

**Network Rail October 2007 Strategic  
Business Plan**

**Supporting document**

**Seven Day Railway**

# Seven Day Railway

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# 1. The vision

## 1.1. Introduction

We have been investigating the balance between generating extra revenue and meeting demand by running additional services at times when the rail network is currently closed for engineering work. We also assessed the change in costs that would occur as a result of re-packaging engineering works to meet these changed access periods. In many cases new engineering methods and technological innovation will be required to deliver the work in the new access periods.

As the railway has grown and continues to grow there is a considerable case for moving from the current 5 day a week railway towards one that operates reliably and without consistent disruption for up to 7 days a week. We have declared our long term vision of becoming world class and are including the delivery of a 7 day railway as one of the key world class work streams.

Our customers have asked for us to propose solutions that will enable them to provide an undisrupted service on up to 7 days a week and are supporting us in this work. Therefore we see Control Period 4 as being the transitional period during which we progressively implement more of the characteristics of a 7 day railway so that by the end of the Control Period we are providing a rail network that is available on 7 days a week as far as possible where this is supported by customer demand.

We recognise that there will remain a number of engineering activities that will require longer possessions and that it will be necessary to continue to disrupt services on a limited number of occasions to deliver these works.

A great deal of work needs to be carried out to build up detailed timetable and engineering proposals and fully understand the costs of implementing and operating a 7 day railway. We have provided some indicative costs and revenues by building on the Efficient Engineering Access (EEA) studies taking account of additional requirements for the 7 day railway. It should also be recognised that this will require a substantial cultural shift and that the speed of change is constrained by this cultural change.

To deliver the 7 day railway requires a commitment to significant innovation. The nature of innovation means that there is little or no historic evidence on which to base decisions and a risk based approach is required. Network Rail cannot deliver the vision alone. However, we aim to work closely with passenger and freight operators to move increasingly towards a 7 day railway in the belief that this will generate benefits to the industry which outweigh the incremental infrastructure costs.

## **What we want to do**

Rail travel is enjoying a period of sustained growth and there is a greater requirement being placed on the industry to cope with expansion of both passenger and freight markets. Between 1952 and 1995 rail travel was in decline and did not see the huge growth that occurred in both road and air transportation. This was, in part, due to the railway not being prepared to manage and fulfil the demand for weekend services which was, and remains, a key driver for transportation development.

Our passenger and freight operating customers tell us that there is demand for more services than is currently offered, particularly at the weekends. Currently we offer a full 5 day railway service and carry out the majority of our heavy engineering works at the weekend in possessions. This results in a proportion of weekend services being subject to disruption and bus replacement services. There is considerable evidence to suggest passengers desire an undisrupted journey and will suffer a slightly longer journey in favour of a bus replacement service and all the complications that brings. Running a reliable service on only 5 days a week, against the increased demand for weekend travel, is becoming a growing reputational issue for Network Rail and the rail industry.

The extent of the passenger demand is being estimated by ATOC. They are working with ARUPS and the Train Operating Companies to undertake a study into the long term demand for Rail Travel.

The Freight operators are experiencing an increase in demand particularly from deep sea (intercontinental) intermodal and imported coal and the importance of maintaining through routes for over night freight traffic is increasing. They have commissioned MDS Intermodal to report on the freight revenue opportunities of a 7 day railway.

The railway also has clear economic, environmental and societal advantages over other modes of transport making it amongst the most efficient and safest mode of transport. Therefore, in addition to the need to satisfy customer demand and addressing reputational issues, there is a pressure from within the rail industry for Network Rail to exploit these benefits further.

At present the railway is not set up appropriately to deal with this current demand and future growth. The challenge taken up by Network Rail is to respond to the growth and command a larger share of the transport market. The demand is spread out over the seven days of the week which is counter to current practices of offering a service at the weekend that is likely to be degraded and disrupted. In order to meet the challenge Network Rail needs to change the basic availability of the rail network to an access configuration that will better meet user demand for up to 7 days per week. At the same time there is an opportunity to simplify the possession access arrangements for the railway.

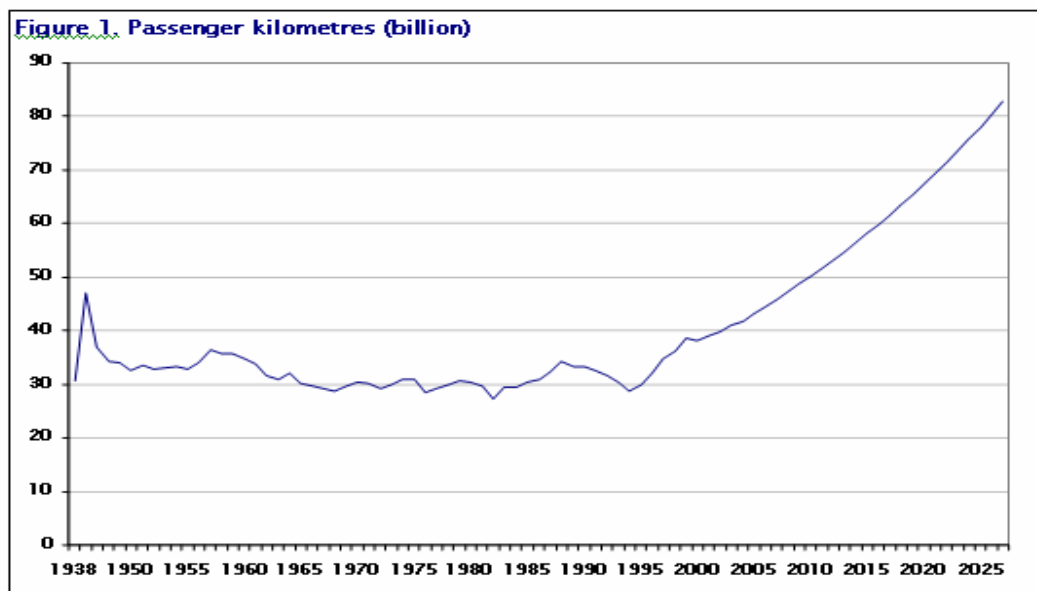
This provides the opportunity to improve current processes that are outdated and were built for the requirements of a declining railway. They do not support growing demand and are not focussed on the strategic business intent of maximising positive outcomes and performance for the industry. The current process for planning engineering work has remained substantially unchanged for many years, despite the changing reality and the requirements of the modern railway.

Network Rail also recognises that years of underinvestment in infrastructure renewal has resulted in increasing average asset age that in the short term requires additional possessions and new delivery methods to address. Increasing capacity and improving the availability of the network puts additional pressure on addressing the increased volume of the engineering workbanks.

The rail industry recognises that it needs to realise its competitive edge and reconstitute its structure and fabric to deal with the challenges of a growing market, a greener economy and the expectations of the public. There is compelling evidence that providing a reliable 7 day railway will stimulate demand and unlock further potential demand for rail travel. However precise quantification of this remains difficult.

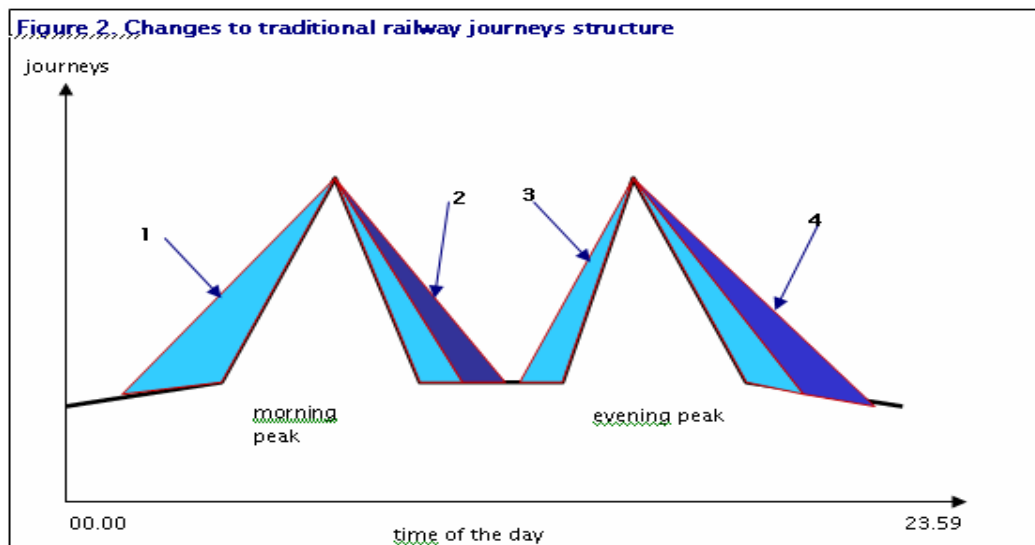
## 1.2. The benefits

The railway is no different to any other business in as much as it is subject to demand and supply forces. For the railway meeting growing demand is key and is inextricably linked with meeting customer needs. The level of



passenger travel reached 40 billion passenger kilometres in 2003 /2004 and is forecast to reach 82 billion passenger kilometres by 2027 (assuming a 3% annual growth and provided that the growth is not constrained by an inability to supply sufficient capacity).

