement programme, including the introduction of approximately 600 portable, lightweight testers and indicators, was delivered in 2013/14
- 750V DC electrical power supply safety equipment was upgraded at Gillingham and Slade Green train maintenance depots in 2013/14.

8. Workforce health

- improvements to equipment at Norwich Crown Point, Orient Way and Southend Vicotria train maintenance depots, to enable the emptying of on-train waste effluent toilet tanks, were completed in 2013/14.

Programme ID 8.00 Access for All

Current Project Stage: Various

The objective of the Access for All Programme is to deliver accessibility improvements at as many stations as possible. The locations have been selected by the DfT in England and Wales (137 stations) and Transport Scotland (TS) in Scotland (18 stations).

The programme delivered enhancements at 22 stations in CP3, and completed another 103 in CP4. The ten year programme agreed with the government has been extended to March 2015 as some schemes, will be completed in the first year of CP5, bringing the total for the programme to 154 stations.

Programme integration analysis continues along with the industry's Integrated Station Plans, the NSIP and station renewals. This is done to make sure synergies and opportunities are exploited and have been achieved through active stakeholder management to minimise business disruption. We have completed 75 per cent of planned station improvements within this framework.

Station specific outputs

For each station identified we must achieve an unobstructed and obstacle free 'accessible route' within Network Rail controlled infrastructure, from at least one station entrance and all drop off points associated with that entrance to each platform and between platforms served by passenger trains.

Scope of works

This is decided on a station by station basis but typically includes the provision of lifts or ramps to an existing, or new, footbridge or subway with the appropriate signage, information systems, non-slip surfaces and colour contrasting handrails as necessary.

Progress in 2013/14

In 2013/14, the following was delivered:

- option selections agreed with the DfT/TS: seven
- outline designs signed off: three
- detailed designs signed off: nine
- stations completed in 2013/14: 27
- additional funding (£37 million) enabled extra schemes to be undertaken under the mid-tier Access for All programme.

The completed stations under the main Programme are: Peterborough, Thornton Heath, Metrocentre, Letchworth Garden City, Bingley, Hatfield, Hitchin, Fleet, Carlisle Hassocks, New Malden, Winchester, Orrell Park, Manchester Oxford Road, Neath, Worcester Park, Limehouse, Manchester Victoria, Gravesend, Dyce, Newton, Rosyth, Shotts, Gleneagles, Crewe, Birkenhead North and Miliken Park.

The completed stations under the mid-tier programme to date are: St Neots, Hanborugh, accessible toilets at various Merseyrail stations, Wakefield Westgate, Swindon, Wokingham, Aldershot, Alton, Tactile Paving at Southeastern stations, Stevenage, Queens Road Peckham, Hackbridge, Ewell East, Crystal Palace, Hampstead Heath, Wendover, Paddington, Richmond, Montrose, Perth, Tilbury Town, Hackney Central, Slough and Clapham Junction.

Programme ID 9.00 King's Cross

Current Project Stage: GRIP 6

The King's Cross station redevelopment programme was a major redevelopment project covering the whole station and incorporating both the main line and suburban train shed renewals and enhancement elements. A key objective of the project was to provide an integrated, seamless transport interchange between the King's Cross main and suburban train sheds, linked to London Underground (via the northern ticket hall located below the new station concourse) and with the adjacent St Pancras station.

Many elements of the existing station have been updated, modernised and renewed including:

- the east and west range offices
- station roofs, platforms and footbridge
- building façades.

Enhancements

Further enhancements to the station include:

- a completely new western concourse, incorporating a mezzanine level with footbridge access to Platforms 0 to 8
- a new platform beneath eastern range offices
- a new square to the south of the station
- a new access road and service yard for station deliveries in conjunction with the adjacent King's Cross central property development.

This project supports improved network capability through increased station capacity and increased train path availability through the construction of a new platform.

Other key outputs

The enhancements were put in place to deliver the following outputs:

- the creation of a high quality passenger environment
- improved circulation space and additional facilities
- additional commercial opportunities by refurbishment of east and west range offices
- maximisation of the heritage environment within the confines of a Grade 1 listed station.

Progress in 2013/14

In 2013/14, the following works were delivered:

Western range:

- the refurbishment of the Northern Range Building has been completed and is now occupied
- retail units have been completed.

Southern façade refurbishment:

- clock tower internal refurbishment works have been completed
- a new War Memorial has been installed and designated.

Main trainshed refurbishment:

- cleaning of the main trainshed interior has been completed
- the replacement of the canopy on Platforms 8 and 9 has commenced.

Public realm works:

- King's Cross Square works have been delivered
- retail outlets have been opened
- construction of the London Underground stair enclosures has been completed.

Final Delivery

Following the opening of King's Cross Square in September 2013, the project was delivered in June 2014.

Programme ID 10.00 West Coast Main Line Committed Schemes

Programme ID 10.01 Bletchley Remodelling Project

Current project stage: GRIP 7

The purpose of the project is to renew signalling and track assets in the area of Bletchley station and the nearby carriage sidings. It also supports the provision of capacity enhancements.

Progress in 2013/14

In 2013/14, the following works were delivered:

- Platform 4 and 5 extensions completed in time for London Midland to operate its planned operational changes
- track recoveries were completed
- handback of all assets into maintenance has progressed well with approximately 90 per cent of asset handback achieved to date

The permanent way drainage is the largest single item that remains to be completed. The current completion forecast is April 2015.

Programme ID 10.02 West Coast Power Supply Upgrade

Current Project Stage: GRIP 5-6

The scope of the overall programme is to deliver an upgraded traction power supply system to support the North West Electrification Programme and the Stafford Indicative Service Specification.

Phases 1 and 2 of the West Coast power supply upgrade were undertaken to support the December 2008 timetable change. There were some residual Phase 2 works identified which were completed in 2012.

Phase 3 is the implementation of an upgraded 25kV traction power supply between Wembley and Great Strickland and will be completed in CP5.

The traction power supply system will be upgraded to a 12kV Autotransformer (AT) feeding.

Progress in 2013/14

In 2013/14, the following was delivered:

- completion of along track works in Leighton Buzzard South feeder area
- commencement of construction works in Weaver North feeder area required to enable North West Electrification Programme commissioning

- commencement of construction works in Brereton North feeder area required to enable Stafford Area Improvements Programme implementation
- commencement of design works in Oxenholme South, and Patford Bridge feeder areas.

Programme ID 10.03 Stafford Area Improvement Project

Current Project Stage: GRIP 5-8

The project supports the implementation of a new service specification on WCML through the provision of additional fast line capacity, additional freight capacity on the Trent Valley route at Stafford station, and additional capacity on the Birmingham to Manchester axis. In addition a package of line speed enhancements between Stafford and Crewe has been developed.

Progress in 2013/14

In 2013/14, the following works were delivered:

- commenced GRIP 5-8 detailed design and build
- Norton Bridge subject to a development consent order which has been formally approved by the Secretary of State
- BPA pipeline diversions complete
- National Grid engaged in the project plan to facilitate the pipeline diversions required in the Norton Bridge area
- stakeholder engagement continues on the programme, working closely with Staffordshire County and Borough Councils, Environment Agency, local community and train operators
- Stafford resignalling works have commenced
- linespeed enhancements between Norton Bridge and Crewe were successfully commissioned on 30 March 2014.

Table 6.7: Milestones for ID 10.03

Activity/Output	*Date*	*Date Met / Expected*
GRIP 4 Completion	April 2014	December 2012
GRIP 6 Start on site Stafford Resignalling	February 2014	February 2014
DCO Approval	May 2014	April 2014
GRIP 6 Start on site Norton Bridge	October 2014	May 2014
GRIP 6 Completion Stafford Resignalling	December 2015	December 2015
GRIP 6 Completion Norton Bridge	August 2017	December 2016
Norton Bridge Infrastructure Operational	December 2017	December 2016

The 2013/14 delivery plan milestones have been met.

Programme ID 11.00 Thameslink

Current Project Stage: Various

The Thameslink programme will provide the stations and railway systems infrastructure to enable modern twelve-car trains to travel from Bedford, Peterborough and Cambridge to destinations such as Brighton, Horsham, East Grinstead, Sevenoaks and Maidstone East through a central London core at a peak rate of up to 24 trains per hour. The scope of the infrastructure works to achieve this are grouped into three key outputs.

Key Output Zero (KO0) delivered infrastructure that enabled a consistent train service throughout the Thameslink programme construction period and was completed in March 2009.

Key Output One (KO1) delivered infrastructure that enabled the operation of twelve-car trains between Bedford and Brighton. An improved infrastructure capacity enabled up to 16 train paths per hour between St Pancras International (low level) and Blackfriars stations and the reopening of the Blackfriars bay platforms was achieved in time for the May 2012 timetable change.

Key Output Two (KO2) delivers a rebuilt station at London Bridge and the headline Thameslink programme infrastructure capability that enables up to 24 train paths per hour between St Pancras International (low level) and Blackfriars stations by December 2018.

The following are some of the key projects in the Thameslink programme.

KO1 Outer Areas

On the Midland Main Line, station and platform enhancements have been delivered to accommodate twelve-car trains. This encompassed works at Bedford, Flitwick, Harlington, Leagrave, Luton, Luton Airport Parkway, Elstree and Borehamwood, Harpenden, Radlett, St Albans, West Hampstead, and Mill Hill Broadway stations.

KO1 Farringdon Station

Farringdon station has been remodelled and extended to accommodate increased passenger numbers and improve existing interchanges with London Underground and a new interface with Crossrail.

KO1 Blackfriars Station

The Blackfriars station and bridge project involved the redevelopment and expansion of the existing station complex. The station has been enlarged with a new north bank concourse, new wider twelve-car

platforms spanning the River Thames and a brand new South Bank station entrance. A photovoltaic (PV) cell scheme to produce solar energy for the station has been incorporated into the roof. Blackfriars Underground station has been enlarged and extensively rebuilt.

KO1 Signalling

The project has resignalled Thameslink routes between Kentish Town and Loughborough Junction to accommodate the more intensive service and twelve-car trains.

KO1 Electrification and Plant

The programme has upgraded the electrification system on wider Thameslink routes to provide sufficient power for longer trains.

On the Midland Main Line this involved the installation of autotransformer feeding equipment between Kentish Town and Borehamwood, providing a consistent traction power supply. On the DC third rail electrified network, new substations and additional lineside cabling have been commissioned to support the train service.

KO1 Borough Viaduct Project

A new twin-track viaduct has been built on the south side of the existing tracks to facilitate the provision of four tracks through the existing 'bottlenecks' between London Bridge and Metropolitan Junction. This will enable Thameslink and Charing Cross services to operate over dedicated tracks improving capacity and reliability. The new track works will be commissioned in January 2016.

KO2 London Bridge Station and Bermondsey Dive-under

London Bridge is being redeveloped, creating one of the largest station concourses in Great Britain (between Tooley Street and St. Thomas Street) at street level. It will be a lighter and brighter station, capable of accommodating 66 per cent more passengers and offering a simplified transport interchange hub.

The station will accommodate two additional tracks from the new Borough Viaduct, changing the configuration of the station to nine through tracks and six terminating tracks. This realignment of the infrastructure enables the increase to 18 Thameslink train paths per hour through the station, and a total of 88 train paths per hour into and through the station as a whole. A dive-under will be constructed in the Bermondsey area, which will enable Thameslink services from Sussex to access London Bridge on dedicated tracks.

KO2 London Bridge Railway Systems

The railway systems project is upgrading the track, signalling, electrification and telecoms infrastructure at London Bridge station and on its approaches to accommodate the more intense service and longer trains. Approximately 48 kilometres of new plain line will be replaced all of which will be high performance rail that will improve layout resilience. Over 550 signalling equivalent units will be installed and the bottle neck on the approaches to London Bridge station has been addressed in the design to enable service groups to stay on dedicated tracks.

KO2 Infrastructure Works to Accommodate the New Train Fleet

A new fleet of 115 Class 700 Desiro City trains will be used on the enhanced Thameslink network from 2016. This fleet is being manufactured by Siemens A.G. for Cross London Trains Ltd. Siemens are building two new traincare depots at Hornsey and Three Bridges. The Thameslink Programme are providing connections in to these new depots and building new or extended facilities at a further seven sites around the south east to out-berth the trains. The power supply at several locations south of London and on the south end of the East Coast Main Line is being increased.

KO2 High Capacity Infrastructure

This project includes the commissioning of European Train Control System (ETCS) to support Automatic Train Operation (ATO) between Blackfriars and St Pancras International (low level), operational and control changes, and station enhancements works required to deliver the infrastructure capability for 24 train paths per hour.

Progress in 2013/14

Key Output 1 works

All of the outputs from the projects detailed above in KO1 were completed in 2013/14.

Key Output 2 works

Rail Systems:

- delivered an additional track on the flydown at Tanners Hill improving a capacity constraint on the approaches to London Bridge
- completed a large volume of cable diversions, constructed new cable routes and installed the first two multi track gantries
- delivered the new approaches to the first new platforms at London Bridge
- delivered a turn back facility at South Bermondsey
- commissioned a major new train describer system at London Bridge Area Signalling Centre.

London Bridge Station and Bermondsey Dive-under:

- completed enabling works including utilities diversions in the streets, cable diversions around the station and deconstruction of the old train shed roof
- the first of the old platforms were decommissioned in May 2013. The first new low level platforms (14 and 15) were brought into use on 31 March 2014 when a further two old platforms (12 and 13) were taken out of use for redevelopment
- enabling works undertaken and clearance on the site of the new dive under at Bermondsey.

Canal Tunnels:

- the tunnel fit out has progressed well and trackwork is now installed. Work is underway on the ventilation and electrical systems and has now been connected at the St. Pancras end with the ECML connection planned in 2014.

Infrastructure works to Accommodate the New Train Fleet:

- Brighton stabling facility is ready to be brought into service. At Cricklewood the remodelled north sidings are in use
- completed all five track connections into the new depot at Three Bridges, completed HV cable diversions and completed vegetation clearance on the down side
- at Hornsey two of the three connections have been installed.

Programme ID 12.00 Intercity Express Programme (IEP)

Current Project Stage: Various

In July 2012 the Government confirmed the train order with Agility Trains so the programme remains focused on delivering the infrastructure capability necessary to allow the trains to test and operate on the network and the capacity necessary to support enhanced timetables from mid 2018 onwards. For Network Rail, 2013/14 has been a year of continued development along with the start of implementation works in line with the phased programme developed in 2012/13.

Over the past year the client remit between Network Rail and the DfT has been updated to reflect the required outputs and interfaces now sought, this has resulted in some minor changes of scope coupled with amendments to the published milestones. IEP continues to maintain strong linkages with other infrastructure projects.

Progress in 2013/14

In March 2013, the CP4 Delivery Plan was updated to reflect the phased capability works programme – gauge clearance and station works. A further change was made in December 2013 to include some of the start on site details for the various projects.

Capability works will continue to be implemented in phases from early 2015 through to late 2017 in line with the train delivery schedule. This takes account of testing in 2015/16 and the introduction into passenger service in 2017/18. During 2013 the Government confirmed that a full fleet of Hitachi Super Express Trains would be ordered for the ECML and these deliveries will now start in summer 2018 and run into 2019. The development and implementation timescales of the specific capacity works on GWML remain unchanged, with completion by December 2017 for the May and December 2018 timetables.

Programme ID 12.01 Great Western Main Line

Current Project Stage: GRIP 3-6

The majority of the work in 2013/14 continued to be focused on gauging and technical interfaces between the train design and the infrastructure. Other development works have also taken place on the stations portfolio along with the capacity schemes at Worcester Henwick and Bristol Parkway.

Capability works

Gauge clearance GRIP 3 work is continuing. GRIP 3 for known sites was completed in February 2013. Improved asset information is such that the number of placeholders in the gauging database have been reduced without the need for physical surveys. The project continues to integrate clearance works with other projects and a number of 'foul' locations were removed during 2013/4 works in the Reading and Crossrail areas. The project team has also developed an integrated gauge clearance approach on the GWML to cater for the many projects that need to undertake clearance work during CP5 (Electrification, IEP, Crossrail, EMU and DMU capability works).

Platform extension GRIP 3 Approval in Principle (AiP) was completed in November 2013. Platform extension works are limited to four stations: Didcot Parkway, Swindon, Westbury and Cheltenham. However, First Great Western and the DfT requested that additional studies at three further locations be undertaken and these studies will conclude in 2014. The remaining stations scope relates to selective door opening studies and joint risk assessments with the franchisee. Stations work has now gained investment authority to implement all the agreed scope in three main packages. This includes integrating two of the four stations (Didcot Parkway

and Swindon) into the GWML Electrification Programme.

During 2013/4 the IEP works in the Paddington area have moved into the detailed design phase, though the main focus has been on the Hitachi North Pole Depot connection works.

The development of the AiPs necessary for the OLE upgrade between Acton and Stockley has started. This scope of work has been incorporated into the wider Paddington to Stockley OLE performance improvement project.

Capacity works

The Bristol Parkway project was delayed in 2013/14 so that the necessary resources could be devoted to the more time critical Dr Days Junction to Filton Abbey Wood project. This has resulted in a one year delay to the completion of GRIP 4. This delay will not impact the delivery timescales and the project will still complete in late December 2017. This delay was all part of the wider development of an integrated approach to the portfolio of CP5 projects in the greater Bristol area. During 2013 the project was able to agree the options to be taken forward with all the key stakeholders and these options were fed into the route wide December 2019 timetable modelling work undertaken.

