Network Rail Response Summary

Context of consultation

The railway system in Great Britain carries unprecedented volumes of traffic. This is the result of growth over the last 10 years of 47% in passenger use and 20% in freight use.

Our network is also among the most open and competitive railway environments in Europe, with services provided by a large number of companies in the private sector. Train operators typically focus on specific geographies and markets within the wider network and can have very different capacity requirements to drive the efficient provision of their services.

Customer access to run trains has to be balanced with the engineering access needs to maintain, renew and enhance the infrastructure – a requirement that increases as the demand for train services rises.

Therefore, good system operation matters. Particularly when seen against a backdrop of anticipated industry change as GB rail heads towards increased geographical devolution, which in turn is in line with the political direction of further devolution of transport policy ownership and funding. We have already seen an increasing diversity of organisations, such as the alliance between Network Rail and Abellio in Scotland, Transport for London's concession model for London Overground, open access passenger operations alongside franchised services on the East Coast Main Line and soon also on the West Coast.

The role of co-ordinating this complex system in a consistent and transparent way has never been more important.

We therefore welcome ORR's consultation on the concept and components of system operation in the GB rail industry, which we appreciate follows extensive consideration of equivalent models in other industries.

The timing is important: this consultation is intended to inform decisions about regulation and incentivisation in the 2018 Periodic Review. This process will be aided by a better common understanding of what those activities are, and where and how they add value.

Value of system operation

The delivery of safety and performance go hand-in-hand. Co-ordinating and proactively managing the interfaces within a complex multi-party system like the GB railway is essential to the delivery of these outputs. We explain more about Network Rail's role with regard to these interfaces in our answer to consultation question 1. The UK has the best recent safety record of any major European railway system; this is at least in part due to good system-wide standards and practices.

Financial value is similarly affected by system operation. The CERRE study on the role of system operators in network industries (Stern, Cave & Cervigni, CERRE, July 2012) quotes a suggestion that effective system operation could hold consumer prices up to 10% lower than a comparable industry without it. So without system operation in Britain's railway we could see significant cost escalation.

Both safety/performance and financial value are underpinned by system operation. Network Rail's role as network system operator includes balancing the needs of our passenger and freight customers, delivering the requirements of our public funders, enabling private investment, building a cohesive national timetable and providing the necessary engineering access to build and maintain the railway.

Informed and effective network coordination is more than just efficiency in capacity management: it captures the range of activities across market forecasting, planning, capacity contracting, timetabling allocation and delivery. Consistent decision making across time and geography gives funders confidence in the realisation of investments and prevents undue discrimination between customers.

Delivering these services to routes and other infrastructure managers together from the core allows us to plan and use the railway in a way that aims to make the 'best' use of the system as a whole. It also means investment/utilisation decisions can be carefully considered and enhancements be made once other system solutions have been deployed – an approach that enables system operators to keep network efficiences high and therefore costs down. Since the location of investment in infrastructure may not be the same as the location where the benefits accrue a cross-network view enables network wide solutions to be pursued. We discuss the benefits of system operation further in our response to consultation question 2.

External constraints

A certain amount of the framework for rail industry interfaces is prescribed by law, much of it originating in EU directives. This will constrain the organisational shape of industry parties that might deliver system operator activities, but it could also constrain the activities themselves. In particular, the 'essential functions' (capacity allocation & charging) must be conducted independently of train operators. Network Rail separates these functions from its devolved routes, authorising sales through a central access rights process and planning on a long-term network-wide basis, so that the routes are able to work more closely and collaboratively with customers and stakeholders – including in deep alliances – than would otherwise be possible.

Scope of system operation

It is important that there is a common understanding of the extent and purpose of the system among the parties that play a role in it.

However, nowhere in the consultation document is there a definition of the 'system' itself; this could be taken to mean only network infrastructure, or a much wider view of the railway industry as a whole. Network Rail's view is that the GB railway system should include (but not be limited to) infrastructure, control and communications systems, rolling stock and depots, train operator assets including people, and supply chain.