In addition, the nature of these journeys has been affected by changes in the public's social and economic life, in as much as changes in the way people live and work affect how and when they wish to use the railway. Therefore the traditional two peak formation is being replaced by a new structure.



The morning peak is extending due to more people living further away from city centres and the growing number of leisure travellers and tourists. The evening peak is extending due to the trend towards more flexible working hours and late night shopping and social events in urban hubs.

Changes in rail journey demand profiles encompass weekend travel as well. There is now a demand for a more consistent pattern of service across the whole week. The concept of a Sunday as a day of rest has been replaced with a new tradition of Sunday as a key day of the week for shopping and leisure activities. Despite growing weekend demand the number of trains operated on a Saturday is on average 33% lower than a Monday to Friday and on a Sunday is 55% lower.

The demand is not just for more passenger trains but also for increased freight services. There is an increased demand for carrying more goods by rail due to the better performance and the green agenda.

The Freight operators are experiencing an increase in demand particularly from deep sea (intercontinental) intermodal and imported coal. A growth of just under 30 percent in freight tonnes lifted is forecast between 2004/5 and 2014/15.

There is also an increasing demand for time sensitive freight movements and for movements that require routes cleared for the W10 gauge. Many of these freight paths operate overnight and reliable delivery at final destination is key to retaining and growing these markets. The MDS Transmodal report prepared for Freightliner and EWS on the benefits of a 7 day railway concludes "In the event that a 24/7 freight railway was established well before 015... we forecast that a 24/7 railway will add £105m to rail revenue freight..

By 2030 we would expect a 24/7 railway to expand rail freight earnings by £210m”.

Developing the infrastructure and simplifying engineering and planning processes to meet this growing demand will allow the UK railway to command a larger share of the transport market and meet customer needs. To build on these further, passengers need to be given the option of booking up to a year in advance of the date of travel. This will require a rolling 52 week plan of engineering work, a major process change.

By carrying more passengers by rail instead of by road and air travel huge benefits can be found for the economy, society and the environment. As the safest and cleanest mode of transport in the UK the railway can offer, not only reduced carbon dioxide emissions, improved safety, less serious injuries and fatalities and less congestion, but also tangible financial savings and social benefits that can benefit the British society as a whole.

Network Rail has set ourselves the vision of becoming the best at what we do and delivering a 7 day railway which is seen as a key output for a world class railway. The provision of reliable services throughout the week will improve the competitiveness of rail against other transport modes and contribute towards satisfying the demand for travel.

## **2. Analysis**

### **2.1. Introduction**

The vision for an increasingly 7 day railway has been developed building on three work streams that have been undertaken. These are:-

- a theoretical analysis of the demands and requirements,
- the industry wide efficient engineering access (EEA) studies, and
- the Sustainability Strategy Steering Group (SSSG) report on the access regime to be implemented on the West Coast Main Line from December 2008.

The emerging results from this work coupled with Network Rail's aspirations to become a World Class organisation led to the realisation that by achieving step changes in the way that access for engineering work is packaged and in the methods used for delivering the work packages, then the availability of the network can be increased and reliable services increasingly provided throughout the full 7 day week.

The EEA and SSSG studies covered specific routes only and to provide estimates of the cost and revenue impacts of moving from the access regimes that exist today has required a number of assumptions to be made regarding the applicability of the conclusions from the EEA and SSSG studies to other routes and for the 7 day railway concepts.

This section summarises the evidence from each of the 3 work streams and how this has been taken forward to assess the likely costs and revenues for a 7 day railway.

### **2.2. Theoretical background**

In June 2007 we published the "7 day railway the Concept" document at the Rail Industry Planning Conference. This document provided the theoretical case for change and outlined the principle concepts being developed to support the 7 day railway.

It looked at the case for change based on the changing demand patterns and theoretical and practical world-class transport solutions. It proposed the key concepts behind the 7 day railway and the benefits that this would deliver. It also suggested a list of key projects that would need to be delivered to enable the implementation of a 7 day railway.

The document analysed the railway and other mass-transport development trends over the last years to identify key trends and benefits of the railway, which seems to be the most energy efficient and environmentally friendly means of transport in the UK. Growing weekend demand builds a business case to run more trains during the weekend period. However, with the current

engineering access regime NR is unable to supply the sufficient number of uninterrupted train services. Our objective is to change that.

The concept document also revealed a strong theoretical background behind the concept based mainly on the current infrastructure management trends and when compared to other world's leading transport companies. It has also listed all the benefits of the 7 day railway that Network Rail and the public can expect once the project is delivered.

Finally, two main chapters of the concept document focused on the project dependencies and requirements. After a series of interviews with the key project managers who develop the workstreams that build the 7 day railway we were able to understand key project dependencies and requirements for the future.

The 7 day railway conceptdocument has received a very good feedback from top Network Rail and industry management with more than 350 copies distributed.

## **2.3. Efficient engineering access studies**

### **2.3.1. Methodology**

The Efficient Engineering Access work stream was one of the 3 work streams that came out of the Possessions Review by the ORR. Under the guidance of the Possessions Steering Group, Network Rail has spent 14 months critically reviewing this concept. The work stream had two main objectives.

- identify possible changes to the access regime on a given route to meet growing demand for extra services and stimulate extra revenue through the fare box; and
- identify how these changes to the access regime would affect Network Rail's costs in comparison to the extra revenue that could be unlocked.

The workstream took the form of a number of case studies, the initial pilot on the London-Bristol route was led by the ORR and the subsequent case studies led by Network Rail.

The ORR sponsored Industry Possessions Seminar in October 2006 saw Network Rail pledge its commitment to the principles of an increasingly 7 day a week railway. The Integrated Industry Planning Conference held in June 2007 launched Network Rail's concept document which set out the theoretical justification for the change. The work carried out through the EEA case studies helped to develop the industry's understanding of how to make the transition from theory to delivery. It was a progressive step towards running a railway that further met the demand for services, while controlling costs and maximising revenue.

The outcome of the case studies will be used to inform the access strategies and cost profile for Control Period 4 (CP4). The local groups were best placed

to understand the affect the principles of a 7 day a week railway would have on Network Rail's costs in comparison to the potential revenue that could be generated. The new access regimes will progressively take place through the control period and beyond.

### 2.3.2. EEA studies

The following case studies have been carried out jointly with TOCs, FOCs, ATOC and ORR:-

Operator	Route
First Great Western	London-Bristol-Taunton
ONE Railway	London - Stansted Airport
ONE Railway	Great Eastern Main Line
ONE Railway	East Suffolk Line
Chiltern Railways	London - Birmingham Snow Hill
South West Trains	London - Southampton
South West Trains	London (Waterloo) - Reading
First ScotRail	Glasgow/Edinburgh - Aberdeen
First ScotRail	Aberdeen - Inverness
First Capital Connect	Hitchin-Cambridge
Southern	(Victoria) - Three Bridges -Brighton
Southeastern Railway	Charing Cross to Gillingham
Southeastern Railway	Tonbridge - Hastings

Initial discussion with operators provided estimates on the sort of revenue prize anticipated. Through the case studies we have been able to substantiate the potential demand. For example:

- on the busy London-Watford line there is a 70% drop in passenger numbers travelling at the weekend compared to weekdays
- the London to Southampton line experiences a 30% decrease in passenger numbers travelling on Saturdays compared to Monday to Friday and a 58% decrease on Sundays
- the Birmingham New Street to Banbury route carries the same number of passengers on a Saturday compared to a weekday and 30% lower passenger numbers on a Sunday

Certain patterns have developed throughout this process and it is best to break it down into several categories such as:-

#### Maintenance

In most cases which have been examined so far, there was enough flex in the maintenance access regimes to

- cut out a one night's access each week and still complete all the work by re-arranging the deployment of resources; and
- reduce possession duration to permit earlier and later services

In cases where there was no flexibility Network Rail promoted traditional concepts such as Single Line Working (SLW) as a means of extending possession time, while providing paths to run trains as well as access for engineering works. From reviewing European railway infrastructure managers, who provide more of a 7 day railway operation, Network Rail found that SLW is used for a large proportion of engineering work. In the UK where it is used less than 5 per cent of the time. Only a limited number of staff remain with the necessary skills and competencies to operate SLW and it is often not considered as an option for undertaking engineering work. Network Rail is planning to introduce increase the amount of SLW and to ensure that staff are trained to operate SLW. Engineering standards need changing/challenging to facilitate working in different conditions.