A new capacity project was started in 2013 – Worcester Henwick. This scheme will enable an enhanced timetable to operate from London to Worcester City Centre (Foregate Street station) without the need for unnecessary empty stock moves to and from Great Malvern. In addition this project also acts as an enabler for improved services from Birmingham to Malvern and Hereford.

Other works

Network Rail continues to provide technical support to the emerging train design and its interface with the infrastructure. This work will continue through the detailed design phase of the train. These cover aspects including: wheel/rail interface, acceleration curve, bridge resonance, and traction power changes on the move. The bridge resonance study completed GRIP 3 in the summer of 2013 and works are only required to two structures across the IEP network.

During 2013/14 we also undertook some work with the franchisee on platform height and stepping distances. Once the final train design is agreed Network Rail, the DfT and the franchisee can determine if any physical works are required.

Table 6.8: Milestones for ID 12.01

Activity/Output	*Date*	*Date Met/Expected*
GRIP 3 complete – Gauge Capability Works, Single Option Selection – Non Core Routes	n/a	September 2014
GRIP 3 complete – Stations Capability Works, Single Option Selection	April 2012	November 2013
GRIP 3 complete – Technical Capability Works, Single Option Selection	April 2012	March 2014
GRIP 3 complete – Bristol Parkway Capacity Works, Single Option Selection	n/a	August 2014
GRIP 3 complete – Worcester Henwick Capacity Works, Single Option Selection	June 2014	June 2014
GRIP 4 complete – Gauge Capability Works, Complete Single Option Development - All Routes	December 2012	June 2015
GRIP 4 complete – Stations Capability Works, Complete Single Option Development	December 2012	December 2014
GRIP 4 complete – Bristol Parkway Capacity Works, Complete Single Option Development	April 2013	December 2014
GRIP 6 start – Capability Works, site works commence	December 2013	December 2013
GRIP 6 complete – Gauge Capability works (Hitachi test routes)	March 2015	March 2015
GRIP 6 complete – Gauge Capability works (mainline routes)	June 2016	June 2016
GRIP 6 complete – Stations Capability works (mainline routes)	December 2016	December 2016
GRIP 6 Complete – Provision of 125mph OLE Acton to Stockley	Spring 2017	Spring 2017
GRIP 6 complete – Capability Works (all other works)	June 2017	June 2017
GRIP 6 Complete – Bristol Parkway Capacity Works	December 2017	December 2017

Programme ID 12.02 IEP ECML

Current Project Stage: Various

Gauge Capability – GRIP 3 was completed on time. 163 sites have been identified that require infrastructure works to provide clearance to IEP. GRIP 4 outline design has commenced.

All milestones associated with the clearance of the test route have been achieved.

Station Capability Phase 1 – platform extensions have been completed at Peterborough, Grantham, Wakefield Westgate and Newark Northgate. The remaining platform extensions will be completed by April 2015.

Station Capability Phase 2 – feasibility studies have been completed for identified stations in LNE and Scotland. Anglia platforms have been de-scoped by the DfT. Further work on Phase 2 is on hold pending a decision from the DfT.

OLE alterations – an additional option in GRIP 3 to examine return screening conductor has led to revised interim milestones. The GRIP 6 completion date remains as planned. The Anticipated Final Cost (AFC) has reduced due to a reduced scope and investment authority received to GRIP Stage 5.

Table 6.9: Milestones for ID 12.02: OLE

Activity/Output	*Date*	*Date Met/Expected*
GRIP 4 complete: OLE Capability Complete Single Option Development	August 2012	December 2014
GRIP 6 start: OLE Capability Site works commence	August 2013	December 2015
GRIP 6 complete: OLE Capability Complete and ready for IEP operation	August 2017	August 2017

Table 6.10: Milestones for ID 12.02: Gauge Capability

Activity/Output	*Date*	*Date Met/Expected*
GRIP 3 complete – Gauge Capability Complete Single Option Selection	Complete	January 2014
GRIP 4 complete (test route only) – Gauge Capability Complete Single Option Development	Complete	September 2013
GRIP 4 complete – Gauge Capability Complete Single Option Development	October 2013	May 2015
GRIP 6 start (test route only) – Gauge Capability Site works commence	Complete	January 2014
GRIP 6 start – Gauge Capability Site works commence	August 2014	June 2015
GRIP 6 complete (test route only) – Gauge Capability Complete and ready for IEP operation	September 2014	September 2014
GRIP 6 complete – Gauge Capability Complete and ready for IEP operation	August 2017	August 2017

Table 6.11: Milestones for ID 12.02: Station Capability

Activity/Output	*Date*	*Date Met/Expected*
GRIP 4 complete: Station Capability Phase 1, Complete Single Option Development	Complete	April 2012
GRIP 3 complete: Station Capability Phase 2, Complete Single Option Selection	June 2013	August 2014
GRIP 4 complete: station capability Phase 2, Complete Single Option Development	June 2014	April 2015
GRIP 6 start: Station Capability Site works commence	Complete	April 2013
GRIP 6 start: Station Capability Phase 2. Site work commence	June 2015	August 2016
GRIP 6 complete: Station Capability Complete and ready for IEP operation	August 2017	August 2017

Programme ID 12.03 IEP – ECML Traction Power Supply Upgrade (PSU)

Current Project Stage: GRIP 5-8

Progress in 2013/14

In 2013/14, the following works were delivered:

Phase 1 – during 2013/14, the project completed a multidisciplinary outline design, undertook traction power system modelling, produced the detailed project estimate, undertook significant stakeholder engagement, obtained an Interim Statement of Safety Verification for Railways and Other Guided Transport Systems (ROGS), agreed the safety case, procured long lead items and completed a suite of surveys. The project also completed the necessary commercial and procurement workstreams to identify a partner to enter into a strategic alliance. GRIP 5-8 authority was obtained from the Network Rail Board in October and the ORR undertook a review of the whole project as part of the CP5 Enhancements Cost Adjustment Mechanism (ECAM) process in January 2014.

National Grid Feeder Stations – development of the project continued, including obtaining planning permission for the National Grid site at Ryhall. The combined project team undertook a breaking ground event in December 2013 at Essendine. Modifications to the existing 400kV supply point at Corey's Mill (Wymondley for National Grid) are required.

Ardsley feeder station – a new 25kv traction supply transformer and additional feed from the Distribution Network Operator were successfully installed and commissioned meeting all project milestones.

ECML PSU – Wood Green to Bawtry. Traction power modelling confirmed that the traction power supply on the ECML is currently at capacity and cannot support the proposed electric train services for the IEP and Thameslink Key Output 2. Upon completion, this project will supply sufficient traction power for all electric passenger and freight requirements with capacity headroom on the ECML between King's Cross and Doncaster. The scope of the project includes the provision of 22 new substations, 260 kilometres of 48 core fibre optic cable for protection and control, 90 new portal structures, 90 kilometres of new HV cable route, 230 kilometres of new return screen conductor (and corresponding return conductor removal), removal of c.200 booster transformers, 920 new locations for cross track bonding (c.12,000 new bond connections), removal of four neutral sections, two new neutral sections, 250 kilometres of new fibre optic cable for digital communications over the Fixed Telecoms Network (FTN) and an increase of the Firm Service Capacity (FSC – the agreed level of power the Distribution Network Operator provides Network Rail at each feeder station) at five distribution network operator supply points.

Table 6.12: Milestones for ID 12.03: National Grid 400kV Feeder Stations

Activity/Output	*Date*	*Date Met/Expected*
GRIP 3 Complete Single Option Selection	July 2011	July 2011
Contract with DNO Contract with National Grid for connection application	September 2011	September 2011
GRIP 6 start Commence installation	December 2013	December 2013
GRIP 6 complete Commissioning Complete	October 2015	October 2015

Table 6.13: Milestones for ID 12.03: Autotransformer Feeder System Upgrade Wood Green to Bawtry		
Activity/Output	***Date***	***Date Met/Expected***
GRIP 3 Complete Single Option Selection (Following GRIP refresh activity in 2011, there were additional requirements to deliver in GRIP 3, but they did not impact on overall programme timescales. GRIP 3 was completed in March 2012)	October 2011	March 2012
GRIP 4 Complete Outline Design Due to changes in GRIP refresh, GRIP 4 started later in October 2012	October 2012	August 2014
GRIP 6 start Commence installation	November 2013	November 2013
GRIP 6 complete – Corey's Mill to Welwyn (Thameslink requirement) Commissioning complete	May 2015	May 2015
GRIP 6 complete – Wood Green to St Neots Commissioning complete	April 2016	April 2016
GRIP 6 complete – St Neots to Bawtry Commissioning complete	August 2017	August 2017

Table 6.14: Milestones for ID 12.03: Classic System Reinforcement - Ardsley Feeder Station		
Activity/Output	***Date***	***Date Met/Expected***
Ardsley (Leeds – Doncaster) GRIP 3 Complete	Complete	January 2011
Ardsley (Leeds – Doncaster), Contract with DNO Contract with YEDL for connection agreement	Complete	February 2011
Ardsley (Leeds – Doncaster), GRIP 6 start Commence installation	October 2013	October 2013
Ardsley (Leeds – Doncaster), GRIP 6 complete Commissioning complete	March 2014	March 2014

Programme ID 13.00 Crossrail and Reading

Crossrail and Reading began as separate projects, with different objectives and clients. Both projects will provide significant capacity improvements on the Great Western Main Line (GWML). With opportunities to share access time and resources during implementation, a single Crossrail and Reading Programme team was established to deliver these two important schemes in the most effective way benefiting from those synergies.

With the emergence of other GWML Network Rail projects including Electrification and IEP during CP4 the Crossrail and Reading programme teams now sit within a wider Wales and Western team working to deliver the full GWML upgrade.

Programme ID 13.01 Crossrail

Current Project Stage: GRIP 5 for majority of projects

Crossrail, which is partly funded by Network Rail, links Maidenhead and Heathrow Airport in the west with Shenfield and Abbey Wood in the east. It includes 23 kilometres of sub-surface railway tunnelled beneath the centre of London.

Network Rail is delivering the on network works (ONW) for Crossrail Limited (CRL), who in turn is delivering the project for the joint sponsors, TfL and the DfT. The ONW comprises enhancements to the existing railway network, on either side of the central tunnels, necessary to deliver the timetable and performance levels required by the joint sponsors.

The requirements on Network Rail are set out in the Network Rail Client Requirements which also incorporates the On Network Functional Requirements. Within these documents CRL sets out the infrastructure capability which is needed to operate the Crossrail train service described within their access option.

Network Rail is also delivering various directly cash funded works for CRL. These are enabling works necessary to support the commencement of tunnelling (for example the relocation of equipment cases at the portals) and are not included in the outputs given in the Delivery Plan.

Scope of works

The ONW comprise the following infrastructure enhancements along 76 kilometres of existing railway:

- platform extensions at a number of stations from Maidenhead to Abbey Wood and Shenfield to cater for 205 metre long electric trains
- improvements at stations to cater for the increased numbers of passengers as well as step free access at a number of stations
- a new station at Abbey Wood
- doubling the capacity of Stockley Viaduct at Airport Junction to improve access to Heathrow Airport
- providing a grade separated junction at Acton
- other operational improvements including freight loops and turn back sidings to support the timetable.

Progress in 2013/14

In 2013/14, the following works were delivered:

- all major work packages are now beyond GRIP 4 except for some telecoms systems, staff accommodation buildings at Gidea Park, Shenfield, and Maidenhead, junction lighting in the North East and Shenfield track layout
- GRIP Stage 4 design for the traction power supply upgrade has been substantially completed and is now in the procurement phase for detailed design and construction
- a revised track layout in the London end of Shenfield has been agreed by all stakeholders to enable GRIP Stage 4 completion of this project in September 2014
- work is now underway at five major Crossrail sites: Old Oak Common, Acton, Stockley and Maidenhead on the West, and Abbey Wood on the Southeast
- a 'staged' GRIP Stage 5 detailed design has commenced for the new overhead line electrification between Stockley Airport Junction and Maidenhead
- a new entrance to Acton Yard was successfully commissioned over Christmas 2013, the eastern half of the dive-under has been completed and the western section is on programme
- track lowering activities have commenced in West outer area to facilitate OHL electrification at a later date
- at Old Oak Common various track and signalling alterations have been completed as part of the wider remodelling to enable construction of the dedicated Crossrail lines
- a new Network Rail maintenance compound has been constructed at North Pole to allow migration away from the existing site at Old Oak Common
- enabling works for the track slew of the North Kent Line and the interim station at Abbey Wood have commenced
- successful delivery of the Easter 2013 works on the west improved stakeholder confidence in the programme's ability to manage the works during a Christmas 2014 blockade
- an extensive programme of works took place over the Christmas 2013. These included:
    - OLE works and resignalling at Old Oak Common and Paddington Approaches
    - installation of new points at Acton section
    - track and OLE works at Stockley, shortening of the Dawley goods loop and installation of a crossover at East of Hayes
    - resignalling at West Drayton (including the Colnbrook branch line)
    - installation of undertrack crossings at Taplow, Ruscombe and Farnham Road
    - the demolition and rebuild of Platform 5 at Maidenhead Station
- the majority of these works were successfully completed and handed back on time, however the Main Line possession overran by just under two hours causing 4,397 minutes delay and 97.5 cancellations (including trains which terminated before their scheduled final destination). A full investigation into the overrun was carried out, with the involvement of the TOCs. The findings of the investigation were used to improve delivery plans for the Easter 2014 blockade
- following the January 2014 floods, the Crossrail team at Maidenhead worked with the Reading delivery unit, Maintenance, contractors, TOCs and FOCs to undertake major repair work to bring the railway back in to service in under five days
- works took place during Easter 2014 possessions:
    - West Outer – track works commenced at a new site in the West Drayton area
    - West Inner Track and Infrastructure (WITI), Acton and Stockley – the new western flyover bridge at Stockley was pushed into position in April 2014,there will be a continuation of track and civil works throughout 2014
    - Acton – there was the continuation of piling and construction of western dive-under
    - Paddington to Old Oak Common – North Siding (FGW depot) bi-directional operation was installed

    - Southeast section – the demolition of Abbey Terrace was commenced
- a further five major GRIP 5-8 contracts have been let:
    - West Inner Track Infrastructure
    - Old Oak Common & Paddington Approaches
    - Stations West
    - OLE West
    - Northeast scope (excluding Signalling).

Milestones in the year

The remaining GRIP 5-8 contracts for Signalling, Traction Power and Telecoms are being let in several stages between April 2014 and April 2015.

Table 6.15: Milestone for ID 13.01

Activity/Output	*Date*	*Date Met /Expected*
Award of remaining GRIP 5-8 Contracts	October 2013	6 let with remaining Signalling, Traction Power and Telecoms contract by April 2015
GRIP 4 completion of all remaining work packages	December 2013	Major work packages completed – December 2013 Full completion – September 2014

Programme ID 13.02 Reading Station Area Redevelopment and Southern Platforms

Current Project Stage: GRIP 6

Reading station area redevelopment is designed to deliver significant capacity and performance improvements throughout the area for GWML, CrossCountry passenger trains and freight services. The southern platform project is an integral part of the redevelopment project and is required to support the proposed plan to operate twelve-car services on the Waterloo lines.

Outputs require a minimum of four additional train paths per hour in each direction, six additional platforms (five new, one brought back into use), bringing 125 per cent improvement in through line platform capacity and associated performance or delay minute improvements.

Scope of works

The programme will deliver the following works:

- a new Thames Valley signalling centre replacing Reading signal box
- new platforms and platform extensions
- a new train maintenance facility replacing existing facilities
- grade separation to allow trains to cross the GWML
- extensive track layout reconfiguration and resignalling throughout the area
- provision for possible future extension of Crossrail and the introduction of access from the west to Heathrow Airport.

Progress in 2013/14

In 2013/14, the following works were delivered:

- station main works – commissioning of western gateline, new transfer deck, subway, new relief line for Platforms 12 to 15, and northern entrance building. Complete in 2013
- relief lines east remodelling was completed in 2013
- relief lines west and temporary/final depot connections will be done in two phases: Key Output 3 (January 2015) and Key Output 4 (April 2015)
- southern tunnel civils works was completed in 2013
- decommissioning of the existing footbridge was completed 2013.

Programme ID 13.03 Reading Station Southern Platforms

Current Project Stage: Project Completion

This project encompassed:

- a new south side platform and platform extensions for Waterloo line services
- additional bridge span over Vastern Road.

Programme ID 14.00 Birmingham New Street

Current Project Stage: GRIP 6

The redevelopment of Birmingham New Street station will upgrade the station to provide greater capacity for passenger handling to the year 2035 and enhanced station facilities. The project is jointly funded by Network Rail, Advantage West Midlands, Birmingham City Council (BCC), Centro and the DfT, with BCC as client.

Progress in 2013/14

In 2013/14, the following works were delivered:

- fit-out of new western concourse completed, including new lifts and escalators
- extensive public communications campaign undertaken raising awareness of new passenger access routes from Phase 1 completion
- Phase 1 ‘switchover’ completed successfully in April 2013, followed by closure of former concourse area

- the programme of platform upgrades is continuing
- façade installation largely completed on the northern side of the station
- main structure of new John Lewis store and multi-storey car park substantially completed
- installation of supporting structure for atrium roof progressing
- construction of new vertical circulation (concourse-platforms) for Phase 2 progressing.

Milestones in the year

Phase 1 completion achieved, April 2013.

