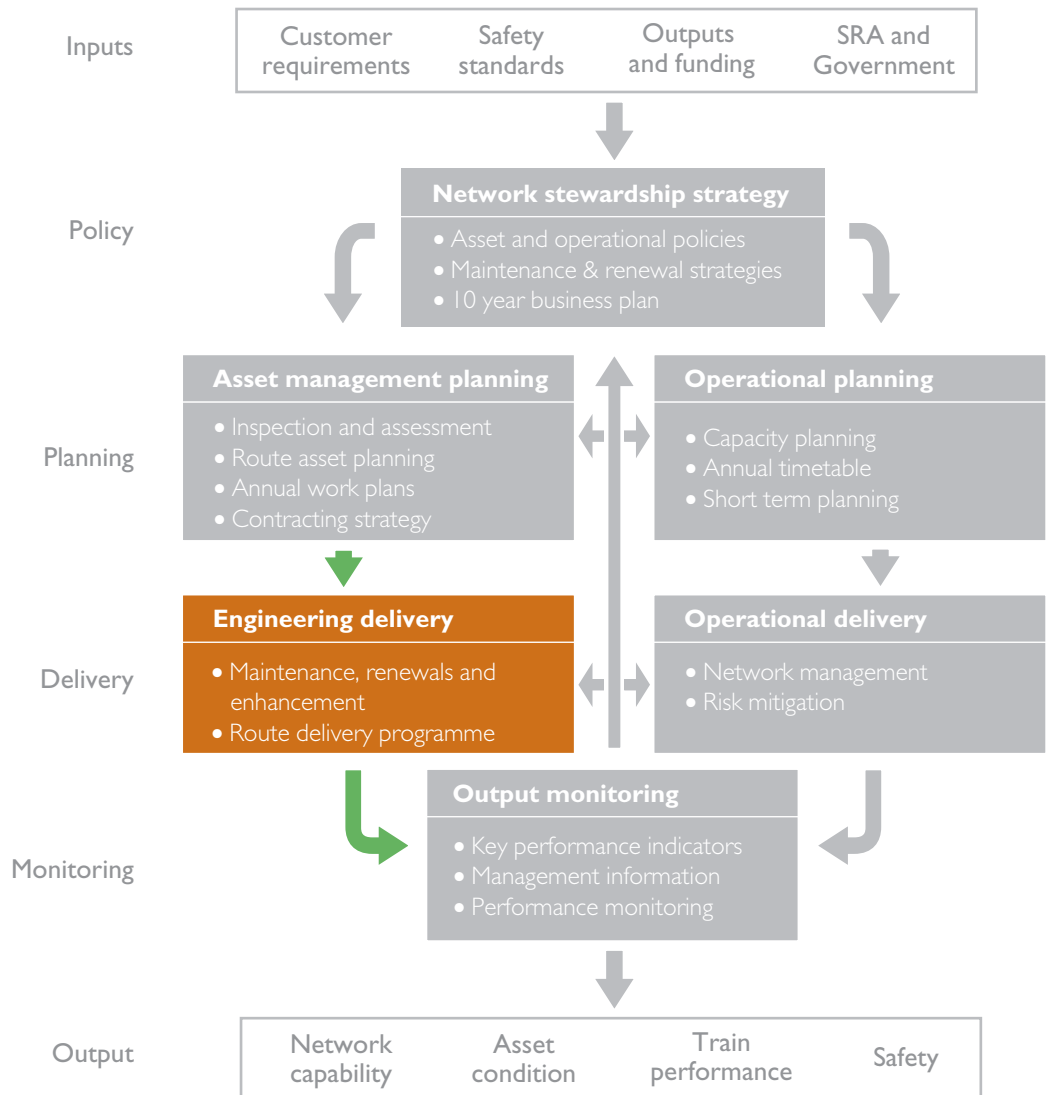


Section 5

Engineering delivery



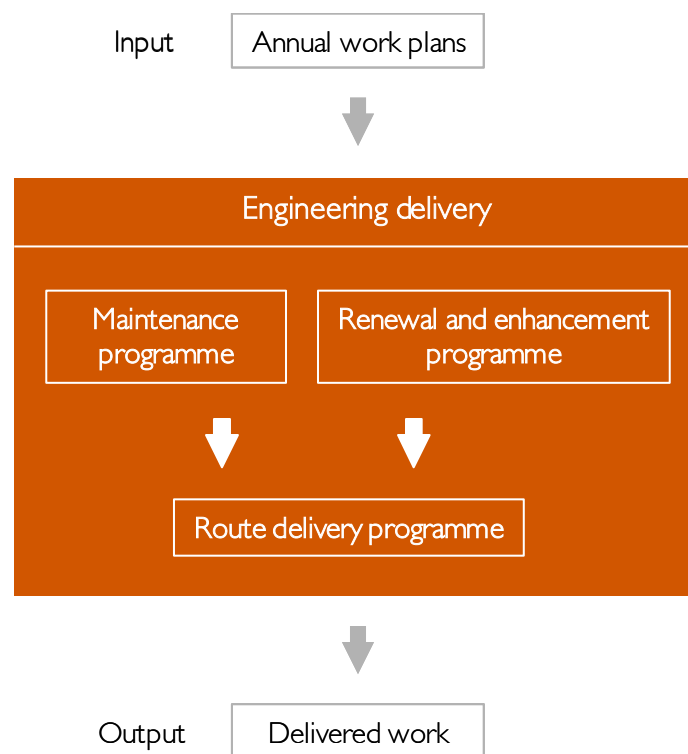
Objective

The asset management planning process provides details of the maintenance, renewal and enhancement work that must be carried on the network over the next three years via the annual work plans. Engineering delivery is the process that delivers these work items in the most cost-effective manner, seeking opportunities to combine work items to optimise delivery efficiencies and possession opportunities.

Approach

Our intended approach is to bring together the maintenance, renewal and enhancement (where appropriate) proposals identified within the annual work plans to develop a robust route delivery programme that provides a suitable balance between potentially conflicting issues, including resource availability, delivery costs and network access.

Figure 5.1 Engineering delivery



In this chapter, we identify the long-term components of successful delivery, assess weaknesses in the delivery process, and highlight the key actions we are taking to address the weaknesses.

There are four key components that comprise the engineering delivery process:

- **maintenance programme** – a detailed programme to deliver the identified work must be developed far enough in advance to obtain resources and identify and request restrictions of use. The move to in-house maintenance will maximise the opportunities to use renewals possessions to also enhance access for maintenance;
- **renewals and enhancement programme** – we aim to develop a deliverable programme of work for renewal and enhancement schemes a year before delivery;
- **area delivery programme** – we intend to move to an area delivery programme whereby an iterative process will commence as part of the annual business plan appraisal, and balance conflicting demands for resources, including possessions, and produce a single programme for each route that optimises network access; and
- **workload delivery** – continuous year-on-year improvement will be sought through the implementation of improvement programmes.

Although projects and contracts may extend over several years, the delivery process should commence at least 20 months before the beginning of the timetable period within which delivery will occur.

An agreed and resourced area delivery programme will be updated as the level of detail on the plan increases approaching the delivery date. Where contractors will undertake the actual work, it will be supervised and accepted by us. If the quality of the work or any supplier process is found to be unacceptable, this will be recorded and managed by a Corrective Action Report (CAR) process. Independent monitoring and audit will also be undertaken as appropriate.

Significant progress has already been made in addressing a number of the shortcomings in our existing processes. Continuing improvements will enable the delivery of our long-term goals and are directly linked to the completion of the transfer of maintenance contracts in-house. Coordination of work along lines of route and greater discussion of our work proposals with our customers will further improve our effectiveness and efficiency.