On rural and lighter used secondary routes there are longer periods of low demand, the revenue on these routes does not support the change in technology and methodology to deliver work in short possession times. On these routes the most efficient delivery method should be adopted but the work timed to fit in with a low demand period.

There does not appear to be any evidence of large cost increases on the routes we have examined so far as a result of small changes to possession regimes. The maintenance function appears to have some flexibility currently that provides opportunity to review efficiencies and package resources differently. However this will inevitably vary by location and care should be taken before reaching general conclusions.

### Renewals

Possessions for track renewals currently result in a large proportion of the disruptive possessions being taken on Saturdays and Sundays.

The cost of undertaking track renewals work using conventional methods is directly linked to the duration of a possession and the methodologies employed. If the possession time is reduced then the renewal can either be undertaken using the same methodology but at much greater cost or the methodology can be changed to a more efficient method for the possession time available. (I.e. use High Output Equipment verses conventional equipment). However the latter option will require substantial capital outlay on the plant and this plant will only be available to work on specified routes.

Using current methods there are large cost increases associated with reducing possession duration. It is possible, on certain routes, to restrict the number of possessions taken provided that the duration remains as planned. The challenge is to revise processes and methods to enable efficient delivery within these reduced access periods.

A strategic approach is being taken for the deployment of the new renewals plant and processes. When considering the deployment strategy both engineering and business need/benefits are considered.

## Demand

The following key conclusions have been reached from our analysis with operators of the potential demand:

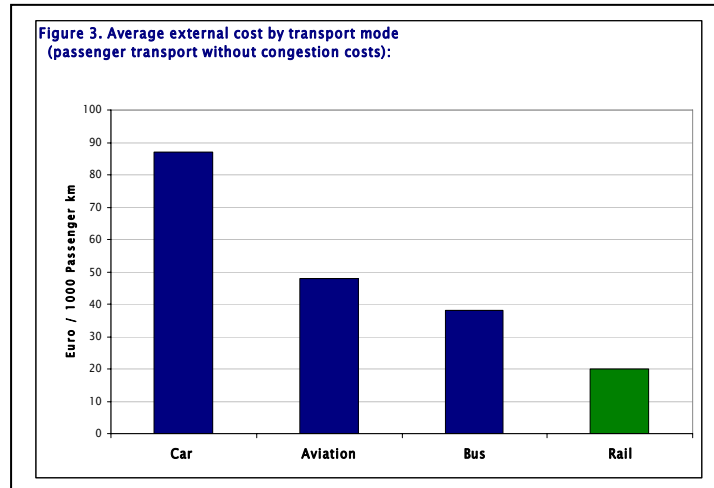
- there is strong evidence of suppressed demand at weekends, especially on Sundays;
- weekend revenues affected by disrupted services (25-50% loss);
- there is additional demand late evening and on specialist flows such as airports traffic;
- TOCs (and passengers) do not like bus substitution (especially at weekends), and the costs of putting on a bus replacement service are high. Bus substitution is suppressing demand as passengers are deterred from using trains on the weekend from fear of being put on a bus for part of their journey;
- operators in the South East do not like disrupted possessions for cyclical maintenance especially at weekends;
- routes with high revenue (Primary, London and Southeast, airport routes) appear to have a strong business case for restricting possessions to a maximum of 8 hours and ensuring services operate on 7 days per week;
- on secondary routes there is a case for reviewing current regimes and amending to more closely meet the current demand. The relevant study indicates that there was unlikely to be any overall direct financial benefit. In this example, however, there was not expected to be any increase in Network Rail's costs and there were likely to be indirect benefits as a result of people moving to a more efficient transport mode;
- on rural and branch lines there may be efficiencies from undertaking renewals work in blockades at times of low demand. The resources used to maintain and renew these lines should be deployed on routes where access is critical whenever access is available and then deployed on the rural and branch lines when access is not available on the major routes; and
- future infrastructure works on all routes should take account of the need for SLW and bi-directional signalling.

## Communications

There is a significant benefit from local engineers and delivery agents meeting with representatives from the TOCs and FOCs that operate over their routes to get a shared understanding of the demands and engineering requirements

## Societal Impact

Other drivers for the implementation of an increasingly 7 day railway comes from the desire to ease the congestion on other forms of transport. Rail travel is often the most environmental and economical way to travel, yet it commands the smallest portion of the Transport market.



(*European Transport Policy for 2010: time to decide, European Commission White Paper, 2001*)

Table 4. Petroleum consumption (m tonnes) per billion passengers kilometres travelled: United Kingdom 2005	
Road transport	0.052
Air	1.268
Railways	0.015

([WWW.dft.gov.uk/transtat](http://WWW.dft.gov.uk/transtat))

Network Rail has therefore looked at changes that could be made that are cost neutral to the industry, but improve the overall services and move the industry further towards a 7 day railway. For example, Chiltern Railways, could run additional late evening services from Marylebone to Warwick Parkway, but the additional revenue would barely cover the additional costs of running the service. However there are other less direct benefits that have not been quantified that include providing a better spread of services for the end user and the opportunity that the services may attract additional custom and it is recommended that Chiltern Railways proceed to implement the operation of these additional services.

### **2.3.3. EEA quick wins**

In many of the case studies opportunities were identified for small incremental changes to the current operating/access regime that could be accommodated with no or minimal impact to the engineering regime. On the Chiltern routes these changes included the ability to operate later services on a Friday

evening when no maintenance work is planned and staff are not normally rostered. In Scotland it proved possible to eliminate some of engineering allowances in the timetable that are never required.

The cross industry nature of the studies delivered its own benefits by helping all the parties to understand the objectives and the requirements of other parties. It is strongly recommended that foras with a similar constituent membership are held with each operator on at least an annual basis.

## **2.4. SSSG**

The work carried out on the West Coast Mainline by the joint industry Sustainability Strategy Steering Group (SSSG) was naturally subsumed within EEA. SSSG was set up to realise the benefits of the £8 billion investment in the West Coast Mainline. It adopted many of 7 day railway principles and highlighted the net industry revenue prize to be had if Network Rail could implement the recommended access regime confirmed by the business analysts.

The proposed access regime gives Birmingham, Liverpool and Manchester a service to London on every day of the week and with weekend journey times only slightly increased from the weekday timings. In addition the strategy required a through route (either West Coast Main Line or East Coast Main Line) to be maintained at weekends.

The resulting possession times available for maintenance and renewal work are very challenging for Network Rail. However, it was confirmed that Network Rail would initially implement the proposed access regime south of Crewe from December 2008 with the intention of extending it to the whole of the West Coast Main Line from December 2009 onwards.

The proposed access regime requires the implementation of new methodologies for renewals activities and changes to the delivery of the maintenance regime.

## **2.5. Extension of analysis to 7 day railway**

### **2.5.1. EEA analysis**

The EEA and SSSG studies have shown the opportunities to optimise revenue and costs that exist on specific routes. As this work stream gained momentum it provided the correct environment to see realistic possibilities in the industry wide desire to run more of a 7 day railway

This work is now assisting in understanding of the potential network wide revenue and cost changes by taking the findings from the case studies and applying them to routes with similar characteristics (passenger flows, access constraints, distance, capacity). Specific local characteristics must not be ignored. In the main, however, the basic EEA strategies can be adopted and slightly modified by expert route planners.

The following table summarises the revenue and cost changes for each of the route categories that were studied as part of the EEA project split by route categories.