Programme ID 15.00 Southern Platform Lengthening

Programme ID 15.20 Package 0: Twelve-car Capability on the Tilbury Loop and Ockendon Branch

Current project stage: GRIP 7

This project had a delivery plan milestone of project implementation by December 2011 which it successfully met.

The scope of the project was to deliver the necessary infrastructure to allow the operation of twelve-car trains on the Tilbury Loop and Ockendon branch.

This required platform extensions and associated signalling, track, power supply and level crossing works at the following stations:

- Pitsea
- Stanford le Hope
- East Tilbury
- Tilbury Town
- Grays
- Ockendon
- Purfleet
- Rainham
- Dagenham Dock.

Progress in 2013/14

All physical works (including snagging) complete.

Programme ID 15.21 Package 1: Cambridge Island Platform

Current project stage: GRIP 7

This project had a delivery plan milestone of project implementation by December 2011 which it has successfully met.

This scope of the project was to deliver the necessary infrastructure to allow operation of twelve-car trains on the West Anglia route between Cambridge and Liverpool Street, based on Class 317 new rolling stock.

Progress in 2013/14

Specialist remedial works to footbridge glazing and alterations to platform train dispatch equipment requiring changes to the signalling system remain outstanding. Neither issue affects the operation of station services.

All assets (except remedial items above) have been handed back to asset owners.

Programme ID 15.22 Package 11: West Anglia Outer Twelve-car Trains

Current project stage: GRIP 8

This project had a delivery plan milestone of project implementation by December 2011 which it successfully met.

This project has allowed twelve-car operations on the West Anglia route between Cambridge/Stansted Airport and Liverpool Street, based on Class 317 vehicles and new rolling stock.

This required platform extensions and associated signalling, track, and power supply works at the following stations:

- Broxbourne
- Cheshunt
- Sawbridgeworth
- Stansted Mountfitchet.

The following stations have platforms that have not been extended, but have been made capable of being served by twelve-car trains that have selective door operation fitted:

- Roydon
- Harlow Mill
- Elsenham
- Newport
- Great Chesterford
- Shelford.

Progress in 2013/14

All assets have been handed back to asset owners. The project is now fully complete.

Programme ID 15.23 Package 4: Gravesend

Current Project Stage: GRIP 7-8

Highlights of this programme:

- remodelling of Gravesend station to accommodate twelve-car operation including a new platform, platform extensions and extensive track and signalling alterations
- provision of Access for All footbridge and lifts.

Progress in 2013/14

In 2013/14, the following works was achieved:

- works commenced on site during May 2013
- the new footbridge was installed during November 2013
- the old footbridge has been donated to a heritage railway
- the station was remodelled within a 15-day blockade over the Christmas/New Year period.

The project achieved the delivery milestone (infrastructure ready for use) for twelve-car operation on 6 January 2014.

Programme ID 15.24 Package 15: Kent Driver Only Operation Stations

Current Project Stage: GRIP 7-8

Platform lengths for twelve-car trains have been provided on all suburban routes from Charing Cross and Cannon Street with the exception of Woolwich Dockyard station and stations east of Gravesend.

Progress in 2013/14

GRIP 7 has been concluded with the assets handed over to maintenance.

Programme ID 15.25 Package 18: Charing Cross Station

Current Project Stage: GRIP 7-8

Platform extensions and associated infrastructure alterations to Platforms 1, 2 and 3 at Charing Cross station.

Progress in 2013/14

GRIP 7-8 is in progress.

The final scope was delivered in 2012/13.

Programme ID 15.26 Package 8: Kent and Sydenham Train Lengthening

Current Project Stage: GRIP 7-8

Our obligation was to provide the necessary infrastructure to facilitate the operational plan assumed with train operators to deliver agreed capacity metrics. The assumed operational plan is described further in route plans.

Highlights of this programme are the platform extensions and/or associated infrastructure alterations to 74 platforms and one siding, providing ten-car capable infrastructure on the Sydenham Corridor and twelve-car capable infrastructure on the Kent metro routes.

Progress in 2013/14

The project achieved the delivery milestone (infrastructure ready for use) during September 2013 and an interim completion report has been produced.

The final scope was delivered in 2011/12 on the Sydenham corridor to accommodate ten-car trains in time for the December 2011 timetable change.

The final scope was delivered in 2013/14 for all other Kent routes to accommodate twelve-car trains in time for introduction on 6 January 2014.

Programme ID 15.27 Package 2: East Grinstead Station

Current Project Stage: Project Completion

The scope of the project was to deliver the necessary infrastructure to allow operation of twelve-car trains at East Grinstead station in time for the December 2011 timetable change.

Programme ID 15.28 Package 16: East Grinstead Line

Current Project Stage: Project Completion

This project had a delivery plan milestone of project implementation by December 2011 which it has successfully met.

The project's scope was to deliver the necessary infrastructure to allow operation of twelve-car trains on the East Grinstead line in time for the December 2011 timetable change. This required platform extensions and associated signalling, track and power supply works at the following stations:

- Sanderstead
- Oxted
- Upper Warlingham.

Programme ID 15.29 Package 3: Ten-car Sussex Suburban Railway

Current Project Stage: GRIP 5

The scope of this project is to deliver necessary infrastructure works to accommodate ten-car train operations on suburban routes from London Victoria and London Bridge. This will require platform extensions and associated signalling, track and power supply works at the following stations:

- Wandsworth Common
- Balham
- Streatham Common
- Norbury
- Thornton Heath
- Selhurst
- Waddon
- Wallington
- Sutton
- Epsom Downs
- Streatham Hill
- Gipsy Hill
- Carshalton
- Cheam
- Mitcham Eastfields.

Progress in 2013/14

In 2013/14 all implementation works were completed and all stations were successfully handed back. Ten-car Southern services commenced as planned.

This project had a committed delivery plan milestone of project implementation by December 2013 and was successful delivered in November 2013 enabling the ten-car timetable to commence on programme.

Programme ID 15.30 Package 17: Battersea Park Station

Current Project Stage: GRIP 8

The scope of this project was to deliver necessary infrastructure works to accommodate ten-car train operation on Platform 3 at Battersea Park station.

Progress in 2013/14

In 2013/14, the following was delivered:

- detailed design completed
- Station Change and Network Change established
- infrastructure works completed and handed back to maintenance
- platform in operation, with ten-car trains now calling at Platform 3.

The committed delivery plan milestone of project implementation was met in December 2013.

Programme ID 15.31 Package 7: South West Suburban railway

Current Project Stage: GRIP 6

The scope of this project was to deliver necessary infrastructure works to accommodate ten-car train operations on the Wessex route into London Waterloo. This required platform extensions and associated signalling, track and power supply works to 93 platforms at 48 locations.

Progress in 2013/14

In 2013/14 all platforms extensions (excluding Strawberry Hill, Kingston, Earlsfield and Effingham Junction sidings were complete and all remaining stations were completed in June 2014.

Programme ID 15.32 Package 9: Windsor Line

Current Project Stage: GRIP 8

The scope of this project was to deliver necessary infrastructure works to accommodate ten-car trains on routes between London Waterloo to Windsor and Eton Riverside, and also at Clapham Junction for services between London Victoria and Sutton/Epsom Downs via Norbury.

This required platform extensions, associated signalling, track and power supply works at the following stations: Windsor and Eton Riverside, Staines, Ashford (Middlesex), Whitton, Twickenham, St Margarets, Richmond, North Sheen, Mortlake, Barnes, Putney, Wandsworth Town, Clapham Junction (Platforms 3 and 4), Queenstown Road, Vauxhall and Clapham Junction (Platforms 14 and 15).

Progress in 2013/14

In 2013/14, the following works were delivered:

- all detailed design, construction, testing and commissioning completed for all stations on the Windsor line
- detailed design and installation completed at Clapham Junction Platforms 14 and 15.

Programme ID 15.34 Wessex Automatic Selective Door Opening (ASDO)

Current Project Stage: GRIP 6

The project is part of an overall programme to deliver increased capacity on both the Windsor and suburban lines into London Waterloo by the end of CP4. There are some locations on the Windsor suburban routes where the cost of extending platforms to allow ten-car trains to call would be prohibitive or offer poor value for money. This project will install radio frequency identification tags within four feet of each platform to allow for automatic train door opening.

Progress in 2013/14

All remaining beacons were installed by April 2014.

Table 6.16: Milestones for ID 15.32

Activity/Output	*Date*	*Date Met / Expected*
Windsor Line – GRIP 6 Commence	March 2011	March 2011
Windsor and Eton Riverside, Ashford (Middlesex), Whitton, Mortlake and Vauxhall – GRIP 6 Complete	December 2011	December 2011
Putney, Barnes, Twickenham, St Margarets, North Sheen, Wandsworth Town, Richmond, Staines, Clapham Junction (3 and 4)	March 2013	March 2013
Queenstown Road	March 2013, change controlled to July 2013	July 2013
Clapham Junction (14 and 15)	December 2013	December 2013

Programme ID 16.00 Power Supply Upgrade

Programme IDs 16.01, 16.03 & 16.04 Routes 1, 2 and 3 Power Supply Enhancements

Current project stage:

- GRIP 4-8 for Kent (Phase 1)
- GRIP 4-8 for Kent (Phase 2 and 3)
- GRIP 6 for December 2013 scope for Sussex
- GRIP 6 for Wessex scope.

Completion will enable longer trains and different rolling stock to operate on the network in Wessex, Sussex and Kent drawing increased quantities of traction power from the DC third rail system. The programme relates to train lengthening proposals agreed with the DfT for the period to the end of CP4.

Progress in 2013/14

In 2013/14 the following was delivered:

- completion of infrastructure to enhance traction power capability in Sussex in December 2013
- in Kent, infrastructure enhancement is the preferred option. The traction power requirements are being delivered in a phased approach: Phase 1 to accommodate a limited twelve-car operation during 2013/14, Phase 2 for the flexibility to operate twelve-car services during the London Bridge high level construction works from December 2014, and Phase 3 enabling twelve-car operations when Kent and Sussex timetable is recast following Thameslink implementation
- in Wessex the milestone date was change controlled to align with the train lengthening date (July 2014). Infrastructure is ready for use at two sites and the delivery of infrastructure to enhance traction power capability in scheduled for July 2014.

Progress to final delivery

Completion of project and financial close out in Sussex.

In Kent the delivery of Phase 1 was achieved to accommodate the introduction of longer trains on 6 January 2014 to meet Southeastern's requirements.

The design and build contract has been awarded for the implementation of Phases 2 and 3.

In Wessex the six remaining sites are nearing completion and are scheduled to meet the milestone.

Programme ID 16.02 Route 1 New Cross Enhancement to Power Supply

Current Project Stage: GRIP 5

This project supports an increase in capacity of the network through an enhanced power availability allowing the HLOS capacity metric to be achieved in south London, north Kent and Surrey.

The project is to modify and extend National Grid's 275kV substation at New Cross to provide a replacement to the existing 66kV railway power supply feeds which will be decommissioned.

Progress in 2013/14

In 2013/14, the following works were delivered:

- all procurement of free issue equipment complete and the main design and build contractor has been appointed
- during detailed design it has been discovered that the previous GRIP4 studies completed was not a viable solution for construction. This has meant that further studies are necessary and construction may now include the boring of a tunnel
- as a result of delays in National Grid completing the necessary consents to demolish an existing building construction may not commence until early 2015
- commission of supply now likely to be March 2017.

Programme IDs 16.05, 16.06 and 16.07 Routes 5, 6 and 7 Power Supply Enhancements

Current project stage: Project Completion

This project had a delivery plan milestone of project implementation by December 2011 which it successfully met.

This project delivered enhancements to existing traction power supply infrastructure required to facilitate the operational plan assumed with train operators for delivery of the agreed CP4 capacity metrics.

In summary, the capacity metrics for CP4 required additional and lengthened rolling stock on each of the routes, as well as the introduction of new Class 379 rolling stock on Route 5.

Programme IDs 16.08 DC Regeneration

Current project stage: GRIP 6

This project is to enable rolling stock to operate with regenerative braking on all DC routes in Wessex, Sussex and Kent.

The scope of works encompasses the modification of circuit breakers, transformer settings and other equipment to allow regenerative braking.

DC regenerative braking is now in use within Wessex, Sussex and Kent routes and no further work is required to meet the obligation.

The project will also increase the nominal system voltage to 750V across the three routes, which marginally increases the available traction supply capacity.

In Wessex where power is supplied to London Underground Limited (LUL) rolling stock, segregation of Waterloo and City Line power supplies is required to allow older LUL stock to continue to operate reliably.

Segregation is not proposed for the District line since it is not considered viable and since older stock will be removed by December 2016.

Until LUL remove older non compatible stock from the District and Circle lines, the maximum regenerative capability for South West Trains will remain limited to 810V.

The project will also modify circuit breakers and raise traction supply outputs on all inner London routes to 750V DC nominal in Wessex, Sussex and Kent. This will be completed in two parts:

- Phase 1 – all inner London traction supply outputs, other than the areas surrounding the LUL District line interfaces at Richmond and Wimbledon, were completed by March 2014
- Phase 2 – the remaining inner London traction supply outputs will be increased once the LUL rolling stock change programme has completed in December 2016.

Progress in 2013/14

In 2013/14, the following works were delivered:

- completion of segregation of the Waterloo and City Line power supplies
- completion of infrastructure works in Kent to enable voltage raising
- completion of Phase 1 voltage raising.

Agreement in place with South West Trains regarding train software changes to enable operation greater than 810V.

Table 6.17: Milestones for ID 16.03: (Sussex)

Activity/Output	***Date***	***Date Met/Expected***
Sussex Substations & Feeder	Dec-13	Dec-13

Table 6.18: Milestones for ID 16.04: (Wessex)

Activity/Output - Other Routes	***Date***	***Date Met/Expected***
Hounslow Loop / Hounslow – Staines - GRIP 6 Infrastructure ready for use	Jun-13	Jun-13
Weybridge via Chertsey/Hampton Court Junction to Guildford via Cobham - GRIP 6 Infrastructure ready for use	Jul-14	Jul-14

Table 6.19: Milestones for ID 16.05

Activity/Output	***Date***	***Date Met/Expected***
GRIP 6 completion and assets into service	Dec-11	Oct-11

Table 6.20: Milestones for ID 16.06

Activity/Output	***Date***	***Date Met/Expected***
GRIP 6 completion and assets into service	Dec-11	Dec-11

Table 6.21: Milestones for ID 16.07

Activity/Output	***Date***	***Date Met/Expected***
GRIP 6 completion and assets into service	Dec-11	Dec-11

Table 6.22: Milestones for ID 16.08

Activity/Output – Phase 1	***Date***	***Date Met/Expected***
GRIP 6 commences	February 2013	April 2013
GRIP 6 complete	March 2014	March 2014
Activity/Output – Phase 2	***Date***	***Date Met/Expected***
GRIP 6 commences	February 2017	February 2017
GRIP 6 complete	August 2017	August 2017

Table 6.23: Route 5 : West Anglia Main Line	
Location	***Scope***
Northumberland Park	Increased Firm Service Capacity (FSC) to 18.5 MVA
Rye House	Increased FSC to 16.5 MVA
Ugley	Increased FSC to 6 MVA
Milton	Increased FSC to 12.5 MVA

Table 6.24: Route 6: Thameside	
Location	***Scope***
West Ham	Increased FSC to 14 MVA
Southend Central	Increased FSC to 14 MVA

Table 6.25: Route 7: GE Main Line	
Location	***Scope***
Hill House	Neutral section and associated 25kV cabling and substation installed.
Hythe	Substation extension and associated neutral section works installed.
	New 25kV supply circuit from UKPN installed.
	Increased FSC to 13 MVA
Rayleigh	Upgraded existing 25kV supply circuit from UKPN.
Springfield	Increased FSC to 18 MVA
Stowmarket	Increased FSC to 10 MVA

Programme ID 17.00 Southern Capacity

Programme ID 17.01 Gatwick Airport Remodelling and Passenger Capacity Scheme

Current Project Stage: GRIP 7

The project has delivered improved performance, reduced journey times and removal of the existing capacity constraint at Gatwick caused by the Gatwick Express services crossing four running lines every 15 minutes. Passenger congestion will be reduced and accessibility improved. The signalling interlocking has also been renewed.

These outputs have been achieved through the construction of a seventh platform at Gatwick Airport, with associated track and signalling, to accommodate the move of the Gatwick Express services from the slow line platforms. Enhancements were also made to the passenger facilities on Platforms five and six to improve passenger circulation and access to and from the station concourse. Full accessibility has been provided onto the new platform via a new walkway linked into the existing concourse.

Progress in 2013/2014

GRIP 6 works were completed in January 2014 and the new platform has been in operational use from 10 February 2014, following the opening of the new Platform 7 by Baroness Kramer on 3 February 2014.

Milestones in the year

Completion of GRIP 6 in January 2014.

Programme ID 17.02 East Croydon Passenger Capacity Scheme

Current project stage: GRIP 7

The station capacity has been improved by the delivery of a mid-platform dispersal bridge that redirects passengers requiring the town centre and office district away from the existing congested concourse and associated access ramps. It has done this by providing a second entrance to the west of the station. The bridge has also provided level access between platforms via lifts and remodels the existing station concourse to improve pedestrian flows into the town centre.

Progress in 2013/14

GRIP 6 works were completed in December 2013 and the new footbridge opened with the new western exit. The footbridge was opened for interchange across the platform in September 2013.

Milestones in the year

Completion of GRIP 6 in December 2013.