Maintenance delivery

This section summarises our plans to achieve the significant improvements required in maintenance delivery to ensure we deliver a sustainable rail infrastructure that meets customer and stakeholder expectations for reliability and availability. These plans have been developed and prioritised, in line with the principles set out in Section 3, to ensure that maintenance is delivered in a way which:

- balances the need to maintain strict engineering standards for managing asset life with the customers' needs for train service availability and performance;
- secures the safety of our employees, contractors, the travelling public and the communities within which we work;
- provides consistent value for money;
- delivers a railway that reflects visually the quality of the underlying asset; and
- develops a culture identified by openness, reliability, pace and absolute determination to deliver these objectives.

Our immediate plans are dominated by the actions required to bring maintenance back in-house, together with the creation of an effective maintenance function within Network Rail. This is itself taking place within the context of a much wider functional restructuring of the whole company. Nonetheless, it is essential that at the same time we lay the foundations for transforming the way in which maintenance is delivered. These changes will take time to deliver and are expected to take three to five years to embed within the new organisation. We are committed, however, to moving as far and as fast as possible. There will be three core phases to the programme:

- for the coming year our focus will be on **taking ownership** of maintenance, delivering compliance, safety and early opportunities for efficiency savings;
- this will be followed by **accelerating improvement** through performance, innovation and higher productivity; and
- then we must move to **sustained and reliable performance** underpinning long-term credibility in our delivery.

Taking ownership

The transfer in-house of all infrastructure maintenance contractors will be complete by the end of July 2004. Commencing with the existing in-house maintenance functions, we will rationalise the delivery areas into a standard organisational structure, properly sized to deliver our obligations. This structure will be designed so as to recognise the three strands of activity: rapid response, core and heavy maintenance.

Alongside this, we will develop a nationwide capability to deliver safety and technical competence to all levels of the delivery organisation. This will incorporate the best aspects of existing practice and will underpin the significant organisation and process changes that we intend undertaking.

We will complete the implementation of the MIMS work management system, ensuring that all areas are not only business reliant on MIMS, but are actively maintaining data quality and using the intended functionality of the system to deliver improvements in work planning and management.

Over the past year Six Sigma techniques have been used to identify key changes in maintenance that will drive reductions in train delay. We will make specific, full time resource available to continue this early work, implementing the projects currently in progress and creating new solutions.

We will lay the foundations for the next phase of improvement by introducing a new framework for standardising our processes and procedures, together with implementation of some early improvements, notably in work delivery planning, a key enabler for increased productivity, and other efficiency savings. This will be supported by definition of our key strategies, including those for plant and equipment, strategic spares and materials, and technologically driven change.

Accelerating improvement

In 2005 we will increase the pace and deliver a step change in maintenance delivery. A key element of that step change will be the development and implementation of the full suite of standard processes and procedures required to ensure that maintenance is delivered consistently and effectively. Comprehensive briefing, training and embedding of the new approach within our front line delivery units will support this. The environment in which our people work, both on and off the railway, will get increased attention as we upgrade our delivery units and impact the visual appearance of the railway.

We will introduce new technologies, plant and delivery techniques, in line with our developed strategy. Significant streamlining of our supply chain will be delivered, building new relationships and ensuring a robust base that is both reliable and efficient. Ensuring that our spares and materials are managed coherently and match world-class logistics standards is a priority. These activities will be underpinned by our comprehensive training and development programme delivered principally from Network Rail owned facilities and by our own experts.

Having delivered a step change in delivery, we will move into a phase of sustained continuous improvement, benchmarking our people and our processes against world-class delivery standards and using Six Sigma to refine our performance.