### EEA Financial Summary

	Revenue		Maintenance		Track Renewals		CASE STUDY
	Current	Forecast	Current Cost	Forecast Cost	Current Cost	Forecast Cost	
Primary	400.00	440.00	100.00	102.50	180.00	190.00	London Paddington to Bristol
	97.20	97.80	6.50	0.00	7.70	8.20	West Coast Main Line
	107.00	108.00	3.23	3.23	1.97	1.97	Great Eastern Main Line
	61.50	64.40	2.10	2.90	2.10	2.10	London to Southampton Three Bridges to Brighton
Secondary	3.22	0.00	1.73	0.00	2.36	2.36	Aberdeen to Inverness
	0.00	0.00	0.00	0.00	0.00	0.00	Glasgow/Edinburgh to Aberdeen
	1.90	0.00	0.00	0.00	0.90	0.90	Birmingham Snow Hill to Dorridge
London & South East	31.20	33.89	3.18	3.41	2.91	2.91	London Liverpool Street to Stansted
	0.00	0.09	0.00	0.09	0.00	0.00	London Marylebone to Birmingham Snow Hill
	21.90	0.00	1.60	0.00	2.60	2.60	Tonbridge to Hastings
	71.30	71.50	1.40	1.40	2.10	2.10	Hitchin to Cambridge
	8.50	8.80	4.00	4.20	5.50	5.50	London Waterloo to Reading London Victoria to Gillingham Charring Cross to Gillingham
Rural	1.50	0.02	2.00	2.00	4.80	4.80	East Suffolk Line
Freight							Immingham to the Aire Valley

This data has been used to determine the network wide changes for maintenance and renewal costs for each of the main route categories (Primary, Secondary, London and South East, Rural and Freight) by taking an average change in renewals and maintenance costs from the EEA studies for each category and extrapolating this across the whole network. Please see table below:-

### Network wide EEA costs table

Category	ren/mtce	2009/10	2010/11	2011/12	2012/13	2013/14	Av	EEA %	Total with EEA
Freight Total	Renewals	63	61	62	58	58	60	100	60
London & SE Total		431	336	365	371	363	373	103.5	386
Primary Total		928	849	766	678	669	778	106.5	829
Rural Total		153	198	168	150	148	163	100	163
Secondary Total		678	723	648	609	592	650	100	650
Grand Total		2254	2167	2009	1866	1830	2025		2089
Category	ren/mtce	2009/10	2010/11	2011/12	2012/13	2013/14	Av	EEA %	Total with EEA
Freight Total	Maintenance	29	29	27	27	26	28	100	28
London & SE Total		150	145	140	136	134	141	102	144
Primary Total		442	430	416	407	403	420	102	428
Rural Total		87	84	80	77	76	81	100	81
Secondary Total		263	255	246	240	236	248	100	248
Grand Total		971	944	910	887	875	917		998

### 2.5.2. Working timetable analysis

An analysis has been undertaken on the extent to which the planned weekend train services are disrupted by line closures. The analysis looked at the total number of planned services in the Working Timetable and then, for a 5 month period, compared it with the number of services for each train operator that were planned for cancellation or substitution by a bus for all or part of a journey.

### 2.5.3. TOC and FOC aspirations for a 7 day railway

ATOC, on behalf of the industry Possessions Steering Group has led a series of discussions with all the TOC's and FOC's regarding their aspirations and infrastructure requirements for a 7 day railway. The output from these is summarised below. These meetings have reinforced the widely held view that the industry wants to run a more intensive and less disrupted weekend service.

	TOC service aspirations	Infrastructure required to facilitate SLW/bi-di
ATW	Run base Sunday timetable.	North & West, and North Wales Coast already have good SLW plans in place and the right infrastructure. Cardiff Valleys basically gives 7 day railway now with cyclic maintenance.
c2c	Run published SO & SUO timetable. Possible 1 hour later start up on Sunday to facilitate less disruptive possessions. Priority is a route London to Southend via either Laindon or Tilbury.	SIMBIDs are already in place Barking- Shoeburyness via Laindon but little use is currently made of it.
Central	Sunday business is valuable to Central, so would like to run booked timetable where possible. PTE objectives are to run the base timetable at weekends, and where possible to run later trains.	Virtually nothing available currently that is signalled. A significant numbers of crossovers would be needed on 3 of the 4 sample routes provided, however the gaps are quite small on Birmingham to Stansted (shortly to be CrossCountry) route where issue is mainly signalling the track already there. "Pilotman signals" are being provided at facing crossovers as part of Lincoln resignalling scheme.
Chiltern	Run base SO & SUO timetable every weekend. Accepting SLW at start & end of service.	Bi-di strategy provided to Network Rail, & circulated to RPF members as example. Bi-di already in place Princes Risborough- Aynho Jct, but facing crossover at Aynho is required to enable full use.
Eurostar	7 day railway will operate on new high speed line. Inspections carried out during daytime white period & maintenance done at night.	Not applicable
FCC	<b>GN:</b> Greater attention needed to managements of long range Major Possessions Strategy. Some experiments to reintroduce SLW have taken place. Must maintain a service (by any operator) from London to Cambridge.  <b>T'link:</b> Run booked timetable at all times. Fast & slow line possessions must not be planned on adjacent sections. No disruptive possessions	No engineering access friendly bi-di at present on GN. Potential bi-di opportunities: Gordon Hill- Hertford North- Stevenage; Connington Jct- Fletton Jct.; Baldock- Foxton; Waterbeach- Ely.

	south of Three Bridges between Easter & September.	
FGW	Operate WTT weekend services. They are expecting growth on Saturday evening & Sundays, so will need shorter weekend possessions by 2010 or so.	There are reasonable diversionary routes as far as Exeter, though some infrastructure enhancement is required, such as additional loop near Axminster. Critical route is from Didcot northwards where bi-di is needed urgently, plus Exeter to Penzance.
GNER	Run base SO & SuO timetable on most weekends. An amended SO/SuO timetable would be acceptable on Bank Holiday weekends. In 1993 route had major possessions 5/6 weekends a year, now around 30 a year. Earlier arrivals into London on Sunday mornings. By 2011 need 4 TPH south of Doncaster due to forecast demand.	Bi-di locations: Digswell-Woolmer Green, Huntingdon- Fletton, Stoke Jct- Loversall Carr Jct, Doncaster-Leeds, Doncaster- York.
Grand Central	Run normal Sunday timetable to Sunderland, and also Bradford which will be sought for Dec 2008.	
Hull Trains	Run base timetable at weekends. Subject to ORR approval 5 return Sunday paths from May 2008.	Faster running on slow lines (100/110/125mph). Bi-di signalling provision on 2 track sections throughout route.
Merseyrail	Run planned service on as many days as possible. SLW is not a realistic option & would not be acceptable to Merseytravel. Would consider early shutdown midweek nights (Sun-Wed) if this substantially reduced Sunday blocks.	Bi-di would involve major resignalling project with number of crossovers.
MML	Run normal Sunday service, plus earlier train Sheffield to London (arr. before 1015). Summer Sundays to be clear of major diversions. Late Saturday service London- Leicester- Etches Park.	
Northern	Run consistent service on Sundays. Northern are not convinced the additional revenue will generate a business case for their services, this may be stronger when connectional services are taken into account. PTEs would welcome ability to extend hours of operation on key local services and would potentially offer financial support.	The current infrastructure does not support SLW. Recent attempts to try this on Settle & Carlisle line were unsuccessful due to the formation not lending itself to SLW. The priority routes are: Leeds-Blackpool North, Leeds/Bradford-Ilkley/Skipton, Sheffield- Doncaster-Hull, Sheffield- Barnsley-Leeds- Nottingham (semi-fast), Liverpool-Manchester Airport.
One	Run booked Sunday service. Improved Sunday service on Metro/Southend/InterCity route. Stansted Express key priority & agreed revised strategy from Dec 2007.	Access to 4 tracks LST-Shenfield on Sunday. Concern about reduced flexibility at Shenfield. Bi-di already heavily used Shenfield-Marks Tey by freight. WA layouts inflexible & bi-di sought.
ScotRail	Main issue is to run additional late night & early morning services Mon-	Enhancements to enable SLW would be prioritised for the following