Programme ID 17.03 Seven Sisters Station Capacity Improvement Works

Current Project Stage: GRIP 5-8

The proposals were developed with stakeholders to improve passenger flows to and from the overland station platforms. Platform accommodation was removed to improve circulation space and the flow of passengers going to and from Platform 1 was improved by the widening of the access staircase.

Scope of works

Completion of the project required the following:

- relocation of staff platform accommodation
- widening of stairs to Platform 1
- decluttering of Platform 2
- reinstate Birstall Road entrance (to be used on match days and for emergency access)
- improvements to CIS and CCTV
- additional shelter on Platform 1.

Progress in 2013/14

All programme milestones were reached, and the programme was completed in March 2014.

Table 6.26: Milestones for ID 17.03

Activity/Output	*Date*	*Date Met / Expected*
GRIP 3 Stage gate review complete option selection	August 2011	August 2011
GRIP 4 completion outline design	January 2012	February 2012
GRIP 5-8 project completion	December 2013	March 2014

Programme ID 18.00 East Coast Main Line (ECML) Improvements

The following projects and schemes will allow an increase in long distance high speed passenger and freight services as part of a programme of ECML schemes identified in the ECML Route Utilisation Strategy.

Programme ID 18.01 Capacity Relief to the ECML (GN/GE Joint Line)

The project will generate additional passenger train paths on the ECML between Peterborough and Doncaster through the provision of W9 and W10 gauge cleared paths on the GN/GE Joint Line (Peterborough to Doncaster via Spalding and Lincoln), and the upgrade of structures and track to accommodate predicted increase in annual gross tonnage. Additional infrastructure upgrades will be introduced to provide an alternate route for freight with a comparable journey time to that currently achieved through daytime ECML journey timings. Any required level crossing upgrades will be driven by increased traffic and line speeds.

Progress in 2013/14 (access to south end of GN/GE)

This element of the works is now being considered as part of the ECML Connectivity Fund in our CP5 Strategic Business Plan.

Progress in 2013/14 (Route)

In 2013/14, the following works were delivered:

- the previously reported loss of planned access due to freight train diversions following the Hatfield colliery landslip had a significant impact on Q1 and Q2 progress
- a major replanning exercise was carried out and work recommenced in late Q2
- the formal delivery date for this project has been changed by industry consent to November 2014
- appropriate funding arrangements for delivery in CP5 have been established
- revised access requests have been well received by the industry and the detail is being embedded within formal access plans
- track work is now over 90 per cent complete, bridge work over 70 per cent complete and all other ancillary work progressing well to the new base plan
- signalling commissioning for the first phase was completed successfully over Christmas and New Year, with the second commissioning blockade around Sleaford taking over two weeks at Easter 2014. Three more blockades will be taken before December 2014
- local stakeholder liaison continues to bring benefits to the project and local communities, with many shared objectives achieved
- Network Change notices continue to be progressed.

Programme ID 18.02 Peterborough Station Area Capacity Enhancements

Current Project Stage: GRIP 7

The scheme will generate additional passenger train paths on the ECML at Peterborough by segregating East Anglian traffic from the ECML through the development of new island platforms (6 and 7) to the west of the station. East Anglian freight traffic will be accommodated by a 775 metre goods Loop to the west of the station area. 775 metre freight trains will be able to access/egress the Spital Ladder from/to East Anglia will be possible via Platform 5.

Extensions to the existing Platforms 2 and 3 will be provided to accommodate twelve-car Thameslink trains. Extensions to the existing Platforms 4 and 5 will be provided to accommodate Intercity Express Programme trains. Both station bridges will be extended to the new island platform, with step free access being incorporated into the main footbridge to all platforms as part of the Access for All programme.

The rear face of the existing Platform 3 is to be built

out to the Up Fast Line to accommodate southbound long distance high speed services (LDHS) and is funded by the NRDF.

Progress in 2013/14

In 2013/14, the following works were delivered:

- project successfully commissioned and is in operation
- minor snagging works and project close out activities (GRIP 7 and 8) continue to programme.

Programme ID 18.03 Alexandra Palace to Finsbury Park Third Up Line

Current Project Stage: GRIP 7

This project provides for an additional third passenger line in the Up direction (towards London) from Alexandra Palace (leading from the Up Hertford line to the north of Alexandra Place station) through to the top of Holloway Bank. It includes associated platform faces at Alexandra Palace and Finsbury Park stations to allow trains to serve these locations. This allows some Gordon Hill/Hertford to Moorgate inner suburban services to operate independently of outer suburban and long distance high speed (LDHS) services from Alexandra Palace.

Progress in 2013/14

The project was successfully commissioned in December 2013 and infrastructure brought in to use in time for the new December timetable.

The project met its committed delivery plan milestone of completion of GRIP 6 by December 2013.

Table 6.27: Milestones for ID 18.03

Activity/Output	*Date*	*Date Met / Expected*
GRIP 6 complete	December 2013	December 2013

Programme ID 18.04 Finsbury Park – Alexandra Palace Third Down Line Improvements

Current Project Stage: GRIP 7

This project supports the improved use of the Down slow line between Finsbury Park and Alexandra Palace which will allow some Moorgate to Gordon Hill/Hertford inner suburban services to operate independently of other inner and outer suburban and LDHS services south of Alexandra Palace through improved linespeeds.

Progress in 2013/14

The project was successfully commissioned in December 2013 and infrastructure brought in to use in time for the new December timetable.

The project met its committed delivery plan milestone of GRIP 6 completion by December 2013.

Table 6.28: Milestones for ID 18.04

Activity/Output	*Date*	*Date Met / Expected*
GRIP 6 complete	December 2013	December 2013

Programme ID 18.05 East Coast Main Line (ECML) Level Crossings

Current Project Stage: GRIP 8

The project supports the increase in passenger and freight services on the ECML between King's Cross and Northallerton and between Newark Northgate and Lincoln by eliminating, or reducing the safety risks associated with level crossings. Optioneering of all relevant level crossings on these routes has been completed for the anticipated increase in passenger and freight services to assess safety risk. Having completed this analysis, this scheme delivered the following scope:

- Co-Op footpath level crossing has been diverted via a new footbridge
- Ballast Hole footpath level crossing has been replaced by an alternative footpath via a nearby CCTV-controlled level crossing (Doddington Road).

Progress in 2013/14

This project has successfully completed the agreed scope and has achieved its committed delivery milestone of GRIP 6 completion by October 2013.

Table 6.29: Milestones for ID 18.05

Activity/Output	*Date*	*Date Met / Expected*
GRIP 6 complete	October 2013	October 2013

Programme ID 18.06 Hitchin Grade Separation

Current Project Stage: GRIP 7

This project eliminates conflicting passenger train movements at Hitchin on the ECML where the branch line to Cambridge divides from the main line. The conflicts are between trains towards London from the Peterborough direction and passenger trains from London which leave the main line heading towards Cambridge. This removes a major constraint in developing timetables, thereby allowing an increase in LDHS and freight services as part of the overall programme of schemes on the ECML, as well as reducing junction layout risk. This scheme also provides for greater flexibility during maintenance, engineering and operational disruption.

The project consists of a flyover to the north of Hitchin Cambridge Junction from the Down slow to the Down Cambridge line and a Down fast to Down slow crossover immediately north of Hitchin Cambridge Junction.

Progress in 2013/14

This project has successfully completed the agreed scope and is in operation. It achieved its committed delivery milestone of GRIP 6 completion by June 2013.

Minor snagging works and project close out activities (GRIP 7 and 8) continue to programme.

Programme ID 18.07 York Holgate Junction Fourth Line

Current Project Stage: Project Completion

This project has eliminated conflicting movements between Down Leeds line passenger services that operate to the north east and Scotland (typically three per hour) and all other passenger services.

This has also reduced a major constraint in developing timetables on the ECML thereby allowing an increase in LDHS services as part of a programme of ECML schemes as identified in the ECML Route Utilisation Strategy. This programme has allowed an increase in services with an improvement in performance even though more trains would be operating.

This project was successfully commissioned into operational use in December 2011.

Programme ID 18.08 North Doncaster Chord

Current Project Stage: GRIP 5

The project will allow an increase in passenger and freight services on the ECML by removing a significant number of existing freight services between Joan Croft Junction and Hambleton South Junction, and rerouting them via the new chord on a more direct route. This will create greater capacity on this constrained two track section of the ECML whilst at the same time reduce mileage and journey times for the majority of the rerouted freight trains.

Progress in 2013/14

In 2013/14, the following works were delivered:

- design completed
- construction 99.5 per cent completed
- delivery milestone for GRIP 6 completion changed by industry consent to June 2014
- access for final commissioning agreed, with full opening planned for June 2014.

Programme ID 18.10 First Capital Connect Train Lengthening

Current Project Stage: Project Completion

This project had a delivery plan milestone of project implementation by November 2011 which it has successfully met.

The project provided infrastructure enhancement to support the delivery of London HLOS capacity metrics in CP4. The specific requirements are for platform extensions for operation of longer vehicle trains and future Thameslink trains at Letchworth Up and Down platforms, and Royston Down platform. This included, where necessary, the provision of additional driver only operated train dispatch equipment on platforms, and possible relocation of existing equipment.

Programme ID 19.00 East Coast Main Line Overhead Line Electrification Performance Improvements

Current Project Stage: Vegetation Clearance GRIP 7, Crossover Wire GRIP 5 and 6

Scope of works

This project is split into the following distinct elements:

- defect survey – full survey of approximately 1,900 wire runs of the ECML to record all defects, all outstanding campaign changes and any existing non-conformances
- campaign changes – the implementation of eleven campaign changes. This is the removal of components or designs with known reliability problems with a modern fit-for-purpose equivalent
- defect removal – in line with the campaign change delivery, all defects identified as a risk to performance will be removed with highest priorities being delivered first. A separate work stream will be used for tunnels where a non-intrusive survey is not practicable. Extra wire runs will be delivered as part of additional scope to be delivered by the end of CP4
- neutral sections – the upgrade of 78 neutral sections to a more reliable type
- renewal of crossover and contact wire – the renewal of crossover/contact wire between King's Cross and Wood Green
- vegetation – a detailed survey of all areas of critical vegetation with specific regard to OLE will be undertaken. This will be completed in line with the Group Standards for new infrastructure with consideration of future schemes (such as auto-transformer) being considered. This will include clearance back to maintainable boundaries where it is required.

Following completion of the survey, the project identified defect removal/campaign changes to 1,252 wire runs on the ECML from London King's Cross to Marshall Meadows incorporating the Hertford, Cambridge, and Doncaster to Leeds branch lines.

Progress in 2013/14

In 2013/14, the following works were delivered:

- campaign changes completed: 1,252 wire runs
- condition survey completed: 1,927 wire runs
- defects removal completed: 1,252 wire runs
- neutral sections completed: 78 + five maintenance spares
- vegetation clearance completed.

The project is on course to achieve the delivery dates.

Table 6.30: Milestones for ID 19.00

Activity/Output	*Date*	*Date Met / Expected*
Crossover wire, contact wire renewals, defect removal and campaign changes	March 2015	March 2015

Programme ID 20.00 St Pancras – Sheffield Linespeed Improvements

Current Project Stage: GRIP 6/7

Scope of works

This enhanced the capability of the infrastructure to enable a minimum eight minute improvement in journey times between London and Sheffield for Class 222 vehicle operated services calling at Leicester, Derby and Chesterfield.

Progress in 2013/14

In 2013/14, the following works were delivered:

- Network Change established
- 23 crossings closed
- eight footbridges constructed at crossings
- GRIP 4 concluded for all disciplines
- GRIP 5 concluded for all disciplines
- commencement of track discipline GRIP 6 work
- all linespeed improvement areas – signalling commissioning achieved (March 14)
- December 2013 Timetable change achieved
- performance improvement work (removal of temporary speed restrictions) commenced.

However, whilst the December 2013 timetable change date was achieved, some elements of the work associated with the linespeed improvement project were deferred. As a result the train operator has not been able to consistently achieve the projected faster journey times. We are working to complete the necessary work so that the new timetable can operate reliably.

Table 6.31: Milestones for ID 20.00

Activity/Output	*Date*	*Date Met/ Expected*
Late works Commissioning / Timetable Change	December 2013	March 14 / December 2013

Programme ID 21.00 Nottingham Resignalling

Current Project Stage: GRIP 7/8

Scope of works

The project enhanced capacity through remodelling, resignalling and redesign of the platform layout at the west end of Nottingham station. This enhances the layout leading to improved services operating through Nottingham and improved performance. The project also migrated the control of the area into the East Midlands Control Centre at Derby.

Progress in 2013/14

In 2013/14, the following works were delivered:

- completion of all civils works
- post works timetable plan implemented successfully
- all switches and crossings and track work installed on time
- additional platform face commissioned on time
- all signalling work installed and commissioned on time
- footbridges opened
- testing completed.

Milestones in the year

Table 6.32: Milestones for ID 21.00

Activity/Output	*Date*	*Date Met / Expected*
Blockade Starts	July 2013	July 2013
Blockade Completion	August 2013	August 2013
GRIP 6 Completion	January 2014	January 2014

Programme ID 22.00 Midlands Improvement Programme

Programme ID 22.01 Bromsgrove Electrification

Current Project Stage: GRIP 4

This project will increase capacity by extending an existing three trains per hour service to Bromsgrove that currently terminate and turn back at Longbridge. The additional services will offer a significantly enhanced frequency for passengers in Bromsgrove. Bromsgrove electrification has a key interface with a third party funded project intended for the relocation and construction of a new Bromsgrove station, a prerequisite for electrification and the extension of

the Cross City line services.

The scope of the project includes:

- extension of electrification from Barnt Green to Bromsgrove
- the existing signalling equipment between Barnt Green and Bromsgrove requires immunisation works which will result in complete signalling renewal and control transfer delivered by the resignalling project
- permanent way and signalling enhancements at the site of the relocated Bromsgrove station to provide adequate infrastructure to turn back trains.

Progress in 2013/14

In 2013/14 the following works were delivered:

- progress on GRIP 3 Option Selection and 4 Option Development Approval in Principle and reference designs. Consultants appointed to undertake the GRIP 3 and 4 engineering development of OLE and track and associated works
- the signalling development undertaken by Network Rail's Signal Design Group (SDG)
- GRIP 3 Timetabling and RailSys draft reports issued. Updated in GRIP 4 and SX timetable produced with on-going consultations with TOCs and FOCs
- bridge reconstruction reference designs were tendered and design build contract awarded to achieve electrification clearances at affected structures
- resignalling GRIP 4 design and recontrol for the route between Kings Norton and Eckington is planned for CP5 including capacity enhancements and incremental improvements in the Bromsgrove area to deliver the required outputs for electrification
- the station scheme obtained planning permission and completed GRIP 4. A design and build contract has been awarded which will include the delivery of two platforms for turning back trains required outputs for electrification.

Table 6.33: Milestones for ID 22.01

Activity/Output	*Date*	*Date Met / Expected*
Start GRIP 4 single option development	April 2013	Aug 2013 (1)
Station re-location agree final option with partners	Nov 2013	Feb 2014 (2)

(1) GRIP 4 commenced August 2013 following completion of the option selection phase. Commissioning date is not impacted.

(2) This date was subject to various consents. Planning permission was obtained in September 2013 and station closure was ratified for the old station by the DfT in February 2014.

Programme ID 22.02 Redditch Branch Enhancement

Current Project Stage: GRIP 5

This programme enables the extension of services on the Birmingham Cross City South to Redditch. Currently London Midland operates six trains an hour to Longbridge with two trains an hour running on further to Redditch. The output is that all services would be extended from Longbridge such that three trains an hour operate to Redditch.

The scope of the project is to deliver a passing loop centred on Alvechurch station involving an additional platform face, 3.2 kilometres of track, OLE and signalling alterations. In addition, the second platform at Alvechurch will require access such as a footbridge to be provided to cross the railway. The project includes the removal of the footpath level crossing at Alvechurch to improve safety and line speed.

Progress in 2013/14

In 2013/14, the following was delivered:

- GRIP 5, detailed design, was progressed
- Network Change established
- design and build contract awarded
- negotiations for an eight week blockade completed
- Development Consent Order process including public examinations and submission of the Draft Order was concluded with the DfT the Order being granted in November 2013
- site works commenced December 2013.

Milestones in the year

The two key milestones were achieved.

Table 6.34: Milestones for ID 22.02

Activity/Output	*Date*	*Date Met / Expected*
Development Consent Order Granted	Nov 2013	Nov 2013
GRIP 6 Commences	Dec 2013	Dec 2013

Programme ID 22.03 Line Speed Improvements Wrexham to Marylebone

Current Project Stage: Project Completion

This output has been delivered by Chiltern Railways, reducing journey time by one minute. It was an integral part of the Evergreen 3 project, which includes linespeed improvements, infrastructure enhancements, and fleet upgrade to deliver a 100 minute fastest journey time between London Marylebone and Birmingham Moor Street. The project was completed in December 2011.

Programme ID 22.04 Route 16 – South Ruislip Loop (formerly Gerrards Cross Bay Platform)

Current Project Stage: Project Completion

This output has been delivered by Chiltern Railways as an integral part of the Evergreen 3 project, which includes linespeed improvements, infrastructure enhancements and fleet upgrade to deliver a 100-minute fastest journey time between London Marylebone and Birmingham Moor Street. Programme 22.04 has contributed towards the delivery of an improved track layout in the Northolt/South Ruislip area allowing slow trains to be overtaken which facilitates more flexible timetable arrangements.