Maintenance efficiency initiatives

The move to in-house maintenance will give use the opportunity to optimise a number of the efficiencies we identified in the June 2003 business plan, as detailed below:

- **reduce the amount of re-work** – analysis has indicated that a significant amount of permanent way work is actually re-work within a relatively short period of time. Re-work largely occurs because the initial job was not completed effectively the first time, which has a variety of causes, including poor planning, insufficient access to the network, inadequate asset information and addressing symptoms rather than root causes. The move to in-house maintenance will help drive us towards a “right first time” environment, resulting in lower labour, plant and material costs;
- **reduce the amount of reactive maintenance** – it is currently estimated that at least of 20% of work is not identified or planned sufficiently far in advance to enable it to be delivered at optimum cost, with the resulting work costing over 25% more than if the work had been planned effectively. We will move towards a more proactive, optimised cost approach through better planning and improved understanding of our assets;
- **mechanise manual activities** – opportunities exist to mechanise many activities that are currently carried out manually. We are continuing with our initiatives to increase mechanised inspections and to introduce mechanised switches and crossing grinding. Further opportunities have been identified and are currently being assessed;

- **increase labour utilisation and productivity** – labour utilisation is currently low and productive time is estimated at 30-40% of available time. A significant element of “lost” utilisation is associated with sub-optimal possession patterns. The remaining “lost” utilisation occurs primarily as a result of travel time, set up time, working methods and practices, poor planning, sickness and training. By improving planning, reviewing working practices and procedures, and improving possession management we will increase productivity; and
- **increase plant utilisation** – a significant quantity of plant is life expired and unreliable (70% of tampers are over 25 years old). Utilisation levels of certain types of plant are less than 40% of available time. In the past, short-term maintenance contracts did not act as an incentive for contractors to invest in new plant. We are improving the forecasting of long-term requirements for plant and will either enter into long-term contracts, or purchase new plant, to reduce costs and facilitate national plans to improve utilisation. Additional initiatives include improving delivery planning and possessions management and seeking to operate some plant as trains, eliminating the need for possessions.

Renewals programme

Having defined the committed renewals and enhancement workbank, it is necessary to develop a deliverable programme in conjunction with the relevant contractors. Key to cost-effective delivery is the minimisation of change to the agreed plan. Therefore it is essential that the scope of work is well defined and in sufficient detail to secure key resources, such as track plant and engineering trains. Having developed this resourced renewal programme it can then be considered with the proposed maintenance and enhancements to generate a route delivery programme.

Improvements to our asset management planning processes (described in Section 4) and the implementation of the integrated planning unit regime (described later in this section) are targeted with maximising the use of resources and possessions.

The GRIP process - stages 5 - 8

The initial four stages of GRIP were described in Section 4 on asset management planning. The final stages, 5 – 8, relate specifically to the detailed design stages and implementation phases of the project, and are shown below:

Figure 5.2 GRIP stages 5 – 8

5	Detailed design	Produces a complete and robust engineering design that allows risks, costs, timescales, resources and benefits to be fully understood prior to commitment to implement.
6	Construction, test and commissioning	Delivers the asset change / renewal to the appropriate specification and provides confirmation that the asset and system work in accordance with their design and that they deliver the incremental network capability.
7	Scheme handback	Transfers asset responsibilities from the project contractor back to the operator and maintainer and brings the asset into beneficial use.
8	Project close out	Ensures that the project is closed out in an orderly manner with updated asset management information, capitalised assets, settled contractual accounts and any contingencies and warranties are put in place.

Working with stakeholders to develop schemes

The improved end-to-end work planning process is approximately one year old and the first full planning cycle is not yet complete; improvements continue to be made in the negotiation and delivery stages. For the development of the 2005 plan, 40 consultation meetings were held with the passenger and freight customers, either individually or in groups, in September and October 2003. This consultation covered all schemes, large and small, across the network.

A primary aim is to reduce the number and scope of changes to the plan beyond GRIP stage 2 (pre-feasibility), in order to improve efficiency and give plan stability to our customers and the supply chain. In practice this has been hampered in the past year due to significant changes in workbanks resulting from the interim review. New processes are being implemented to ensure greater consistency of work scoping and prioritisation. Additionally KPI measures are being introduced to monitor and help reduce changes to the workbanks from three years out. A further aim is to maximise the potential for combining schemes at the same or adjacent locations in order to better use the available access.