	Sat, rather than additional Sunday services. This would apply to radial routes from Glasgow (recently had late night services introduced on Fri & Sat), plus Edinburgh- Fife Circle & North Berwick. Additional Sunday services may be desirable on Edinburgh- Fife Circle, & Glasgow Queen St- Edinburgh.	routes: Edinburgh- Glasgow Queen St, Glasgow Q.S. to Perth via Stirling, Edinburgh- Dundee, Edinburgh- Stirling/Dunblane.
Silverlink	As per SSSG report from Dec 2008	Detailed in SSSG report, completed by Dec 2008
Southeastern	Consistently operate the booked Sunday service, with some enhanced frequencies where there is a business case. There is passenger demand for earlier services on Hastings – Tonbridge route.	Future resignalling schemes should incorporate bi-di provision, and this applies on most routes. If longer week night access is required then the “3 <sup>rd</sup> peak” from London after 2300 should be considered.
Southern	Sunday service timetabled to operate over 2 of 4 tracks Victoria – Balcombe Tunnel Jct, which means for most weekends the base timetable can operate to Three Bridges. However unable to run any additional services on regular basis. This arrangement has applied for over 20 years but the Sunday market has developed significantly. Would like 4 tracks available from 1100 for summer period, and eventually all year round.	No infrastructure changes are needed on mainline to operate proposed service, just access to all 4 lines. If longer week night access is required then the “3 <sup>rd</sup> peak” from London after 2300 should be considered. Future resignalling schemes should incorporate bi-di provision and most Southern routes, particularly to facilitate ECS back to depots.
SWT	Run the normal WTT service wherever possible.	A comprehensive list of crossovers and signalling requirements provided. SLW is currently possible (with some limitations): Surbiton-Woking-Basingstoke-Micheldever, Guildford- Woking, Southampton-Totton, and Guildford- Haslemere.
TfL	Demand in London is substantial throughout the day, i.e. 0600-0100. Mayor’s policy is for minimum frequency of 4 tph on London’s suburban services throughout the day, and for hours to be consistent with that of LUL. Same level of service at weekends but slightly reduced operating hours.	
TPE	Manchester & Leeds services are critical. 24/7 access to Manchester Airport, which currently has overnight buses 1 week in 6.	Concern about track patrolling possessions in Manchester area from Dec 2008. Key sections for bi-di provision: Heaton Lodge Jct. - Thornhill LNW Jct, & the Hope Valley route (heavy freight traffic also).
Virgin CC	To run as per the weekday timetable with a later start up on Sunday.	Significant amount of route currently has no bi-di capability or reasonable diversionary route. Bottleneck at Skelton Bridge (York)

		that significantly reduces ability to run services when down lines blocked.
Virgin WC	As per SSSG report from Dec 2008	Detailed by SSSG report, completed by Dec 2008

ATOC have commissioned ARUPs to undertake a review of the likely additional revenue benefits from the introduction of a 7 day railway. An interim report has been issued covering the long term revenue benefit as a result of additional Sunday services which is estimated at up to £130m per annum. In addition there is expected to be a growth revenue of £20m and a non-financial benefit of £60M.

Freightliner and EWS commissioned MDS Transmodal to prepare a report on the benefits of a 7 day railway. They have compared the anticipated growth that a 7 day railway would provide compared to that under the current (5 day railway) regime. They have assumed that the railway is “24/7” and that to achieve this efficient single line working operation will be established and that there will also be a network of gauge cleared diversionary routes.

They have concluded that “In the event that a 24/7 freight railway was established well before 2015 .....we forecast that a 24/7 railway will add £105m to rail revenue freight”  
 “By 2030 we would expect a 24/7 railway to expand rail freight earnings by £210m”

#### **2.5.4. Network Rails 7 day railway costs**

We have undertaken an initial assessment of the incremental costs and revenues associated with the introduction of an increasingly 7 day railway.

We have developed the incremental Network Rail costs in. We have taken the known costs of track installations, switches and crossing installations, signalling installations and other known asset types and formed this into an indicative programme that meets our customers’ aspirations. Clearly over time the exact nature of these schemes will be adjusted through consultation with our customers to meet specific needs for ‘7 day railway’ running. We will set up a robust cross industry business case authorisation process to refine each scheme prior to commissioning. These costs necessarily include increases to the maintenance costs as a result of the changed access regime, changes to delivery costs and allowances for additional enhancement works for infrastructure works such as bi-directional signalling and additional crossovers.

We have currently developed a list of potential initiatives at totals nearly £560 million over CP4. However, we would not expect to require all these initiatives to achieve the required outputs. We recognise that with value engineering, innovation and proper portfolio management this would reduce to up to £300 million.

Much of this is capital investment which will have longer term value. Although we believe that the potential benefits are greater than this, it would clearly not be appropriate to commit these investments until this has been demonstrated and further work is required with train operators in this area. One option could be to treat this item in a similar way to the Network Rail Discretionary Fund and we propose to discuss this with ORR, DFT and Transport Scotland to decide whether the estimated funding requirement in these areas should be combined. We summarise in the table below the principle areas of incremental expenditure.

	Seven day railway schemes	Capex	Opex
Operations	Investment in integrated engineering planning process	10	
Maintenance	New methods and equipment for patrolling and inspection	11.7	
	Junction lighting, access points and fixed warning systems	35.4	
	Investment and modifications to plant for revised working arrangements	65.3	
	Maintenance staffing costs (including training of additional staff)	5	58.34
	Isolation arrangements		10.4
	Single line working arrangements		19.5
	Intelligent infrastructure	5	2.7
Infrastructure Investment	8/200 track renewals		4
	Signalling, Electrification and Plant, Civils and earthworks, Telecommunications and estates additional costs	10	113.1
Enhancements	Remodelling and additional crossovers to facilitate the operation of single line working	75	5
	Additional bi-directional signalling	75	
	Modifications to power supply and earthing for both overhead and third rail electrified systems	55	
	<b>Total</b>	<b>347.4</b>	<b>213.0</b>

### 2.5.5. 7 day railway timetable.

A desktop exercise has been undertaken to review the feasibility of the 7 day railway principles and has demonstrated that there are no insurmountable issues with the introduction of the concepts. This has included a detailed analysis of the Kent region to show that the “third peak” (2200 to 2300 on a Friday evening departing London) can be accommodated by applying 7 day railway concepts.

## **3. Programme**

### **3.1. Introduction**

The implementation programme is a very early stage of development and a number of the concepts that are required for a 7 day railway are not yet supported by defined programmes. However some of the Efficient Engineering Access studies have identified the opportunity for incremental changes to the possession regime that would permit limited additional train services to operate. Where feasible these incremental changes will be implemented during the current control period.

In preparation for CP4 Network Rail needs to improve the consistency of the operation of the current timetable. We have already explained the plans we have in place to update current processes to remove inefficiencies. Central to this is reviewing the performance of the current Working Timetable (WTT).

It is envisaged that Control Period 4 (CP4) will form a transitional period from today's access regime to the full 7 day railway concept. It is anticipated that the concept will be introduced incrementally on a route specific basis, with the south end of the West Coast Main Line adopting the 7 day railway concepts with effect from the December 2008 timetable.

The dependencies for the implementation plan are currently being established. We have identified a number of interdependencies including the GSM-R programme (critical for the introduction of the TOP's initiative), the strategy for the deployment of the high output track renewals equipment and the modular S&C programme.

#### **3.1.1. Phase one - WTT compliance**

At the weekend Network Rail operates approximately 60-65% of the trains we do on a normal midweek day. On average 14% of weekend services are disrupted (around 8% on Saturdays and 22% on Sundays). Before we can consider running more trains and moving towards the full capacity and half capacity railway concept we need to get to a position where we are consistently running an average of no less than 95 % WTT. Only then will Network Rail have laid the proper foundations on which to build a legitimate case to running more of a 7 day railway.