The project was completed in December 2011.

Programme ID 22.05 Route 17 – Train Lengthening

Current Project Stage: Project Completion

The project has supported the industry capacity metric and requirements for train operating companies' operational plans and rolling stock.

Progress in 2013/14

The project was substantially complete by December 2012 and the project close out report was authorised in February 2014.

Table 6.35: Programme ID 22.05: Train Lengthening

Corridor	*Rolling stock*	*Stations (Platforms)*
Stourbridge	DMU Class 150, 170 and class 172 type units in formations no greater than 6 vehicles.	Droitwich Spa (1, 2)
		Kidderminster (1, 2)
		Lye (1, 2)**
		Langley Green (1, 2)
		Cradley Heath (1, 2)
Stratford on Avon	DMU Operational Class 150 and class 172 type units in formation no greater than 6 vehicles.	Wythall (1, 2)
		Spring Road (1, 2)**
		Whitlocks End (1, 2)
		Yardley Wood (1, 2)
Leamington	DMU Operational Class 150 and class 172 type units in formation no greater than 6 vehicles.	Widney Manor (1, 2)
		Small Heath (3, 4)
Cannock	DMU Operational Class 170 type units in formations no greater than 4 vehicles.	Hednesford (1)
		Rugeley Trent Valley (1)

**SDO 6 car, 5 car platforms

Programme ID 22.06 East Midlands Train Lengthening

This scheme has provided additional carrying capacity on East Midlands routes by operating longer passenger trains. This required platform lengthening to accommodate ten Class 222 vehicle trains at Loughborough and four Class 170 vehicle trains at Stansted Airport. Additionally this project has allowed the full passenger carrying capacity of all trains stopping at Loughborough to be utilised.

Loughborough platform extension

This part of the project was delivered February 2012.

Stansted Airport

This part of the project was delivered December 2011.

Class 170 SDO

This part of the project was delivered February 2011.

Programme ID 23.00 Northern Urban Centres (a) Yorkshire

Interventions described in this section are based on the quantum and deployment of additional rolling stock described in the operational plan agreed between the DfT and its franchised train operators. The operational plan for Northern Rail is divided into three interventions, which have now been contractualised.

Network Rail's CP4 Delivery Plan was originally based on the assumption that rolling stock provision and the consequent operational plan would be contractualised between the DfT and Northern Rail by July 2009. In reality a much reduced agreement was finalised in May 2011, and (with the exception of the Horsforth turnback and additional signals which are designed into a planned signalling renewal), the programme dates have been revised to reflect this.

Programme ID 23.01 Capacity Improvements (Leeds Area)

Current Project Stage: Project Completion

Following changes to the operational plan for Leeds station during the contractualisation process between the train operator and the DfT, a study of platform capacity at Leeds station was undertaken which confirmed that the proposed longer and additional services could be accommodated within the existing platform capacity of the station. As a result, no physical works were undertaken. The option development work which was undertaken has been retained and will form the basis of any requirement for additional platform capacity.

In conjunction with signalling renewals between Harrogate and Horsforth, two additional signal sections were provided in each direction, increasing the capacity of the route and enabling a more evenly-spaced train service to operate in peak periods. In addition, a new turnback siding was installed at Horsforth, enabling terminating services to turn back clear of the running lines. To allow for future growth, the turnback is capable of up to 4x23 metre vehicles in length.

At Skipton, Broughton Road Carriage Sidings were remodelled and extended to provide stabling and servicing facilities for 12 additional vehicles, facilitating the operation of additional peak services on routes from Skipton and Ilkley to Leeds. Additional stabling capacity was also provided at the depots at Leeds (Neville Hill) and Hull (Botanic Gardens) to accommodate the requirements of Northern Rail's operational plan.

The works in connection with this project were completed in 2012/13.

Programme ID 23.02 West and South Yorkshire Platform Lengthening, including South Yorkshire Train Lengthening

Current Project Stage: Project Completion

This project concerned the provision of longer platforms at stations in West and South Yorkshire to meet the requirements of Northern Rail's CP4 operational plan, and to meet HLOS passenger growth metrics.

The scope of this project evolved during the course of CP4 during the process to contractualise the operational plan between Northern Rail and the DfT. Through discussions with the DfT and Northern Rail, it was agreed that no platform lengthening would be required at stations in South Yorkshire during CP4. For stations in West Yorkshire, platform extensions were delivered at a total of five stations, namely Cottingley, Deighton, Marsden, Mirfield and Mossley (in Greater Manchester). This met the requirements of Northern Rail's operational plan for CP4.

The works were completed in 2012/13.

Programme ID 23.03 South Yorkshire – Stabling for Northern

Current Project Stage: Cancelled

The CP4 Delivery Plan was originally based on the assumption that rolling stock provision and the consequent operational plan would be contractualised between the DfT and Northern Rail by July 2009. In reality a much reduced agreement has been finalised. The reduced operational plan no longer required the provision of additional stabling capacity in South Yorkshire.

Programme ID 24.00 Northern Urban Centres (b) Manchester

Programme ID 24.01 Route 20 – Platform Lengthening

Current Project Stage: GRIP 8

The project has provided the infrastructure to allow for operating longer trains in accordance with the Northern Rail operational plan by platform lengthening.

Progress in CP4

In 2013/14, the following was delivered:

- the extended platforms were brought into use in the December 2011 timetable change
- Bescar Lane (Down) platform extension was brought into use as a temporary construction. The permanent platform extension was completed in June 2012 following redesign
- Thatto Heath (Down) platform extension was completed in conjunction with the North West electrification project in September 2012

Table 6.36: Milestones for ID 24.01

Activity/Output	*Date*	*Date Met / Expected*
GRIP 4 Completion	September 2011	September 2011
GRIP 5-6 Completion *	December 2011	September 2012

* This is later than planned due to agreement of the platform stepping work at Swinton and Walkden which was completed in August 2013.

- work to raise the platforms at Swinton and Walkden were complete in August 2013.

Programme ID 24.02 Route 20 – Stabling for Northern

Current Project Stage: GRIP 8

Allerton Depot provided additional stabling and servicing facilities for Northern Rail's DMU fleet to accommodate the additional rolling stock which was introduced in the December 2011 timetable change. Facilities provided include stabling sidings, an under-carriage vehicle washer, watering, fuelling, wheel lathe, exterior washer, fitters store and train crew facilities. The works were completed in 2012/13.

Table 6.37: Milestones for ID 24.02

Activity/Output	*Date*	*Date Met / Expected*
GRIP 3 Completion	July 2011	July 2011
GRIP 4 Completion	August 2011	August 2011
GRIP 5-6 Completion	December 2011	October 2012 (including additional scope)

Programme ID 24.03 Salford Crescent Station Redevelopment

Current Project Stage: GRIP 6

This project is to redevelop Salford Crescent station in order to support the operation of six-car units, improve passenger circulation and comply with Disability Discrimination Act arrangements.

The project will also review the potential for an additional platform at the station in order to relieve overcrowding.

The primary objectives are to:

- accommodate future projected growth of passenger numbers by lengthening and/or widening station platforms
- remodel the station to improve passenger circulation space on the platforms, (possibly by de-cluttering station buildings and furniture)
- improve access arrangements in and around the station along with improved interchange facilities.

Progress in 2013/14

In 2013/14, the following was delivered:

- platforms de-cluttered through demolition of existing buildings in June 2013
- new lift commissioned in July 2013
- new ticket office opened to the public in July 2013
- re-authorised to include funding from Salford City Council for partial refurbishment of old footbridge in August 2013
- works substantially completed ahead of schedule in October 2013
- formal opening on 15 October 2013
- GRIP Stage 6 completed in December 2013.

Milestones in the year

This project has a committed delivery milestone of completion by October 2014 and achieved GRIP 6 (implementation complete) in February 2014.

Table 6.38: Milestones for ID 24.03

Activity/Output	*Date*	*Date Met / Expected*
GRIP 6 completion	February 2014	Dec 2013
GRIP 8 completion	October 2014	June 2014

Programme ID 24.04 Route 20 – Capacity Enhancements

Current project stage: Stalybridge – GRIP 8

This scheme combines track and signalling renewals with the installation of an additional bay platform turnback at Stalybridge station. It includes some remodelling and line speed increases through the station. A new control system is to be provided for Stalybridge, Ashburys and Guide Bridge which will be located at Manchester South Signalling Control Centre.

The scheme will provide increased flexibility for network operation and train movements. The proposed additional bay platform adjoining the Ashton branch will result in increased capacity for Manchester Victoria services in support of the DfT HLOS. It will remove conflict from Stalybridge Junction, and enhance performance of the Stalybridge to Manchester Piccadilly services. There will also be a new platform face for through trains.

Progress in 2013/14

Snagging works for the scheme were completed.

Table 6.39: Milestones for ID 24.04

Activity/Output	*Date*	*Date Met/Expected*
Ashburys re-control	November 2011	November 2011
Guide Bridge re-commissioning	December 2011	December 2011
Output definition Hadfield intervention	March 2010	on hold
Hadfield intervention completion GRIP 2	December 2010	on hold

Programme ID 25.00 Northern Urban Centres (c) Liverpool to Manchester Journey Time Improvements and Manchester to Leeds Journey Time Improvements

Current Project Stage: GRIP 6

Liverpool to Manchester – Implementation; Manchester to Leeds – Outline Design

The primary output is to stimulate further passenger demand through improving journey times between Leeds and Manchester via Diggle, and Manchester and Liverpool via Chat Moss.

Reductions in journey times between these cities are a move towards the Government's target journey time of 30 minutes between Liverpool Lime Street and Manchester via Chat Moss and 43 minutes between Manchester and Leeds. It is recognised that achieving improved journey times will require both the defined infrastructure interventions combined with an industry agreed timetabling intervention.

The line speed improvements will manifest themselves as revised sectional running times over the route between Liverpool Lime Street and Leeds.

Scope of works

It has been agreed that the project will be taken forward as two separate schemes: Liverpool to Manchester and Manchester to Leeds.

Liverpool to Manchester

The project scope is for track, signalling, structures and earthworks alterations to take place at locations between Liverpool Lime Street station and Manchester via the Chat Moss route.

These changes will facilitate achievement of a journey time of 32 minutes from Liverpool Lime Street to Manchester Victoria.

- rerailing 8,250 yards of rail at various locations
- upgrade of switches and crossings to allow 90mph running at Earlestown East and West, Sankey and Newton-le-Willows
- track lowering and drainage works at Rainhill
- recanting and realignment (8,759 yards) at various locations
- design and/or maintenance tamping (5,330 yards)
- spot sleeper replacement
- fencing upgrades
- signalling alterations
- structural remedial works
- level crossing deck replacements at two locations).

This scope of works allows the introduction of the following line speed changes to support sectional running time changes:

- 3m – 3m72ch increases from 75 – 80mph (Up)
- 3m72ch – 21m60ch increases from 75 – 90mph (Up)
- 3m – 21m60ch increases from 75 – 90mph (Down)
- 22m 40ch – 25m 40ch increase from 40/60 – 75mph (Down)
- 22m40ch – 25m43ch increase from 40/60 – 75mph (Up).

Progress in 2013/14

In 2013/14, the following was delivered:

- Network Change established
- additional fencing requirements incorporated
- all works between 16m and 25m completed by December 2013, three months ahead of schedule
- works between 6m and 16m (excluding Huyton-Roby) are 90 per cent complete, with the remaining works to be commissioned in advance of the May 2014 timetable change
- some works have been incorporated into the Huyton-Roby blockade (August 2014) for more efficient delivery.

Manchester to Leeds

The project scope is to develop and deliver journey time opportunities which involve capacity improvements to move towards a journey time of 43 minutes between Manchester and Leeds via Diggle in CP4.

Early work in GRIP 1 and 2 has looked at the standard hourly timetable to identify the use of pathing time and options to reduce it.

The following single options have been identified for progress to final design and implementation:

- relaxing the approach control through signalling interventions to the Down passenger loop at Dewsbury
- relaxing the approach control at Mirfield East Junction.

Significant interfaces

There are interfaces with stakeholders including the DfT, TOCs, FOCs, Merseytravel, Transport for Greater Manchester (TfGM) and West Yorkshire PTE. The scheme has interdependencies with other projects including the Seven Day Railway renewals and resignalling schemes, the Northern Hub and electrification.

Progress in 2013/14

In 2013/14, the following was delivered:

- GRIP stage 6 complete for Mirfield to Dewsbury
- Mirfield and Dewsbury approach control changes successfully commissioned.

Programme ID 26.00 Western Improvements Programme

Programme ID 26.01 Barry to Cardiff Queen Street corridor

Current Project Stage: GRIP 4

This scheme aims to deliver an increase in network capacity and capability on the lines between Barry through Cardiff Central to Cardiff Queen Street from the current twelve trains per hour to 16 trains per hour. This will be achieved alongside the renewal of the signalling system throughout the Cardiff Signal Box control area and including the following enhancements:

- Cardiff Queen Street additional Platform 1a
- Cardiff Queen Street additional bay platform
- Cardiff Central additional Platform 8
- Cardiff East crossover Platform 4 to Up Barry and bi-directional signalling in platforms
- station building improvements at Cardiff Queen Street and Cardiff Central south entrance
- Treforest Curve doubling
- Cogan Junction Loop enhancement
- City Line linespeed enhancement.

These outputs are as agreed with the ORR following the change control approval.

Additionally the work includes:

- improved access to Canton Depot, reinstatement of the main-main crossover at Rumney River Bridge and access to Platform 2 from the Down Main and Down Relief lines under the Seven Day Railway programme to improve layout flexibility
- additional platforms will be provided at Barry Town and Caerphilly stations, and a new platform and passing loop at Tir Phil funded by the Welsh Assembly Government.

Progress in 2013/14

In 2013/14, the following was delivered:

- successful commissioning of the second Cardiff area signalling renewal (CASR) phase on the Valley lines in Sep 2013. This has enabled innovative technology to be deployed including Frauscher axle counters and plug coupled cabling
- substantial work completed for the third main stage commissioning, that of the Barry Line section with pre-testing of signalling equipment in progress in readiness for the commissioning in June 2014. Installation works have started on Phase 4, East of Cardiff
- ground works for delivery of the stations completed and the new retaining wall at Cardiff Central for Platform 8 erected. New Platform 5 and bay platform nearing completion at Cardiff Queen Street and the steel frame for the new station building at Cardiff Queen Street started
- remaining programme for commissioning work for remaining three phases developed and consulted with TOCs and key stakeholders (the main central section being planned for November 2015; Platform 8 will follow in the spring of 2016 after the closure of Cardiff PSB and transfer to the nearby Wales Route Operational Control).

In order to support the funding of the required new station buildings associated with the additional platforms at Cardiff Central and Queen Street, the planned Cardiff Central Bay Platform 5 enhancement was removed from the scope following agreement with the ORR. This element was not required to support the core output of 16 trains per hour in the Barry to Queen Street corridor.

Milestones in the year

The second commissioning was delivered in 2013/14.

This project is currently reprogramming the remaining commissionings with an anticipated final commissioning for Cardiff Central in November 2015.

Programme ID 26.02 Cotswold Line Redoubling

Current Project Stage: Project Completion

The objective of this project was to increase capacity and improve performance by redoubling two sections of single line between Charlbury and Ascott-under-Wychwood, and Moreton-in-Marsh and Evesham. The extra 20 miles of track significantly increases the capacity for both passenger and freight operators, as well as improving the robustness of the timetable and reducing delays caused by the currently restrictive infrastructure.

Other improvements include increased line speeds between Wolvercote Junction and Norton Junction, through removal of several speed restrictions on the approach to the single and to the double line junctions and the removal of the token exchanges at Moreton-in-Marsh, Evesham and Norton Junction/Worcester Shrub Hill. The provision of turn-back signals at Charlbury, Moreton-in-Marsh and Evesham also improve the flexibility of the route during periods of maintenance engineering and operational perturbation.

The Charlbury to Ascott-under-Wychwood section was commissioned as planned in June 2011 and the

Moreton-in-Marsh to Evesham section was brought into service in August 2011.

Three new passenger train services commenced in September 2011 between Moreton-in-Marsh and Oxford/London, and in December 2011 between Charlbury and London as a result of the additional capacity created through this scheme.

Programme ID 26.03 Westerleigh Junction to Barnt Green Line Speed Enhancement

Current Project Stage: GRIP 6

The project will enhance the linespeed on approximately 18 miles of track between Westerleigh Junction and Barnt Green. The project output will be a line speed of 100mph over the majority of the route.

Significant interfaces

- Bromsgrove station relocation project
- Bromsgrove electrification and Redditch branch improvement.

Delivery of this project is dependent on the high output renewals programme.

Progress in 2013/14

In 2013/14 the following was delivered:

- linespeed improvement from 90mph to 100mph implemented on Down line between Bromsgrove and Stoke Works
- linespeed improvement from 75mph to 80mph implemented on Up Line at Cheltenham Alstone
- all signalling works completed between Charfield and Westerleigh Junction and prep-testing undertaken of an eight mile section (both lines)
- all signalling works completed Gloucester Road Junction and Tuffley
- new diverted footpath crossing at Charfield open to the public in advance of formal decision on Order
- closure of Stoke Prior footpath crossing being progressed by Worcestershire County Council. Land agreement with farmer completed
- all planned high output, conventional renewals and tamping realignment works completed. Some failures due to DB Schenker strike
- additional track surveys undertaken to define scope of track quality issues.