Resource allocation

Engineering resources for scheme development are still a significant constraint for the immediate future in some asset groups. However, signalling design and testing resources are now less of a constraint on our renewals and enhancement programme. This improvement has arisen through a number of actions:

- a proactive approach to management of signalling design and testing resources;
- a more uniform workload, through volume reductions and the completion of TPWS;
- increased interaction with the supply base; and
- more effective and earlier planning of signalling and S&C renewals.

We have initiated a major campaign to establish competency standards for all project roles, and are currently embarking upon a training and development programme to close the skills gap. Specialist training providers have been engaged and training courses initiated. The competency and development framework will be a key tool in ensuring that we have appropriate project management skills in the restructured business.

The strategy for supporting project control services (planners, risk, estimating, and quantity surveyors) has been to take these in-house progressively over the last year. This will continue over the coming year in order to improve efficiency and consistent control.

Deliverability reviews

The deliverability review process has been developed and refined over a number of years. These reviews are held with each region and major investment initiative team on a quarterly basis, with the aim of:

- understanding progress against the current year's plan;
- understanding the robustness of the next two year's programme;
- identifying any risks to the deliverability of the investment plans; and
- agreeing actions to be taken to mitigate these deliverability risks.

The reviews are conducted using questionnaires and structured interviews with the respective portfolio investment managers in order to achieve consistency across the regions. Actions required on key issues that cannot be otherwise settled are escalated to the Projects & Engineering Director.

Route delivery programme

We intend to implement a delivery programme based around route or route sections. This will bring together the resourced programmes from maintenance, renewals and enhancements to create a single programme for each route. It will be an iterative process that will commence as part of the annual work-planning appraisal. Led by our programme management office, it will seek to reconcile and balance conflicting demands for resources including possessions, and maximise the level of work delivered whilst minimising the cost to the industry. The individual programme teams will be responsible for programming and ultimately delivering their work within the framework provided by the programme management office.

The integrated planning unit team is responsible for converting renewal workbanks and maintenance plans into deliverable engineering work plans, complete with identifying anticipated outputs. Whilst the primary role of the teams is to ensure that core maintenance and renewal programmes are generated and delivered, they also ensure that delivery of enhancements are efficiently planned and integrated within the overall asset delivery programme. This is particularly important for access planning.

Network access

Previously, possessions have been planned in a way that has not always been the most efficient, often to fit solely with the requirements of the timetable, and with little or no consideration for the time that will be required for the completion of the work. For example, in planning possessions to be as short as possible it is often difficult to increase the amount of work to be performed without changing the possession. If the possession cannot be changed there will be a requirement for additional possessions, which add further cost. For large jobs, this has meant that a large number of repetitive possessions have been required to perform the work rather than a single and more efficient long possession, resulting in extra cost arising from the duplication of unproductive possession set up and hand back time and additional logistical and management costs.

The focus of our work from early 2002 has been to challenge established practices and to implement new ways to plan and manage possessions.

Our aim is to:

- improve forward planning to allow the optimisation of possession plans;
- improve possession utilisation, reducing the number and length of possessions required; and
- improve the taking up and handing back of possessions and isolations to increase the available work time.

Managing network access

We are progressively taking control of the management of possessions from our contractors. This will allow us to monitor better, and hence control possession (and isolation) start and finish times. Closer adherence to planned start and finish times will allow us to plan with a greater degree of confidence than in the past. We will also be able to reduce the proportion of time in possessions that is unproductive, through the adoption of a single network-wide approach to the management of possessions and isolations.

Our control of possessions will give us the ability to plan an increase in the number of jobs per possession with confidence, and manage the risks associated with additional associated worksites. We are also improving safety, and the way we deliver work within possessions. For example, we have started to operate tampers as trains, which eliminates the need to take conventional possession protection when we are carrying out tamping work. This helps us improve productivity within possessions. Additionally, we are reviewing the competence of specific possession and isolation staff with the aim of improving consistency, efficiency and safety.