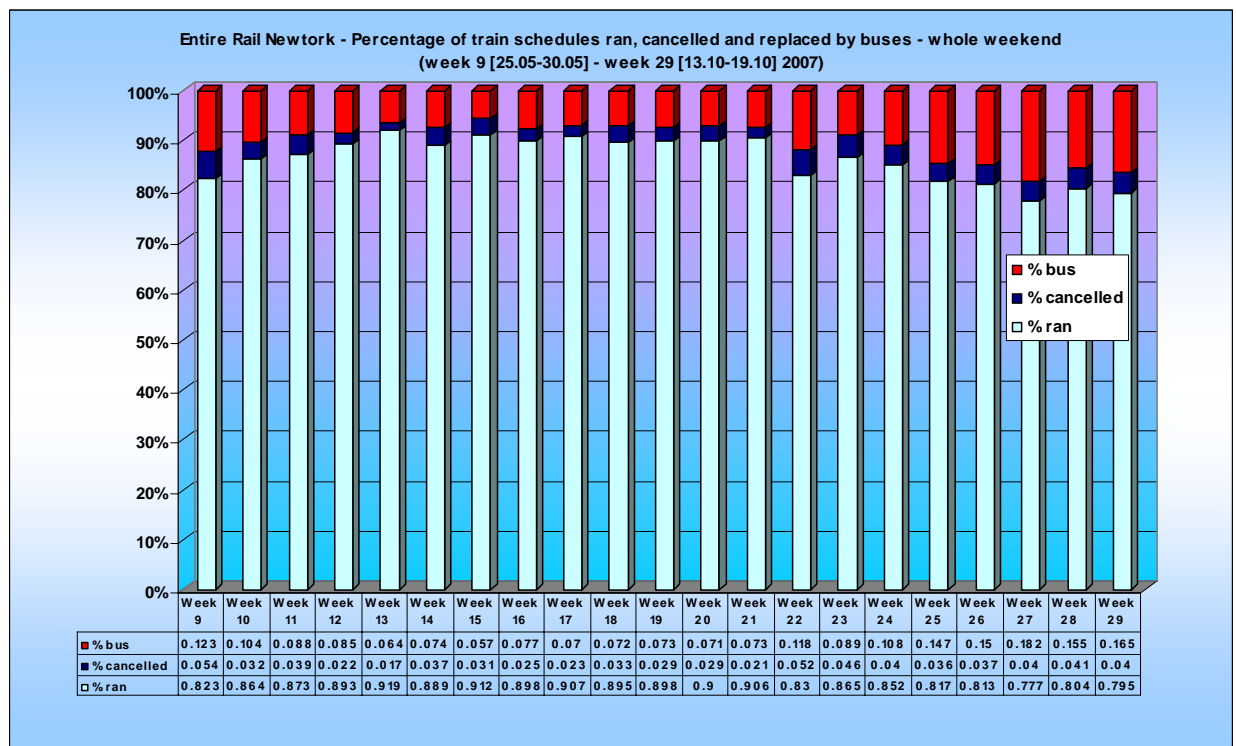
#### **Closing the gap**

The graph below shows the level of disruption caused by the current engineering practises. Network Rail need to close the gap between the amount of timetabled services advertised in the WTT and the amount of services that run. This will be achieved, in part, by engineering innovation, improved planning and refinements to the current ROTR (as seen through the EEA work). However each route has unique characteristics and different demand profiles that need to be identified and captured in route specific

recovery plans. Each routes target WTT compliance percentage will be regulated by its own demand profile.

The first stage of the process is to impose WTT disruption targets on particular TOCs to be able to increase percentage of trains ran to 90% by the end of 2008. All TOCs received their targets which in total lead to 4.1% improvement in disruptions by the end of 2008 which is believed to possible to achieve by using optimised planning and using less disruptive techniques, however it does not yet require extensive use of the 7 day railway solutions which would be relatively hard to implement in the short terms because of the long-term planning cycles.

Starting from week 30 2007/8 the Director of Operations is set to receive a weekly report prepared by the designated person from the Ops Planning department that will clearly show the progress of each of the TOCs in reducing of WTT disruption.



### **3.1.2. Phase two**

#### Half Capacity / Full Capacity Railway

There are a number of dependencies on the implementation of the half capacity railway and the phasing in of the full 7 day railway will be progressively introduced during CP4. The detailed programme for this is currently being developed.

The elements required to deliver a 7 day railway have been split into the following categories

- Demand
- Operational efficiencies
- Engineering efficiencies
- Improved processes
- Behavioural and cultural change

The following initiatives are being progressed for each of the categories

### **3.2. Demand**

#### **3.2.1. Reduce number of weekend disrupted services**

Network Rail have put in place a system to monitor the number of train schedules that are cancelled or where part or all of a journey is replaced by a bus. Targets have been set to reduce the overall volume of train schedules subject to disruption

#### **3.2.2. Identify quick wins**

The studies completed to date have identified additional availability that is currently available. A review should be undertaken on all routes to identify any further opportunities and to advise the relevant TOC about any additional services that could be run

#### **3.2.3. Develop the full capacity/half capacity timetable concept**

The strategy for achieving a 7 day railway is based on the principle of operating a half capacity railway at times of low demand. When the half capacity timetable is in operation engineering possessions will be available based on a nominal 8 hour window. This assumes using only half of the network is available for running commercial services from 10 pm to 6 am each day, with the second half being used for engineering work. To summarise, this means 4 tracks to 2 tracks, 2 tracks to 1 single line worked track.

This will allow a fixed timetable to be created that will meet user demand on up to 7 days per week and that will not be diminished on a regular basis. The strategy will provide additional train paths and improve the overall availability of the network for rail operators, whilst delivering sufficient engineering access to deliver the engineering requirements for maintenance and renewals.

To compliment this change Network Rail has developed a suite of operational and engineering efficiency initiatives to prevent locking in inefficient behaviour to a revised access strategy. The following are Network Rail's key efficiency initiatives.

### **3.3. Operational efficiencies**

#### **3.3.1. Single line working (SLW)**

The use of SLW to enable through services to operate, avoid bus substitution and the complete closure of a route is an essential component of the 7 day railway concept. In recent years negative attitudes towards it on the grounds that it is unsafe and too difficult and therefore there is a reluctance to make use of it. As a result Network Rail has lost the ability to plan and use this effectively and needs to reinvigorate SLW by understanding what can be done and how best to use SLW.

To enable the required capacity to be achieved with SLW consideration will need to be given to the provision of additional crossovers to permit entry and exit to/from the single line section and to the use of bi-directional signalling. All such schemes will subject to a full business case analysis and bi-directional signalling schemes will need to take account of the ERTMS roll out programme.

Where possible we will take the opportunity when renewing or maintaining the track to increase the interval between tracks to facilitate the use of SLW.

#### **3.3.2. Track Occupancy Permit**

This will offer a step change reduction in the time required for setting up and handing back a possession. Operating the railway in half capacity mode and increasing the usage of SLW creates a challenge to protect track worker staff and requires clear and reliable communication throughout engineering works. The present process is time consuming and TOP is quick and easy. Implementation of TOP requires strong technological support from GSM-R and changes to some safety-critical rules.

#### **3.3.3. Electrical isolations**

There are a number of indicatives in place aimed at improving the efficiency of taking electrical isolations. These include:

Standardising on the use of 'Procedure B' for current isolation

At present the vast majority of the Network uses 'Procedure B'. Kent, Sussex and Wessex use 'Procedure A'. There are a few exceptions as the North London Line and Network Rail/CTRL interfaces at Ashford, Ebbsfleet & Folkestone, with LUL soon to follow on the East London Line at New Cross Gate use Procedure B. The basic difference between the two procedures is

that under Procedure B we take a Block to Electric Traffic and work can be completed in stages between the passage of d.c. electric trains or non electric trains if required (Network Rail/WI/ELP/3091 instruction B26.3) making it more flexible with regard to the train service. Under Procedure A, we take a T3 possession which requires the complete stoppage of all normal train movements on that line. Introducing Procedure B on a wider scale will require briefing to maintenance staff, signallers and ECOs.

### DC (3<sup>rd</sup> Rail) Isolations

We are trialling a method called “buffer zone” isolation. A S/C strap is applied at each end of the isolation (the buffer zone). All of the rectifiers that supply the intermediate sections are then discharged and this avoids the need to apply further S/C straps in these sections as the isolation is protected by having Circuit Breakers opened and inhibited. This will not work everywhere on third rail railway as quite often a rectifier will be supplying more than 1 route and if all of the rectifiers were discharged then we would not be supplying electricity to routes that are available to traffic.

We are also looking at other options for 3<sup>rd</sup> rail systems that include remotely operated S/C devices, procuring a DC Circuit Breaker that has a S/C capability, designing and fitting a mechanical S/C device that becomes a fixed part of our infrastructure, using S/C bars in intermediate sections rather than S/C straps (similar to Merseyrail, but we would need to consider if on track machines are being used) or challenging the usage of S/C straps with RSSB etc. (London Underground open all of their DC CBs every night and do not apply any straps or issue any documentation for their isolations!).

### 25Kv OLE isolations

We are installing AC Circuit Breakers (CB) that can be closed to earth . These negate the use of flexible earths. These CBs are being installed around the country as part of the AC switchgear renewal programme but are not everywhere and unlikely to be everywhere for a very long time. OLE isolations require flexible earths to be applied every 2 miles if both lines are isolated however if 1 line is to remain open and energised (e for Single line working) then earths have to be applied every ¼ of a mile.

#### **3.3.4. Diversionary routes strategy**

The timetabling concepts of the 7 day railway will require a strategic approach to the provision of diversionary routes.