Deficient track quality and track geometry issues have prevented the linespeed improvement commissioning at Tuffley and Charfield/Westerleigh. Due to possession availability, the remediation works, and Testing and Commissioning works will be completed by April 2015.

Milestones in the year

This project has a committed delivery milestone of completion by April 2015 and the project is on target to meet that date.

Table 6.40: Milestones for ID 26.03

Activity/Output	*Date*	*Date Met/Expected*
GRIP 6 completion (non-Track)	November 2012	March 2015
GRIP 7 commissioning	December 2012	April 2015

Programme ID 26.04 Maidenhead and Twyford (relief lines)

Current Project Stage: Closed

It has been agreed with the TOC and the DfT this project is no longer required to sustain the operational plan.

Programme ID 27.00 North London Line Capacity Enhancement

Current Project Stage: Project Completion

The project created the rail infrastructure to facilitate the following service pattern, whilst maintaining loading gauge and capacity for freight traffic (numbers stated are in each direction):

- four trains per hour Stratford to Richmond
- two trains per hour Stratford to Camden Road (peak hours only)
- two trains per hour Stratford to Clapham Junction
- two trains per hour Clapham Junction to Willesden.

In addition, the enhancements to the North London Line infrastructure have enabled an extension of the East London Line services to Highbury and Islington.

The infrastructure modifications enable segregation of the North London Line and the East London Line services over the most constrained section of the route and provide passing loops for freight trains.

The work facilitates a package of transport improvements in the area, which form a part of the Olympics Transport Plan.

The project outputs have been met and the new train service commenced in May 2011.

Programme ID 28.00 GSM-R Coverage of Freight-only Lines

Current Project Stage: GRIP 6

The main GSM-R Programme is now substantially complete, with only the GSM-R coverage solution for the Merseyrail Area yet to be brought into operational service.

The 40 freight-only branch lines south of the 'Severn-

Wash' line were installed with GSM-R base station sub-system equipment and brought into live GSM-R operation late in 2012. The live system provides, as a minimum, a level and quality of driver-signaller communication equivalent to the NRN service being replaced by GSM-R.

Progress in 2013/14

The work to deploy GSM-R on the north freight branches in similar manner and to the same design criteria as those in the south is also substantially complete, with all construction work now completed and most lines commissioned and either in operation already or progressing through the final authorisation process for operational implementation over the next few months.

Completion of the implementation of GSM-R on all remaining freight branches will be achieved by the end of May 2014.

Programme ID 29.00 Station Security

Current Project Stage:

- Phase 1, pilot stations: complete
- Phase 2a, remaining managed stations: complete
- Phase 2b, remaining managed stations: complete
- Phase 3, franchised stations: implementation.

This programme incorporates enhanced security measures at stations for the safety and benefit of all our users, i.e. our staff, the train and freight operating companies' employees and customers, as well as any contractors or other third party stakeholders. The following schemes are included:

Station security – three phases:

- Phase 1 – pilot stations
- Phase 2 – remaining managed stations
- Phase 3 – franchised stations.

Highlights of this programme are:

- the provision of measures to prevent vehicle access to station concourses nationally at both managed and franchised stations
- the alteration of working practices to allow appropriate staff coverage.

The implementation phase has provided significant challenges around listed building consent together with buried services diversions. The programme was rephased to allow the key stations which had Olympic links to be completed ahead of the others.

Progress in 2013/14

In 2013/14, the following was delivered:

- Phase 2b outstanding works complete
- Phase 3 remaining franchised stations are complete apart from the four schemes at:
  - Cambridge
  - Brighton
  - East Croydon
  - Sheffield.

These schemes are all associated with complex third party projects at those stations which would mean the works could be abortive if the works move forward. The DfT continues to support the schemes moving forward and funding has been rolled over.

In addition to those above, Newcastle has not yet been completed due to changes around the front of the station from the Stations Commercial Project Fund (SCPF) scheme. The materials are in place and will be delivered by the City Council to complement there works around the station.

Programme ID 30.00 Scotland: Tier 3 Project Development Fund

Current Project Stage: Various

Fund Purpose

This fund is primarily aimed at initial development of future projects that will enhance the network in Scotland and will contribute to the Scottish Government's target of promoting sustainable economic growth.

Schemes are developed to a point where a decision about next steps and funding can be made. In a small number of cases and by agreement with Transport Scotland, expenditure from the fund has contributed to the implementation of new schemes.

All project proposals are submitted by Network Rail for approval by Transport Scotland prior to any commitments being made.

33 schemes have/are nearing completion of their development under this fund.

Programme ID 31.00 Scotland Small Projects Fund

This programme comprises 20 projects (including those completed in previous years) at various stages of development/delivery, from output definition to project close out. All projects were programmed to be completed during CP4.

Glasgow South Suburban Renewals (GSSR, LLF690)

Current Project Stage: Enhancements Completed

Various enhancements in synergy with major signalling renewals, comprising: doubling of existing single lead junction at Busby Junction, signalling capacity enhancement on Glasgow Barrhead and Kilmarnock line and turnback facilities at Whitecraigs

station on Neilston line. The project is now partially delivered with all enhancement elements completed in July 2013. Final remedial works at Kirkhill are scheduled for late 2014.

Hurlford Line Speed Increase

Current Project Stage: Project Completion

This consisted of the planned removal of an existing permanent speed restriction by moving a signal to achieve correct braking distance for the proposed higher linespeed, with associated speed board changes. The project is now delivered and complete.

Midcalder Switches and Crossings Renewal

Current Project Stage: GRIP 7

The project redoubled the junction at Midcalder from current single lead on the Shotts line, through alignment with the switch and crossing track renewal scheme. This project was delivered in conjunction with conversion of Kirknewton Level Crossing to a manually controlled barrier – obstacle detection (MCB-OD). The junction and level crossing are commissioned with snagging works progressing.

Dumfries Station Improved Turnback Facility

Current Project Stage: Projection Completion

The scheme involved the provision of a turnback facility at Dumfries Station. The original project did not proceed and instead a signal was converted to main aspect to enable turnback on the main line. The project was delivered June 2013.

Stirling North to Dunblane Minor Renewals and Enhancement (previously titled Bridge of Allan)

Current Project Stage: Project Completion

This consisted of the provision of a new signal section in the down direction between Stirling and Dunblane, improving headways/capacity on the route. The project was delivered in March 2013.

Barnhill Line Speed Improvement

Current Project Stage: Project Completion

This involved linespeed improvements between Perth and Barnhill for passenger and freight trains. The works are now complete and this has increased the linespeed from 20mph to 30mph. The project was delivered in March 2014.

Stirling Middle: Junction Doubling

Current Project Stage: Project Completion

The doubling of Stirling Middle Junction increased capacity and now provides higher linespeed to/from Alloa for both passenger and freight services. The project was delivered October 2013.

Camelon Line Speed Improvement

Current Project Stage: Project Completion

This covered linespeed improvement works between Carmuirs East Junction and Falkirk Grahamston. The works are now complete and this has provided a linespeed increase on the Up line from 40mph to 50mph. Project delivered March 2014.

Ladybank Junction Enhancements

Current Project Stage: Project Completion

The project increased linespeed for trains between Edinburgh and Perth/Inverness by remodelling the route towards Hilton Junction. The project was delivered March 2014.

The following projects were also delivered during CP4 using this fund:

- Grangemouth branch improvements – delivered in 2010
- Larbert Aster track circuit replacement – delivered in 2010
- Newbridge West junction switches and crossings renewal – delivered in 2010
- Rosehall removal of permanent speed restriction – delivered in 2011
- Edinburgh to Glasgow removal of permanent speed restriction – delivered in 2011
- Ladybank/Hilton linespeed improvement – delivered in 2012
- Paisley Corridor Improvements Scheme – delivered in 2012.

The following projects were developed through the Small Project Fund, for proposed delivery in CP5.

- Laurencekirk new freight loop
- Taybridge High Girders, removal of one train working restriction
- Mossend South to East Clearance restriction.

Table 6.41: Milestones for ID 30.00

Activity/Output	*Date*	*Date Met / Expected*
1. Aberdeen Station north bay platform. Option selection completed. No further work currently being undertaken	-	Completed in earlier year
2. Grangemouth east facing freight connection. Pre-feasibility completed in previous year. No further work undertaken	-	Completed in earlier year
3. G&SW line speed increases. Pre-feasibility completed in previous year. No further work undertaken	-	Completed in earlier year
4. Rail enhancement between Aberdeen and the Central belt – pre-feasibility	Milestone date not yet agreed	Completed GRIP 2 in April 14 (CP4 Tier 3 accrued)
5. Carstairs Junction remodelling. Further pre-feasibility work undertaken	Completed GRIP 2 in June 12	-
6. Mossend area capacity improvements. Further pre-feasibility work undertaken	Completed June 12	-
7. Motherwell North re-signalling enhancements – option selection	Completed Jan 13	-
8. Further electrification of the network – option selection	Completed July 12	-
9. Motherwell/Back of Shops area stabling. Further pre-feasibility work undertaken	Completed GRIP 2 in June 12	-
10. Motherwell area stabling – Bridge Sidings pre-feasibility	Oct 2013	Completed GRIP 2 March 14
11. Carstairs to Haymarket line speed improvements. Option selection work being undertaken	May 2013	Completed GRIP 3 March 14
12. Greenock Central Crossover pre-feasibility	March 14	Completed March 14
13. Law – Garriongill line speed improvements pre-feasibility	May 14	May 14 (CP4 Tier3 accrued)
14. Milngavie Platform Extension pre-feasibility	March 14	Completed GRIP 4 March 14
15. Johnstone – Kilwinning line speed Improvements pre-feasibility	Nov 13	June 2014 (CP4 Tier 3 accrued)
16. Polmadie to Glasgow Central bi-directional working pre-feasibility	March 14	Completed March 14
17. Bathgate car park extension pre-feasibility	April 13	Completed April 13
18. Highland Main Line journey time improvements. - Phase 1 – design & construction - Phase 2 – option selection	 March 2012 June 2014	 Completed GRIP 6 April 12 June 2014 (Part Tier 3 funded and part from CP5 determination)
19. Aberdeen to Inverness rail improvements - Option selection - Revised option selection	 May 2012 Dec 2013	 Completed May 12 Completed Dec 13
20. Dalmarnock Station redevelopment – design & construction underway	September 2013	Completed Dec 2013
21. Morar & Rovie AOCL+B GRIP 1-8	March 14	Completed April 14 (including £0.050m rolled over and added to Scottish Network Improvement Fund)
22. Carmuirs line speed improvements – option selection	March 14	August 14 (Tier 3 funding accrued)

Table 6.41 Continued: Milestones for ID 30.00		
Activity/Output	***Activity/Output***	***Activity/Output***
23. Conon Bridge new station – output definition	February 13	Completed February 13
24. Mossend Freight loops (bi-directional working) – option Selection	Completed June 12	-
25. Slateford Junction capacity – pre-feasibility	March 14	Completed March 14
26. Electrification of Edinburgh Suburban line – option selection	Sep 14	Sept 14 (Part Tier 3 funded and part from CP5 determination)
27. Newtonhill Enhancements – option selection	March 14	August 14
28. Greenock Central Car Park extension – pre-feasibility	March 14	March 14
29. Rutherglen S&C remodel – pre-feasibility	May 14	May 14 (CP4 Tier3 accrued)
30. North Clyde linespeed enhancement – option selection	March 14	April 14
31. Anniesland connection – option selection	July 14	July 14
32. Driver only operation on Rutherglen to Coatbridge – GRIP 1-8	GRIP 6 Aug 14	Aug 14
33. Glasgow Central & Waverley Information screens	March 14	June 14 (Funding in CP5 will be from Scottish Stations Fund)

Programme ID 32.00 Scotland Projects

Programme ID 32.01 Airdrie to Bathgate and Linked Improvements

Current Project Stage: Project Completion

The project is now complete and has reopened the railway between Airdrie and Bathgate. This now provides an additional four trains per hour between Glasgow and Edinburgh in addition to providing a service to the new intermediate stations.

The project has built and commissioned:

- a reopened and electrified double track railway between Drumgelloch and Bathgate
- three new stations at Caldercruix, Armadale and Blackridge
- two relocated stations at Drumgelloch and Bathgate
- five new station car parks
- three upgraded stations at Airdrie, Livingston North and Uphall
- one new Light Maintenance Depot
- a replacement national cycle route between Drumgelloch and Bathgate.

Passenger services commenced in December 2010.

Programme ID 32.02 Paisley Corridor Improvements

Current Project Stage: Project Completion

This project is now complete. Its objective was to enhance capacity on the Glasgow Central to Ayrshire and Inverclyde routes and this was done by means of:

- additional platforms at Glasgow Central
- three-tracking, and some four-tracking, of the Paisley corridor (between Shields Junction and Paisley Gilmour Street)
- an extension of the loop at Elderslie.

The project also included a full signalling renewal of the Paisley Corridor. Control of this line, plus the routes to Ayr, Ardrossan, Largs, Wemyss Bay and Gourock, were transferred to the West of Scotland Signalling Centre. Substantial completion of the project was achieved in February 2012 with all new infrastructure operational by that date.

Progress in 2013/14

All significant post construction activities were completed in the previous year, including commencement of an enhanced Ayrshire timetable from December 2012, featuring additional train services and faster journey times.

Milestones in the year

All project milestones were achieved by 2011/12. This included the signalling re-control milestone, which was originally December 2012, being achieved 12 months early. This was done by reprogramming this activity to exploit the opportunity offered by the Christmas 2011 disruptive possession, thus negating the need for additional access.

There were no remaining milestones to be achieved in 2012/13 or 2013/14.

Programme ID 32.03 Borders Railway

The Borders Railway is a project to build a new rail connection between the existing station at Newcraighall (south of Edinburgh) and Tweedbank in the Scottish Borders. This involves approximately 30 miles of new railway and the construction of seven new stations.

Transport Scotland intended procuring the project using a Design, Build, Finance and Maintain (DBFM) Strategy. Two of the three consortia selected by Transport Scotland withdrew from the procurement leading to the termination of the process. In September 2011 Network Rail was invited to take the project forward through final development and implementation.

Network Rail assumed the role of Authorised Undertaker in November 2012 via a transfer agreement with Transport Scotland.

A commercial agreement is in place for Network Rail to deliver the project to commence driver training by June 2015.

Progress in 2013/14

The mining remediation commenced in October 2012. The main works site mobilisation commenced in January 2013. GRIP Stage 4 was completed in spring 2013. All of these milestones were achieved ahead of their planned milestone date.

A submission was made to the ORR in summer 2012 for the inclusion of the development and delivery of the project in the Delivery Plan, which identified future milestones to be met as follows in Table 6.42.

Table 6.42: Milestones for ID 32.03

Activity/Output	*Date*	*Date Met/Expected*
Commence Mining Remediation	15 November 2012	15 October 2012
Commence Main Works site mobilisation	31 January 2013	7 January 2013
GRIP 4 Stage Gate Review	30 April 2013	17 April 2013
Commence Track Laying	29 June 2014	29 June 2014
Route Available for driver training	14 June 2015	14 June 2015
Stations ready for handover to TOC	14 June 2015	14 June 2015
Service Commencement by TOC	6 September 2015	6 September 2015

Programme ID 32.04 Glasgow to Kilmarnock

Current Project Stage: Project Completion

This project was commissioned in December 2009. The works are now complete and the final accounts settled. The project is now completed.

Programme ID 33.00 Other Transport Scotland Tier 3 Schemes

Programme ID 33.01 Class 380 Introduction

The projects in this programme are now complete and closed.

Ayr Townhead Depot enhancement

The project involved enhancement to stabling facilities at Ayr Townhead Depot to accommodate the new Class 380 trains introduced onto the Ayrshire and Inverclyde routes from late 2010. The project comprised provision of additional electrified sidings with access platforms, a non electrified siding for diesel trains, provision of new Controlled Emission Toilet (CET) facilities, and extension to an existing electrified headshunt to accommodate longer train formations.

Yoker Depot enhancement

The project involved enhancement to the existing CET facilities at Yoker Train Maintenance Depot in Glasgow, currently leased to First ScotRail.

Corkerhill Depot headshunt extension

The project involved the extension of the existing headshunt at Corkerhill Depot by 58 metres to allow longer trains to use the facility.

Shields Depot enhancement

The project was required to enhance maintenance and stabling facilities at the existing Shields Depot in Glasgow to accommodate the new fleet of Class 380 trains.

It involved:

- the construction of an additional train maintenance shed with specialist maintenance equipment
- the construction of a new wheel lathe building and installation of a new wheel lathe
- the decommissioning and removal of the existing wheel lathe for transfer to another Network Rail site (Plymouth Laira), and demolition of the existing wheel lathe building
- the installation of additional electrified sidings
- the installation of new CET facilities.

Gauge clearance in Central Scotland at 46 sites has been completed.

Stepping Improvement Works

This project is complete.

Platform Extensions

This project is complete.

Cook Street Neutral Section Relocation

Work was done to put in new neutral sections. The recovery of redundant equipment was undertaken in conjunction with Paisley Corridor Improvements possessions. In addition, a booster overlap at Prestwick Town was relocated. This work was completed in March 2012.