Optimisation of network access

The integrated planning units take a holistic view of the development of annual work plans. They are charged with identifying and planning possessions patterns which will minimise the costs of delivering work on the network. The recent implementation of the new possession planning system (PPS) provides the first national industry wide database of possessions. Using innovative tools and techniques, such as the possession optimisation software that is being developed and deployed in conjunction with the PPS, optimal possessions patterns can be identified, and renewals and cyclical maintenance can be bundled into single possessions, if appropriate. This allows repeatable maintenance work to be planned effectively, and gives us the confidence that we will be able to secure the appropriate access to deliver the required work. In general, our integrated planning units are producing possession patterns that result in fewer, but longer, possessions than has been the case historically. Network Rail, TOCs and FOCs all want disruption minimised, and a recent survey conducted for the Rail Passenger Council suggests that passengers are more positive towards a blockade type strategy rather than an extended disruption to service patterns.

Automatic Track Warning System

In parallel with RIMINI (implemented to improve planning of work and increase the level of activity undertaken in green zones) we have introduced an Automatic Track Warning System (ATWS). This will provide an automated warning to alert trackside staff of approaching trains more reliably and earlier than can be done by a lookout. As part of an initial programme, we have installed permanent or semi-permanent ATWS on specific parts of the network where maintenance and patrolling frequencies are high, and where there would be particular benefits of enabling a greater degree of safe red zone working.

Efficient engineering access project

This is a project led jointly by the SRA and Network Rail, which aims to reduce significantly the industry cost (combined construction cost and train operator revenue loss) of delivering work on the network. This will be achieved through delivering work in the following pattern:

- in fewer possessions;
- in longer possessions (in duration and distance);
- more evenly spread across the week and the year; and
- with more work items in each possession.

Current activities are based around testing the findings of a consultant's study, commissioned jointly by the SRA, Network Rail and ORR in 2003. We have just completed two studies to inform that approach. The first was a physical exercise in East Anglia region to understand best practise in the maximising of work activities into a single possession as a means of reducing delivery costs. This involved replanning the region's workbank and then testing this pattern against both deliverability and business case criteria. The exercise also reviewed the safety and general management of multi-occupancy possessions. The second study was a desktop exercise in Great Western region to determine whether industry cost reductions may be derived through the adoption of alternative access strategies. This involved the planning and delivery of single long maintenance possession in which as much work that is economic and practical was delivered.

The benefits of this approach were tested against the conventional approach of delivering work in shorter multiples possessions over an extended period of time. The results of the initial analysis of both initiatives is positive, although further work is required to fully quantify these benefits and identify the most appropriate next steps.

National delivery service (NDS)

Previously the national logistics unit, the NDS operates a dedicated unit to provide a supply and delivery service to all track maintenance, renewals and enhancement projects. Each year it buys and distributes 2.5 million tonnes of track ballast, one million sleepers, 140,000 tonnes of rail and 4,500 major switch and crossing components, and arranges the removal from site, recycling and disposal of used materials. This requires the operation of 16 local distribution centres, a dedicated fleet of 6,000 wagons, and 25,000 engineering trains movements per year.

As part of the current reorganisation the role of this unit will be expanded to increase the efficiency of our supply service. Additional roles include:

- the management and deployment of all our railway vehicles;
- a wide-ranging materials supply service in support of in-house maintenance; and
- the bulk hire and geographical allocation of on-track plant - a major new initiative to minimise resource shortages, improve the use of expensive assets and reduce unit costs.

The current initiatives to reduce the unit costs of materials manufacture, supply and recycling include:

- the rationalisation of existing regional supply depots from 16 to 13; and
- the opening of a new purpose-built supply depot at March in Cambridgeshire.