It is our customer’s view that at present there are often several possible diversionary routes but all have severe operational restrictions that render them unfit for purpose. These restrictions include gauge clearance, non electrified, low line speed, reduced capacity, extra mileage and additional journey time.

Freightliner and EWS have stated that they require a true diversionary network with one or two fit-for-purpose diversionary routes to be created for freight to allow a suitably capable route to be always available for the core freight routes both on midweek nights and at weekends. In order for this to be economically viable diversionary routes must be gauge cleared, and allow for the same weight and length of train including axle load and crucially allow for no worsening in journey time. There will be further considerations to freight operator such as additional costs for fuel, track access and marginal wagon and loco maintenance for longer journeys.

Such a network will require considerable investment and a step change in NR maintenance patterns with a need to avoid constant and unpredictable diversions, however the revenue opportunities are considerable.

### **3.4. Engineering efficiencies**

#### **3.4.1. Modular switches and crossings (S&C)**

This is a well developed project aimed at reducing S&C renewals down from 54 hours to 8 hours with the added benefit of an average cost reduction of 25% and a guaranteed standard quality throughout the network that can increase safety, as well as reduce maintenance. It provides standard, factory built and ready for installation products that can be delivered to site on bespoke wagons. Current process requires 5 preparatory 8 hour possessions, 1 core 52 hour possession and 5 follow up 8 hour possessions with Temporary Speed Restrictions (TSRs). Modular S&C aims to reduce this to 2 'core' 8-12 hour possessions for a crossover and a single 8 hour possession for a turnout.

#### **3.4.2. High output methodology**

The introduction of High Output Track Relaying and Ballast Cleaning in 2004/05 has delivered significant quantities of midweek plain line renewals in possessions of 8 to 11 hours. Network rail are equal to or best in class at high output deployment and the use of this technology has now passed into 'business as usual'. There is a business case for the purchase of more high output kit currently being evaluated.

#### **3.4.3. Modular plain line**

The basic concept is to develop a standard unit of plain line rail, sleeper and ballast (RSB) track renewal. All future work will be based on repeating multiples of this unit either within single or separate possessions. If this is achievable then the drive will be to reduce delivery time, not increase the unit of delivery. The starting point is 200 yards of full renewal which fits with the existing unit of long welded rail. This is planned to be delivered in 8 hours of SLW possessions with all work completed in the possession with the track returned to traffic at 80 mph or line speed (whichever is the lowest), 80 % track quality with no follow up work and improved unit costs for the end to end supply chain.

#### **3.4.4. Plug and play signalling**

This aims to reduce the time taken in testing and commissioning signalling renewals by using equipment and processes that allow quicker testing and commissioning of new signalling installations through independent testing of trackside and interlocking equipment. Plug and play signalling involves introducing robust plug-couplers between all trackside signalling elements and the interlocking equipment, thus allowing interlocking and trackside installation to be installed and tested independently. This process will significantly reduce the time taken to test and commission signalling equipment, avoiding disruptive possessions.

The continued development of these initiatives, such as SLW and the continued squeezing of track access into the 8 hour window will open up new opportunities both for timetable amendments and the engineering process. The findings of the EEA work stream will be implemented throughout the network in order to move towards a more demand led timetable and will inform the shape of the new timetable and engineering regime. This will still require a review and change to these planning processes.

### **3.5. Process change**

#### **3.5.1. Timetable planning**

Network Rail is currently developing the December 2008 7 day railway timetable for overnight and the mid week period. The new train planning system, Integrated Train Planning System (ITPS), will aid Network Rail in producing a full capacity / half capacity timetable.

#### **3.5.2. Engineering work planning**

This process needs to be redesigned order to simplify it and adjust to the needs of the 7 day railway with the main guidelines being:

- a reduction in people, meetings and time required before the work start.
- linking people and functions involved in the process with people accountable for it.
- taking into account the fixed possessions hours and aT-52 weeks lock down before the start of the possession.

In order to demonstrate and monitor the availability of the network in terms of length of track and time Network Rail have developed an Availability KPI. This can be used as an indicator of how well we are managing our engineering access. Network Rail is currently developing this further to be able to capture the level of disruption caused by the percentage of track unavailable.

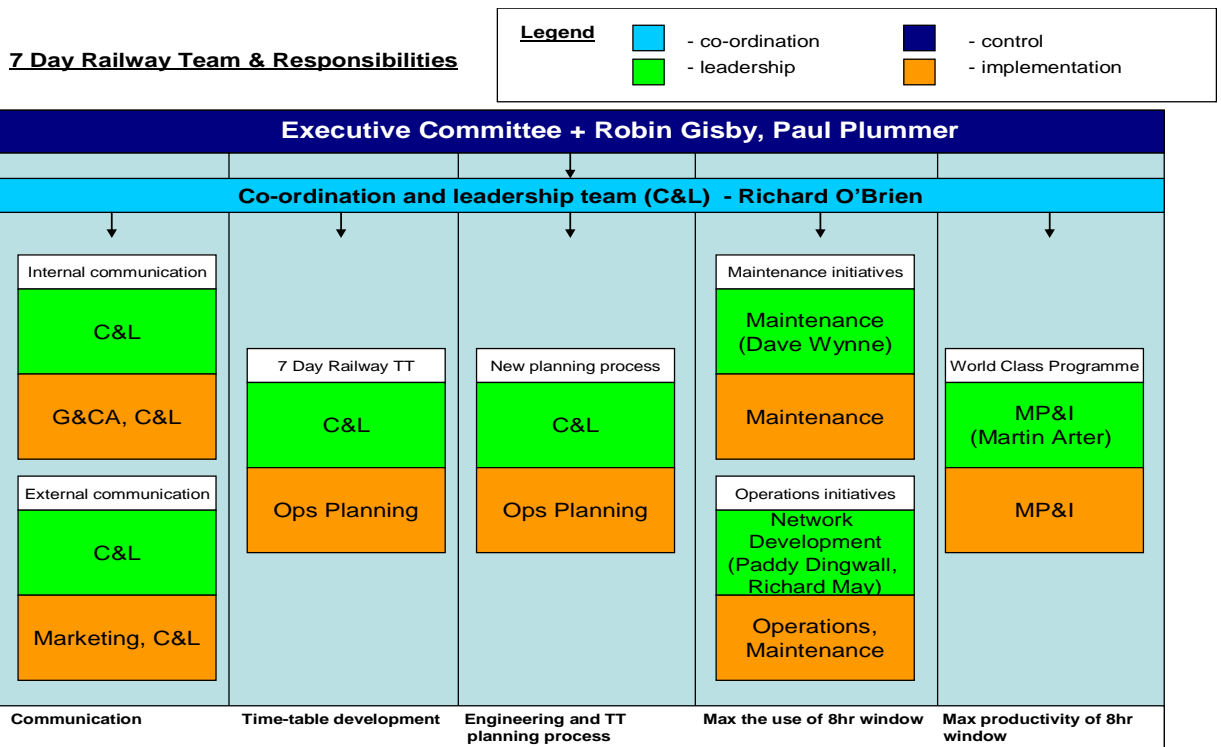
We are developing a measure of the number of services that are disrupted each week and plan to start managing this on a week by week basis by setting route based targets.

### **3.6. Behaviours and culture**

An organisation's culture can be defined as 'the way we do things around here'. It is difficult to change and it can be argued that organisations are captured by their own cultures. The implementation of a 7 day railway will require cultural changes.

Training and communication will play a fundamental role in easing through cultural changes as it will help to build up confidence in new procedures and will span across all business units.