Programme ID 33.02 Waverley Steps

Project Stage: Project Completion

Network Rail provided covered, well lit with CCTV and improved access, including step free and DDA compliant access, between Waverley Station and Princes Street, in Edinburgh, by delivering:

- three banks of two up and down, covered and lit escalators with CCTV connecting with the existing internal station mezzanine link bridge and mall shopping precinct
- the removal and reconstruction of seven varying flights of stone steps, which are covered and lit to modern standards
- a new feature pedestrian entrance to Waverley station on Princes Street, which is capable of being closed and secured during station closure hours
- the provision of two 16 person lifts, located within the existing station footprint but adjacent to the Princes Mall Shopping Centre, which connects with the internal station mezzanine link bridge
- level access to and from the lifts to Princes Street by means of a pedestrian walkway across the roof of the Princes Mall Shopping Centre which also includes a ramped access. This provides step free access from Princes Street to the station platforms.

Progress in 2013/14

In 2013/14, the following were delivered:

- All snagging works completed
- commercial close out of project.

Programme ID 33.03 Edinburgh Gateway (formerly Gogar) Intermodal Interchange

Current Project Stage: GRIP 5

This project forms part of the Edinburgh Glasgow Improvement Programme (EGIP). It will provide a new intermodal station on the existing Edinburgh to Fife rail line in the Gogar area. The station will be located adjacent to the new Edinburgh Tram network that is being constructed by the City of Edinburgh Council.

The new station will provide a means of connecting Edinburgh Airport into the National Rail network via the Edinburgh Tram network. It will also provide an access to the surrounding Edinburgh Park and Gyle areas as well as the proposed West Edinburgh development area.

The current obligation for this project is to deliver GRIP Stage 5 (Detailed Design) and the implementation of advance works. The advance works consist of:

- track lowering below the adjacent A8 road bridge to achieve electrification clearances
- utilities diversion works
- land acquisition.

Progress in 2013/14

Progress with the commission was significantly affected by the contractual dispute between the City of Edinburgh Council and the consortium awarded the contract for the delivery of the Edinburgh Tram project. As a consequence the detailed design could not be completed and only some of the advance works have been undertaken. The project was therefore placed on the 'Projects Outwith the Change Control Process' list in the March 2011 update of the Published CP4 Delivery Plan. Following the resolution of the dispute the project was removed from the list in December 2013.

Work undertaken in 2013/14 comprised the provision of advice to City of Edinburgh Council and Transport Scotland on potential alternative design solutions to address the Edinburgh Tram interface issues and liaison with Scottish Water and adjacent land owners

on the utility diversion works.

The implementation of the project is included in the recently approved Commercial Submission for EGIP Initial phase Key Output 1.

Programme ID 33.04 Edinburgh Glasgow Improvement Programme (EGIP); Haymarket North Lines Electrification

Current Project Stage: Project Completion

This project formed part of the Edinburgh to Glasgow Improvements Programme (EGIP). It electrified the northern two tracks (the North Lines) of the Edinburgh to Glasgow (E and G) route between Edinburgh Waverley and Haymarket Central Junction. Electrification of this section of the E and G facilitates the reliable operation of the new Airdrie to Bathgate services, as introduced in December 2010. The electrification through Haymarket North Tunnel into Princes Street Gardens was completed March 2011.

Following the track lowering in 2010/11 there were concerns that underpinning works might be required at a number of locations in the tunnel, and a monitoring regime was put in place on completion of the original works to determine whether any additional works were required. Network Rail has concluded that rock anchor and foundation protection works should be undertaken. The design proposal is currently being developed and optimised, prior to the works being carried out during 2014/15. This has been taken into account and included within the CP4 rollover arrangements.

Programme ID 33.05 Edinburgh Glasgow Improvement Programme (EGIP) – Infrastructure Project

Current Project Stage: GRIP 5

EGIP is a key component of the Scottish Government's future transport strategy. EGIP will deliver more frequent and faster rail services between Edinburgh and Glasgow.

EGIP contains two main constituent projects, the electrification of the main Edinburgh to Glasgow via Falkirk (E and G) line and a number of inter-related infrastructure projects that provide the additional capacity required to operate the enhanced services post electrification.

Transport Scotland's HLOS for CP5 specified that EGIP should be implemented in a number of Phases. The Initial Phase, to be delivered in CP5, will electrify the Springburn to Cumbernauld route and the main E and G route. It will also include a number of the infrastructure projects.

The following projects will be delivered as part of EGIP Initial Phase:

- Edinburgh Waverley station infrastructure capacity
- Glasgow Queen Street high level station infrastructure capacity
- Haymarket to Inverkeithing signalling headways
- Springburn remodelling
- new EGIP rolling stock stabling depot
- intermediate E and G station platform lengthening works
- Glasgow Queen Street high level station concourse works.

The following projects are planned to be delivered as later Phases of EGIP:

- Croy Station turnback
- Greenhill Upper Junction enhancement
- Winchburgh Junction enhancement
- Almond Chord
- Winchburgh Junction to Dalmeny Junction upgrade
- Hyndland turnback.

Progress in 2013/14

GRIP Stage 4 development work was completed on the new EGIP rolling stock stabling depot, Intermediate E and G station platform lengthening works and Glasgow Queen Street high level station concourse works projects. These projects were only introduced into the scope of EGIP at the time of the HLOS announcement and as a consequence had to progress through earlier stages of the GRIP process.

Preparatory work was also progressed on the confirmation of scope, timescales and funding requirements in CP5 for EGIP Initial Phase.

Programme ID 33.06 Edinburgh Glasgow Improvement Programme – Electrification Project

Current Project Stage: GRIP 5-8 for 2013 Advance Works and Cumbernauld Electrification

The majority of these works form part of the Edinburgh Glasgow Improvement Programme (EGIP). It will electrify the core Edinburgh to Glasgow via Falkirk High (E and G) route, and undertake the majority of route clearance works on the linked diversionary route (via Falkirk Grahamston and Cumbernauld), and the northern extensions to Stirling, Dunblane and Alloa. It was subsequently decided that electrification of these routes would form part of Transport Scotland's rolling programme of electrification for delivery in CP5.

The initial phase of the Project will deliver approximately 205 single track kilometres of new electrification. A 275kV feeder station will be installed in the Greenhill area to supply power to the newly electrified routes.

The outputs from this phase of the Project were the completion of a package of advance route clearance works and electrification of the route between Springburn and Cumbernauld.

Progress in 2013/14

In the 2012 advance route clearance works 28 structures were completed on schedule, prior to the June 2013 delivery milestone.

In the 2013 advance route clearance works 13 of 16 structures have been completed, and the remaining three locations are anticipated to be cleared by June 2014. The Delivery Plan milestone date for works completion is December 2014.

Electrification of the route between Springburn and Cumbernauld has been completed and ScotRail driver training commenced in March 2014, on schedule for the start of electrified services to run on that route from May 2014.

Following a commercial submission to the ORR, and both their and Transport Scotland's agreement to RAB fund further advance works, contracts were awarded in October 2013 for the next tranche of advance route clearance works during 2014. Local Councils have signed off the majority of Form A designs for advance route clearance civils works, and at certain locations have offered to part-fund replacement structures that will deliver more appropriate long-term solutions.

Disruptive access has been agreed with Train Operators for delivery of the 2014 route clearance works and constructive engagement and input has been received from customers during the formulation of access plans for 2015. Preparatory work has also been progressed on the confirmation of scope, timescales, and funding requirements in CP5 for the electrification, and for the infrastructure elements of EGIP Initial Phase.

Programme ID 33.07 – Edinburgh Glasgow Improvement Programme – Haymarket Station Capacity

Current Project Stage: GRIP 5-8

This programme forms part of EGIP. It has enhanced the facilities at Edinburgh Haymarket station in order that it can accommodate forecast future demand levels, including that generated by EGIP. A tram interchange will be available on completion of the Edinburgh Tram project by the City of Edinburgh Council.

This project involves the redevelopment of Haymarket station to extend the station concourse over the existing car park to the rear of the station building.

Specific works are:

- an expansion of the existing station concourse
- the creation of an additional new entrance facilitating improved accessibility and links to other transport modes
- the retention of the Grade A listed building with the refurbishment of the ground and lower ground floors
- a glazed roof structure over the new concourse with new station ticket office and retail outlets beneath
- a new footbridge concourse extension with lift, escalator and stair access to platforms below
- the removal of the old footbridge and stairs
- reprofiled platform surfaces throughout including new copes and new surfacing with tactile strips
- new six-car length platform canopies
- refurbished platform facilities for staff and passengers
- new emergency escape facilities from the east end of Platforms 2, 3 and 4
- associated alterations to car park access and egress arrangements
- enhanced security measures.

Progress in 2013/14

In 2013/14 the following was delivered:

- completion of new concourse deck and new ticket office in December 2013
- removal of existing footbridge
- installation of new platform canopies.

Programme ID 33.08 Paisley Canal Electrification Additional CP4 Alliance Project Performance – Rolling Stock

Scope of works

Network Rail has installed 25kV overhead electrified contact system on the Paisley Canal Line. The physical works comprise the electrification of the Line from Corkerhill Depot Junction to Paisley Canal station. The section from Shields Junction to Corkerhill Depot Junction is already electrified and is utilised to service Shields and Corkerhill Light Maintenance Depots.

Installation of approximately 8.8 single track kilometres of 25kV OLE, provision of Driver Only Operation (DOO) platform equipment; a limited clearance OLE contact wire height in conjunction with track lowers at foul overline structures; parapet protection works at overline structures; and immunisation and electromagnetic conductivity (EMC) works to cable routes, equipment and station domestic wiring installations.

This project was a Network Rail and First ScotRail Alliance initiative to improve timetable performance and maximise the utilisation of existing electric

multiple unit (EMU) rolling stock. This introduced EMU operation to the following stations: Dumbreck, Corkerhill, Mosspark, Crookston, Hawkhead and Paisley Canal.

The project was supported by Transport Scotland and has been added to the Scotland RAB.

Electrification of the route has allowed two Class 156 DMU sets to be deployed elsewhere in Scotland. This provides additional resilience for short-term strengthening for special events and helps support alternative transport facilities.

The redeployment of existing DMU resources also contributes to the rolling stock required to operate the Borders Railway project.

Progress during 2013/2014

During this period outstanding work items and defect correction activities were undertaken. Issues have arisen at some of the track lower sites in relation to track quality. This has lead to the requirement to undertake remedial track works to resolve the situation. In all other elements of the project are complete.

Table 6.43: Milestones for ID 33.04

Activity/Output	*Date*	*Date Met/Expected*
Electrification between Haymarket Central Junction and Haymarket Station (including Platform 0).	December 2010	March 2011
Electrification through Haymarket North Tunnel into Princes Street Gardens.	March 2011	May 2011

Table 6.44: Milestones for ID 33.05

Activity/Output	*Date*	*Date Met/Expected*
GRIP4 complete ; All Schemes (except those detailed above)	December 2012	December 2012
GRIP3 complete ; Intermediate E&G Station Platform Lengthening Works	March 2013	March 2013
GRIP4 complete ; New EGIP Rolling Stock Depot	June 2013	June 2013

Table 6.45: Milestones for ID 33.06

Activity/Output	*Date*	*Date Met/Expected*
Completion of GRIP Stage 4	January 2011	January 2011
Completion of GRIP Stage 5 to 8 for 2012 advance works	May 2013	May 2013
Completion of GRIP Stage 5 to 8 for 2013 advance works	Dec 2014	Dec 2014
Completion of Cumbernauld Electrification	June 2014	May 2014

Table 6.46: Milestones for ID 33.07

Activity/Output	*Date*	*Date Met/Expected*
Complete GRIP 4 Stage Gate Review	April 2011	April 2011
Award GRIP 5 to 8 Contract	December 2011	December 2011
Completion of Construction Works	December 2013	December 2013
Removal of existing footbridge	April 2014	April 2014

Table 6.47: Milestones for ID 33.08

Activity/Output	*Date*	*Date Met/Expected*
Award GRIP 4 to 8 Contract	June 2012	June 2012
Commission 25kV OLE	November 2012	November 2012
Complete Works	March 2013	March 2013

Programme ID 33.10 Edinburgh Glasgow Improvement Programme – Newton North Connecting Line

Current Project Stage: Project Completion

The project delivered a doubling of the railway infrastructure at Newton to enable parallel moves of trains on/off the West Coast Main Line (WCML) and the Kirkhill Lines, to improve WCML capacity and train regulation at this critical location on Scotland's rail network.

Specific works were:

- installation of a new crossover and turn-out on the Kirkhill Lines
- construction of an adjoining 620 metre single line section of track, electrified and signalled
- installation of a connection on to the WCML Down line.

Programme ID 33.13 Rutherglen and Coatbridge (R&C) Electrification

Scope of works

Network Rail is electrifying the R&C route from Rutherglen East Junction to Whifflet North Junction and Langloan Junction to Coatbridge Junction.

The project comprises: installation of approximately 26 single track kilometres of 25kV OLE, provision of Driver Only Operation (DOO) platform equipment; replacement of a foul road overbridge with a new bridge to achieve OLE clearances, parapet protection works at overline structures, and immunisation and electromagnetic conductivity (EMC) works to cable routes, equipment and station domestic wiring installations.

This proposal is a Network Rail and ScotRail Alliance initiative, supported by Transport Scotland. It forms part of the rolling programme of electrification specified for CP5 to reduce emissions and energy consumption, with delivery accelerated to maximise the utilisation of existing EMU rolling stock.

This is part of the electrification rolling programme for Scotland agreed with Transport Scotland for CP5. Electrification of the route will allow consideration of possible improvements in capacity, journey times and connectivity available by integrating the Whifflet (R&C) passenger services with the Argyle line group of services.

Electrification also provides a further diversionary route for Virgin and First TransPennine Express electric passenger services, thus enhancing network resilience.

Progress during 2013/14

This is an early CP5 delivery project with a short timescale from detailed design through construction to commissioning of the OLE and full implementation of electrified services between Glasgow Central and Whifflet.

The OLE is scheduled to be commissioned in August 2014 to allow a partial EMU service to commence prior to the December 2014 timetable change when full EMU introduction is scheduled to take place.

Table 6.48: Milestones for ID 33.13

Activity/Output	*Date*	*Date Met/Expected*
Award GRIP 4 to 8 Contract	January 2014	January 2014
Commission 25kV OLE	August 2014	August 2014
Complete Works	March 2015	March 2015

Programme ID 100.00 Electrification

Programme ID 100.01 Great Western Main Line Electrification

Network Rail's obligation

Our obligation is to develop the extension of electrification of GWML from Maidenhead (the furthest western extent of the Crossrail project) and to deliver the scope of works described below.

Scope of works

The detailed scope required for this project includes the extension of electrification on the core route as noted below:

- from Maidenhead to Reading
- depot at Reading
- Reading to Newbury
- Reading to Didcot Parkway
- Didcot Parkway to Oxford
- Didcot Parkway to Wootton Bassett Junction
- Westerleigh Junction to Bristol Parkway
- Bristol Temple Meads to Bristol Parkway
- Bristol Temple Meads to Bristol Parkway (Filton)
- Wooten Bassett Junction to Thingley Junction
- Thingley Junction to Bristol Temple Meads
- Bristol Parkway to Newport
- Newport to Cardiff Central
- Cardiff Central to Swansea.

Additional scope includes:

- Acton to WCML
- Thames Valley passenger branches (Windsor, Marlow, Henley).

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

The remit is being executed by Network Rail delivering 25kV AC overhead electrification between Maidenhead, Oxford, Newbury, Bristol, Cardiff and Swansea and is further detailed in the activity tables above.

Outputs

This project facilitates the further introduction of electric train service operation on GWML between London and Swansea.

Significant interfaces

This programme will interface with the following programmes:

- the Crossrail scheme will deliver an electrified passenger train service linking the west of London to the east and southeast via new dedicated infrastructure through central London. Crossrail services will interweave with national train operating company services on Network Rail infrastructure northeast and west of London. Crossrail will provide an intensive service for stations in the western suburban area – Paddington to Heathrow Airport and Maidenhead
- the IEP is planned to introduce a fleet of electric and bi-mode Super Express Trains capable of 125 miles per hour on key business routes on the GWML
- Reading station area redevelopment will provide additional capacity and performance benefits for both the GWML and north-south routes with additional platforms, track layout reconfiguration and associated signalling alterations. Installation of the GWML electrification within Reading station boundaries will be considered for delivery within the Reading project. The project will deliver electrification of the Reading Train Depot
- Western Mainline signalling renewal – the existing signalling equipment along much of the route requires immunisation works. The proposed timescales for electrification will drive amendments to the existing signalling renewal plan for the route
- SCADA project – suitable solution for electrical control that meets the timescales for GWML electrification is to be established
- Cardiff Area Signalling Renewal (CASR) project – a joint programme to take advantage of signalling possessions/blockades for electrification work is to be established
- layout enhancements in the Bristol and Oxford areas
- W12 gauge clearance between Didcot to Bristol and Reading and Acton.

Key assumptions

The following define the assumptions stemming from the above interfaces for GWML electrification:

- electrification of the main and relief lines between Airport Junction and Maidenhead will be provided by the Crossrail project. Electrification between Paddington Main Line station and Airport Junction already exists for Paddington to Heathrow services
- changes to the existing OLE system between Paddington and Airport Junction that may be required for the Intercity Express Programme; will be provided by the IEP project
- signalling renewal and immunisation work throughout the route will be undertaken in advance of electrification to provide electrification immune signalling and telecoms
- provision of new National Grid supply point at Didcot, Melksham and Imperial Park

- the Western programme integration team will coordinate the access, possessions and programme integration issues across all the major Western programmes. A key role will be to integrate the various programmes to deliver the key outputs, for example operation of electric services to Cardiff from December 2017
- the electrification project will be able to obtain all relevant planning consents in a timely manner and without impact to the project programme.