### 3.7. Overview of high level implementation plan



### 3.8. Provisional NR implementation programme

Route	2009/10	2010/11	2011/12	2012/13	2013/14
Kent	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW	Max 8 hrs - SLW	Max 8 hrs - SLW
Wessex	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW	Max 8 hrs - SLW	Max 8 hrs - SLW
Sussex	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW	Max 8 hrs - SLW
LNW - West Coast South	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW	Max 8 hrs - SLW	Max 8 hrs - SLW
LNW - West Midlands	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 8 hrs - SLW	Max 8 hrs - SLW
LNW - Manchester	Existing /as is	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 8 hrs - SLW
LNW - Liverpool	Existing	Max 16	Max 12	Max 12	Max 8

						/as is	hrs	hrs	hrs - SLW	hrs - SLW
LNW - Preston						Existing /as is	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 8 hrs - SLW
LNE - North Eastern						Existing /as is	Existing /as is	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW
LNE - Great Northern						Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW	Max 8 hrs - SLW
LNE - East Midlands						Existing /as is	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 8 hrs - SLW
Scotland - Edinburgh & Glasgow	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW	Max 8 hrs - SLW	Max 8 hrs - SLW					
Scotland - Rest of Scotland						Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW	Max 8 hrs - SLW
Western - Wales & Marches						Existing /as is	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW

Western - West Country	Existing /as is	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW
Western - Thames Valley	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW	Max 8 hrs - SLW
Anglia	Max 16 hrs	Max 12 hrs	Max 12 hrs - SLW	Max 12 hrs - SLW	Max 8 hrs - SLW

Maximum weekend renewals possession durations	CP4 -7 Day Access Pattern						
Application to	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Proof of concept	Conventional	37 hrs	27 hrs	16 hrs	8 Hrs + HCR	8 Hrs + HCR	8 Hrs + HCR
WC South (SSSG)		12 Hrs	12 Hrs	12 Hrs	8 Hrs + HCR	8 Hrs + HCR	8 Hrs + HCR
Reduced access booked for Tranche 1 routes		Conventional	37 hrs	27 hrs	16 hrs	8 Hrs + HCR	8 Hrs + HCR
Kent, Wessex, E&G, Reduced access booked for Tranche 2 routes		Conventional	Conventional	37 hrs	27 hrs	16 hrs	8 Hrs + HCR
All others, but excluding rural lines							

#### Assumptions

Half capacity railway (SLW on 2 track, 2 track on 4 track) only required to support 8 hour access pattern

Proof of concept required to lead access booking by 1 full year

Conventional access pattern currently being developed for 2009 timetable year RoR, so no significant change ahead of 2010

Not feasible to roll-out change to all operators in a single tranche due to scale of change and potential resistance

There will still be a small proportion (TBA) of exceptional disruptive possessions required for activity which cannot be delivered in short possessions

### 3.9. 7 day railway cost analysis

FUNCTION	Project	Activity / Requirements	Rational	Quantity	Capex £m	Opex Spread to reflect gradual intro during control period				
						2009/10	2010/11	2011/12	2012/13	2013/14
Operations										
	Half capacity timetable	Single line working – additional staff for operation of SLW	20 staff at £50k			0.1	0.3	0.5	0.7	1
	Rule book issues	Additional signal box opening times.	staff cost only			0.1	0.3	0.5	0.7	1
	Engineering Planning	TOPS – national implementation costs (radios etc if not already included)	assumed inc elsewhere							
		Gatekeeper (are costs included elsewhere)	assumed inc elsewhere							
		OTM switch out (are costs included elsewhere)	assumed inc elsewhere							
		Others	assumed inc elsewhere							
		New timetabling system (ITPS) New engineering planning process	assumed inc elsewhere eg new IT system?		10					
		Strategic plant deployment	assumed no additional cost							
	Miscellaneous	Update Network Code	assumed inc elsewhere							
				Ops Total	10	0.2	0.6	1	1.4	2

Maintenance					2009/10	2010/11	2011/12	2012/13	2013/14	
	Track	Design patrolling	Purchase of Inspection Trolleys	100	0.7	0.002	0.006	0.01	0.014	0.02
			Daytime activities to nighttime		0	0.025	0.075	0.125	0.175	0.25
		Daylight inspection of S&C (restricted)	Assumed extra staff/overtime	N/A	6.5	0.05	0.15	0.25	0.35	0.5
		LOWs systems	Purchase of systems and ongoing maintenance	100	4.5	0.005	0.015	0.025	0.035	0.05
		Installation of FATWS	Purchase of systems and ongoing maintenance	100 sites	9	0.005	0.015	0.025	0.035	0.05
		Junction lighting	Purchase of systems and ongoing maintenance	N/A	7.5	0.005	0.015	0.025	0.035	0.05
		New access points	Installation and ongoing maintenance	N/A	19	0.2	0.6	1	1.4	2
		Changes to working hours, may mean additional staff to cover daytime rapid response duties	5% uplift to maintenance labour cost		0	1.25	3.75	6.25	8.75	12.5
		Additional S&C tampers (limited all line blocks)	Up to 12 extra machines	12	33	0.315	0.945	1.575	2.205	3.15

		Additional plain line tampers (would need justification and should be more possession time but with adjacent line open) May be cost of adapting tampers to work under SLW	Modification cost for SLW	N/A	4.8	0	0	0	0	0
		All new plant to be specified for operation under SLW, will add cost to all plant investment	annual mtce cost assumed covered elsewhere	N/A	17.5	0	0	0	0	0
		New methods needed for welding with adjacent line open		N/A	10	0.05	0.15	0.25	0.35	0.5
		Recruitment Training, accommodation for additional staff	Overheads	N/A	5	0	0	0	0	0
		OLE Isolation and earthing additional staffing?	138 extra staff		0	0.2	0.6	1	1.4	2
		SLW additional site protection staff		N/A		0.55	1.65	2.75	3.85	5.5
	Signalling	UTU, Rail Grinding, NMT assume that no additional resource required	assume costs covered elsewhere							
		Should not have much of an impact on signal maintenance activities		N/A		0.095	0.285	0.475	0.665	0.95
	E&P	Method of doing E02 inspections with adjacent line open (may need significant investment in OLE rationalisation)	may need new plant		5	0.25	0.75	1.25	1.75	2.5
						0	0	0	0	0
	Miscellaneous	There could be additional costs based on following (fbased on West Coast list)				0	0	0	0	0
		Drainage, removal of RZP, RCM lite, Intelligent infrastructure, small plant, railvac, drain train, vegetation, fencing, removal of redundant infrastructure, spares, tamper stabling points	Drainage covered in another Capex. Intelligent Infrastructure (Points Condition Monitoring)	N/A	5	0.105	0.315	0.525	0.735	1.05
		Changes to terms and conditions	assumed included elsewhere							
		Additional Staff due to work moving to night.	Overheads	110		0.18	0.54	0.9	1.26	1.8
				Mtce Total	127.50	3.287	9.861	16.435	23.009	32.87

Infrastructure & Investment				2009/10	2010/11	2011/12	2012/13	2013/14
Track Renewals	HO renewals	Assume that current 2 x HOBC and 1 x TRT plus additional sets ordered for West Coast will be sufficient to cover all routes. Costs should therefore be included already	5					
	Conventional 8/200	Assumption needed on costs (development and ongoing) P Ansell suggested that for 16 hours there would be no unit costs increase but that 8 hour looked like a large cost increase. Also how much of the workbank would be delivered using this method		0.816	0.816	0.81	0.817	0.817
	Modular S&C	Assume current programme covers whole network and no additional costs for 7DR						
	NDS	May need to change engineering trains and LDC's to meet new access times (assume opex inc above)						
	Signal Renewals							
	Signalling renewals	modern equivalent renewals		0.704	2.803	13.043	13.043	13.043
	E&P renewals							
E&P renewals	modern equivalent renewals	0	0	0	2.4	6.965		
Civils								
Civils renewals	modern equivalent renewals	2.538	5.944	17.271	17.271	17.271		

	Estates	Estates renewals	modern equivalent renewals		-0.127	-0.151	-3.471	-2.187	-3.848
	Telecoms	telecoms renewals (UTX)	modern equivalent renewals		0.11	0.191	0.191	3.125	7.007
	Engineering	Asset Policies	assumed to be covered elsewhere.						
				I&I total	5	4.041	9.603	27.844	34.469

Enhancements				2009/10	2010/11	2011/12	2012/13	2013/14	
Track	Signals	Additional infrastructure investment in crossovers	50 xovers at £1m each. mtce 100k pa per crossover	50		0.5	1	1.5	2
		Other remodelling to facilitate SLW	guess	25					
	E&P	Resignalling schemes	All resignalling schemes that have not yet reached GRIP 3 should be remitted to include full bi-di. Additional investment cost required (if not already included).	75					
		Rationalisation of OLE.	Assumed that OLE renewals already in CP4 base will include rationalisation.	25					
		Remote Earthing	Cost of installing automatic earthing devices to reduce the requirement for on site earthing straps	10					
		Conductor Rail position	On 3 <sup>rd</sup> rail cost of moving 3 <sup>rd</sup> rail away from six foot (may have implications for patrolling in cess that need consideration)	10					
		Conductor Rail strapping	Installation of remote operated earthing straps	10					
			Enhance total	205	0	0.5	1	1.5	2
TOTALs									
			TOTAL SPEND	347.50	7.53	20.56	46.28	60.38	78.13