Activities and milestones

The DfT target is for electrification to be completed for electric train operation by:

- September 2015 Didcot IEP test section
- December 2016 Didcot to Oxford
- December 2016 Reading to Newbury
- December 2016 Didcot to Bristol Parkway and Chippenham
- May 2017 Chippenham to Bristol Temple Meads
- December 2017 Bristol to Cardiff
- May 2018 Cardiff to Swansea.

Network Rail's specific commitments:

London to Newbury, Oxford and Bristol

In addition to the main project works, advance works such as bridge reconstructions to provide electrification clearances are being carried out where access is available.

Bristol to Cardiff

In addition to the main project works, advance works such as bridge reconstructions to provide electrification clearances are being carried out where access is available.

Cardiff to Swansea

Cardiff to Swansea electrification is currently being developed with completion of GRIP 3 in quarter three 2014.

Procurement of High Output Plant System (HOPS)

- work with adjacent line open (ALO)
- construct an average of one equivalent tension length per shift (six hours)
- carry all materials to site
- install two conductors simultaneously, at design tension.

The HOPS will be formed of three consists:

- Consist 1 foundations (not just piling)
- Consist 2A main steelwork and small part steelwork and Consist 2B wiring – can be split, each with its own traction units
- Consist 3 finishing and measuring.

Key assumptions

Delivery of electrification of majority of open routes between major junctions will be achieved by use of High Output Plant. The techniques can be developed to enable electrification work to take place with the adjacent line open to traffic, with a six-hour productive shift.

Table 6.49: Milestones for ID 100.01: London to Newbury, Oxford & Bristol Pkway

Activity/Output	*Date*	*Date Met/Expected*
GRIP 3 complete Single option selection	May 2014	May 2014
Entry into Service	December 2016	December 2016

Table 6.50: Milestones for ID 100.01: London to Newbury, Oxford & Bristol Temple Meads

Activity/Output	*Date*	*Date Met/Expected*
GRIP 3 complete Single option selection	May 2014	May 2014
Entry into Service	May 2017	May 2017

Table 6.51: Milestones for ID 100.01: Bristol to Cardiff

Activity/Output	*Date*	*Date Met/Expected*
GRIP 3 complete Single option selection	October 2014	October 2014
Entry into Service	December 2017	December 2017

Table 6.52: Milestones for ID 100.01: Cardiff to Swansea

Activity/Output	*Date*	*Date Met/Expected*
GRIP 3 complete Single option selection	October 2014	October 2014
Entry into Service	May 2018	May 2018

Table 6.53: Milestones for ID 100.01: High Output Plant System (HOPS)		
Activity/Output	***Date***	***Date Met/Expected***
High output base	Construction complete/available for use	Complete
Consist 1	Piling system available for use	Complete
Consist 2	Structures system available for use	June 2014
Consist 3	Wiring system available for use	August 2014

During the course of 2013/14 Network Rail has significantly reconfigured the governance and programme management arrangements associated with this complex route-wide upgrade. The improvements are now in place, and have strengthened capability in areas such as system engineering and integrated planning. We continue to work closely with our stakeholders to build confidence that, despite the complex technical and operational challenges, the December 2016 timetable is deliverable.

Programme ID 100.02 North West Electrification (NWE)

Current Project Stage: GRIP 5-6

The NWE programme incorporates AC electrification at 25 kV OLE of various routes in North West England. The programme facilitates the introduction of electric train operation on passenger and freight services on the following routes:

- Liverpool to Manchester
- Huyton to Wigan
- Preston to Blackpool
- Manchester to Preston.

The current target is for electrification to be completed in 2016. Implementation is planned in four phases:

- Phase 1: Castlefield Junction to Newton-le-Willows/Lowton Junctions
- Phase 2: Earlestown to Edge Hill, Huyton to Wigan, Ordsall Lane Junction to Manchester Victoria
- Phase 3: Preston Fylde Junction to Blackpool North
- Phase 4: Deal Street/Ordsall Lane Junctions to Euxton Junction.

Each phase will be implemented with two work packages: an advanced civils package (structures clearance, parapet and access point works) followed by main works (foundations, masts, OLE, signalling, telecoms and distribution). Due to the nature of the different phases and the DfT target dates for commissioning, the implementation works have already begun for Phases 1, 2 and 3. The programme therefore covers a range of project phases from outline/detailed design to implementation.

Progress in 2013/14

In 2013/14, the following works were delivered:

- implementation works have been successfully completed on the main works package (OLE, signalling, distribution) for Phase 1, which was commissioned in December 2013
- implementation works have progressed on the main works package for Phase 2. Works are on programme to be completed by December 2014
- advanced civil works on Phase 3 have been completed
- options for linespeed improvements on Phase 3 have been developed
- outline designs have been progressed for Phase 4.

Milestones in the year

A change to the Delivery Plan was initially introduced in September 2013 to amend the milestone for completion of GRIP 4 for the Phase 4 Civils Enabling Works to reflect the fact that the plan for the implementation of the works is spread over two years (2014 and 2015) and that the GRIP 4 work has been prioritised accordingly. This milestone has subsequently been incorporated with that for the Phase 4 main works**.**

Table 6.54: Milestones for ID 100.02		
Activity/Output	***Date***	***Date Met / Expected***
Phase 1 Main Works: Completion of GRIP 6.	December 2013	December 2013
Phase 3 Civils Enabling Works: Completion of GRIP 6	December 2013	December 2013
Phase 4 Civils Enabling Works: Completion of GRIP 4	September 2013	September 2014

Programme ID 100.03 North Trans-Pennine Electrification

Current Project Stage: GRIP 5

This programme has been divided into two separately managed sets of outputs:

- Trans-Pennine Electrification (West)
- Trans-Pennine Electrification (East).

The current scope of each programme is for the design of 25kV AC overhead electrification and associated power supplies and distribution for the following routes:

Trans-Pennine Electrification (West)

- Manchester Victoria to Stalybridge Junction
- Guide Bridge West Junction to Stalybridge National Grid Feeder station
- Ashburys West Junction to Philips Park Junction/Baguley Fold Junctions.

Trans-Pennine Electrification (East)

- Stalybridge National Grid Feeder station (exc) to Copley Hill East Junction
- Neville Hill West Junction to Colton Junction
- Micklefield Junction to Selby station
- Hambleton East Junction to Hambleton North Junction
- Hambleton South Junction to Hambleton West Junction.

The current target is for electrification of all routes to be completed in 2018. The interim completion of the North Trans-Pennine Electrification (West) routes in 2016 will align with the outputs of North West Electrification.

Progress in 2013/14

In 2013/14, the following was delivered:

- GRIP Stage 3 Outline Design for North Trans-Pennine Electrification East continued throughout the year
- Implementation works have commenced for the Trans-Pennine Electrification West Civils Enabling Works
- GRIP Stage 3 Outline Design for North Trans-Pennine Electrification West has commenced.

Milestones in the year

Through the creation of the CP5 Delivery Plan, the GRIP Stage 3 milestone for North Trans-Pennine Electrification East was confirmed as March 2015. This updates and amends the milestone stated in the CP4 Delivery Plan.

Table 6.55: Milestones for ID 100.03

Activity/Output	*Date*	*Date Met / Expected*
North Trans-Pennine Electrification East *GRIP 3 (stage gate review complete)*	March 2015	March 2015
North Trans-Pennine Electrification West *Civils enabling works: GRIP 4 (stage gate review complete)*	June 2013	Sept 2014
North Trans-Pennine Electrification West Civils Enabling Works Commencement of GRIP 6	Oct 2013	Oct 2013

Progress in CP4

The North Trans-Pennine Electrification programme was created during CP4. Since its creation the following progress has been made:

North Trans-Pennine Electrification (West)

- completion of the GRIP Stage 3 for civils enabling Works
- commencement of GRIP Stage 3 for main OLE works
- commencement of GRIP Stage 6 for civils enabling works.

North Trans-Pennine Electrification (East)

- Completion of the GRIP Stage 2 feasibility
- Commencement of GRIP Stage 3.

A change to the Delivery Plan was initially introduced in June 2013 to amend the milestone for completion of GRIP 4 for the North Trans-Pennine West Civils Enabling Works to reflect the fact that the plan for the implementation of the works is spread over two years (2013/14 and 2014/15) and that the GRIP 4 work has been prioritised accordingly. This milestone has subsequently been incorporated with that for the North Trans-Pennine Electrification West main works.

Programme ID 101.00 Northern Hub

Current Project Stage: GRIP 3

The Northern Hub programme consists of a series of journey time improvement projects on radial routes from Manchester and capacity schemes as various locations across the north designed to enhance the capability of the rail network to stimulate economic growth.

Journey time improvement projects are:

1. Preston line
2. Calder Valley
3. Hope Valley.

Capacity projects are:

1. Huyton and Roby
2. Ordsall Chord
3. Manchester Victoria
4. Rochdale
5. Chat Moss
6. Manchester Oxford Road
7. Manchester Piccadilly
8. Castlefield Corridor
9. Manchester Airport
10. Hope Valley.

All the interventions have completed the Option Selection stage. Huyton and Roby/Chat Moss and Manchester Airport capacity projects are on site.

The Northern Hub is planned to be completed in two stages, with target completion dates of December 2016 and December 2018 for the various interventions as follows:

By December 2016:

- Preston Journey Time Improvement (JTI)
- Calder Valley JTI
- Huyton & Roby
- Ordsall Chord
- Manchester Victoria
- Rochdale
- Chat Moss.

By December 2018:

- Hope Valley JTI
- Manchester Oxford Road
- Manchester Piccadilly
- Castlefield Corridor
- Manchester Airport
- Chinley
- Hope Valley.

Individual projects will be completed at different timescales prior to the overall completion dates depending on the scope of works, interfaces and consents required.

Progress in 2013/14

In 2013/14, the following was delivered:

- Stage 1 of the Huyton and Roby capacity project and signalling elements of the Chat Moss capacity project have commenced on site
- the TWA application for Huyton Stage 2 has been submitted
- the TWA application for the Ordsall Chord has been submitted and a Public Enquiry has been arranged for April 2014
- a review of affordability and value for money of proposed scope has been held with industry stakeholders. This has resulted in some elements not being continued (Maple and Chester JTI schemes, and Chinley capacity) but retaining the overall service outputs planned for December 2016 and December 2018
- a review of selected options and service patterns has resulted in a reappraisal of the location of the proposed eastbound loop on the Hope Valley line, and a revised option at Rochdale for providing a Manchester facing bay has been adopted
- civils works at Manchester Airport station have been advanced earlier than planned by utilising the Transport for Greater Manchester (TfGM) Metrolink contractor already on site to undertake works on behalf of Network Rail and to deliver the works in an efficient and collaborative manner
- where appropriate, delivery of works for the Northern Hub and NW Electrification on the same routes have been integrated within a single delivery programme.

Milestones in the year

- GRIP 3 stage gates have been completed for all projects
- GRIP 4 has been completed for Huyton and Roby and Chat Moss capacity
- GRIP 6 has commenced for Huyton and Roby, Chat Moss capacity and Manchester Airport
- The TWA Order application has been submitted for Huyton and Roby.

Table 6.56: Milestones for ID 100.03

Activity/Output	*Date*	*Date Met / Expected*
GRIP 3 stagegate review complete (Ordsall Chord)	March 2014	March 2014
GRIP 3 stagegate review complete (Other central Manchester interventions - Oxford Rd, Piccadilly, CMP, Man Victoria, Man Airport)	March 2014	March 2014
GRIP 4 stagegate review complete (Chat Moss line interventions - Huyton & Roby and Chat Moss capacity)	October 2013	October 2013
GRIP 6 commences (Chat Moss line interventions - Huyton & Roby and Chat Moss capacity)	November 2013	November 2013

Programme ID 102.00 Swindon to Kemble Redoubling

Current Project Stage: GRIP 6

This enhancement will provide capacity for four train paths an hour (each direction) between Cheltenham Spa and Swindon. The linespeed remains unchanged. The planned completion was Easter 2014, but has been deferred until August 2014. The completion of the project will still, however, coincide with Swindon Area resignalling and recontrol to Thames Valley Control Centre and so optimise the efficiency this would realise to the programme.

The scope of the project works include:

- redoubling the railway between Swindon Loco Junction and Kemble, based on predominately slewing works to the existing single line and the relaying of a new second track, associated signalling and other discipline works
- additional intermediate infill signalling is to be provided between Kemble and St Mary's crossing, and between this crossing and Standish Junction. This new signalling is to include associated cable routes, telecoms and signalling power supplies
- provision of a new footbridge in Stroud. This would facilitate the diversion of one foot crossing over the operational railway and the extinguishment of another.

These outputs are as agreed with the ORR following change control approval.

The work includes other work streams (which have separate funding provision):

- planned earthwork renewals at locations in Purton and Minety
- the relocation and renewal of two crossovers outside Swindon station
- provision of new footbridge in Stroud and thereby removing the use of foot crossings over the operational network.

Progress in 2013/14

In 2013/14, the following was delivered:

- challenges with the provision of engineering trains and wagons during the year have required a deferment to the GRIP 6 milestone from Easter 2014 through to August 2014. This was done following a detailed review of the competing projects by senior stakeholders. The outcome was to agree this deferment which would permit this project to once again coincide (in totality) with Swindon A Signalling Renewal (SASR)
- the challenge with the provision of engineering trains was driven by the extension to programme as a consequence of the derailment of an engineering train within the 23 day blockade in summer 2013. The significant output of this was to remove core elements of scope that could not now be undertaken within the blockade (and so would need to be reprogrammed) given notable damage to existing infrastructure was caused (by the derailment) that was not part of the project works and so increased the project scope
- works have progressed in this year toward the establishment of the new track bed for the second track and with a significant amount of the second track now in place. This output has also included substantive enhancement of a number of core earthwork sites to accommodate for the second track and track bed
- a revised commissioning strategy has been developed with SASR. There are now two blockades in April and August. The latter will commission this project and SASR
- the new footbridge in Stroud has been commissioned on programme in February 2014. Following objections interim arrangements are in place for the closure of the two foot crossings (Beards Lane and Downfield). This will lead to a planning appeal and the requirement for a Statement of Case to be produced by this project.

Significant interfaces

- prime interface with SASR to coincide planned works between the enhancement (Swindon to Kemble Redoubling) and renewal. It has been noted that SASR had been due to commission (in totality) at Easter 2014. However, challenges with the programme were encountered which led to a two tier commissioning timeline (Easter and August). With the deferment of this project, SASR will now commission in August 2014 which will coincide with Swindon to Kemble Redoubling
- GWML electrification – the project is a prerequisite to the planned disruptive works in CP5 in the Bristol area as this enhancement will allow for a robust diversionary route for South Wales services when the line is closed at Bristol Parkway/Severn Tunnel.

Programme ID 103.00 East London Line Phase 2 (ELLP2)

Current Project Stage: Project Completion

The project has delivered infrastructure to allow a four trains per hour service to run in each direction between Old Kent Road Junction and Clapham Junction.

Additional outputs include:

- better integration of rail services with other modes of transport
- improved access between east and south west

London
- additional capacity to accommodate growing demand.

Scope of Works

- Package 2: Old Kent Road Junction: Construction of a new double junction controlled from London Bridge ASC, to provide a connection to Rail for London's (RfL) East London Line with associated track, structures, power and signalling works and SCADA modifications to enable electrical power control from Lewisham ECR. Extend GSMR coverage to new Silwood Lines
- Package 3: Clapham Junction – conversion of Platform 2 into two separate four car platforms with associated track remodelling, signalling, installing a facing crossover and doubling a section of track.

This project was successfully commissioned into operational use in December 2012.

Programme ID 104.00 Station Commercial Project Facility (SCPF)

Current Project Stage: Various

The Station Commercial Project Facility is a joint rail industry initiative involving Network Rail, TOCs, local authorities and the DfT. This is funded primarily by the DfT and aims to deliver £100 million worth of commercially focused station improvements in England and Wales. In many cases funding is supplemented by TOCs, local authorities and other interested parties raising the potential provision by an additional £33 million.

The aim is to reduce industry costs by funding station improvements that generate an increased financial return. As a result of investing in assets that generate increased income, the DfT is able to achieve a higher value for the franchise when it is let. Additionally, financial benefits are realised through the creation of a new revenue stream that reduces the level of subsidy or a possible revenue share arrangement.

Seventeen projects have been completed in the last year of CP4 bringing the overall total of delivered schemes to twenty eight schemes benefiting thirty three stations. Fifteen projects are planned for completion in early 2014/15.

Progress in 2013/14

The completed projects are listed by delivery agent in Table 6.57.

Table 6.57: Programme ID 104.00: Completed projects

Delivery Agent	***Stations***
Northern Rail	New Pudsey Car Park
East Coast	Westgate
SouthEastern	Hill TG
FGW	Spa
TPE	Northallerton
First Great Western	Hanborough car park expansion
SouthEastern	Three Bridges retail development
SouthEastern	Dover Priory ATG
TPE	Huddersfield TG
Greater Anglia	Southend ATG
Greater Anglia	Tottenham Hale ATG
Stockport MBC	Stockport MSCP
Cheshire East	Crewe CP
Southern	ITSO Card machines
Network Rail	Neville Hill Depot Enhancements
East Coast	Ferme Park Depot Enhancements

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