Once the boundaries of the system are defined, its high-level purpose can be identified. This is about delivering the objectives of public and private sector funders; these might give rise to various aims and targets relating to volume, user satisfaction, and cost-reduction. Only then can good system operation be assessed; against the effectiveness of the system in delivering its purpose. The aim of ORR's consultation is vital in this respect, and continuing communication with industry parties, user representatives and funders will be important as the concept is developed over the coming months.

Network Rail response to specific consultation questions

Consultation question 1

As discussed in section 2, to deliver good system operation, we think system operation involves these functions;

1. *Developing proposals for changes to the network;*
2. *Choosing projects for changes to the network;*
3. *Determining capacity from the physical network;*
4. *Allocating capacity (including to possessions) and performance;*
5. *Operating the system (including at the route level) enabling services to run.*

What are your views on the functions we have mapped out, and their ability to facilitate delivery of the system operation outcomes? Do you think we have missed any key functions of system operation?

We recognise most of the functions described but would suggest these are discussed with wider industry and stakeholders to achieve clarity on system boundaries and the terminology used.

1. Developing proposals for changes to the network
'Network' could be taken to have a narrow definition of infrastructure or a slightly wider definition as per the Network Code.   However, the activity could be expanded to include other parts of the railway system, so clarity over terminology and system definition is necessary.   Among Network Rail's current activities, the long term planning process consisting of market and route studies would fall within this system operation function.

2. Choosing projects for changes to the network
Currently, funders do this for large scale projects via HLOS, e.g. GWEP, EGIP and Thameslink. Smaller projects are sometimes specified by funders and sometimes by Network Rail in consultation with operators – funds for these are identified by overall purpose in the HLOS. Asset management activity undertaken by Network Rail in its role as infrastructure manager (not system operation in the ORR diagram) frequently generates changes to the infrastructure, for example through a renewal where the modern equivalent form improves capability.   As with the previous point, 'network' is not the same as 'system' and care is required over terminology.

3. Determining capacity from the physical network
Creating a railway timetable is a complex task and involves many different components. Network Rail is central to many of these, such as understanding the capability of its infrastructure and defining Timetable Planning Rules in consultation with operators. However, the way rolling stock performs on the infrastructure is also critical – it too is part

of the system. For example, where the infrastructure may be fit for 90mph running between two terminus stations but no rolling stock can achieve this because of the need to accelerate and decelerate and because of differing performance on gradients. Each train type has different capabilities, so there can be no one standard expression of capacity. Network Rail must work with operators and rolling stock suppliers to identify the operational capability of each type of rolling stock on each part of the infrastructure: all of this activity is, in our view, part of system operation.

4. Allocating capacity (including to possessions) and performance
Performance is an output of the trade-offs that are made when allocating capacity to a mix of train services and possessions. The performance implications of choices are a key consideration in decisions over these trade-offs.

Decisions relating to performance are also not an autonomous accountability but a shared one - and a key driver of customer satisfaction; the latter being fundamental to the business of train and freight operators.

In understanding and informing these trade-offs, one basic building block is a quality timetable. Network Rail is investing resources into developing a zero-defect timetable by systematically improving its competencies, processes and professional capability. In parallel, we have led the industry in developing an Industry Access Programme which aims to optimise access between train services and engineering work, in order to create benefits and unlock value for the whole industry.

The consultation document implies that delivering maintenance and renewals can be separated from system operation activities, which include the identification of possessions for this work, i.e. the allocation of infrastructure 'downtime'. Experience to date, including through the IAP, has been that these decisions are best made when considering delivery methods for engineering work at the same time as considering their impact on services. This is a key part of system operation: it should be possible to impose additional cost on the IM if the benefits of doing the work in a more costly way are outweighed by the benefits of being able to run trains for longer.

5. Operating the system (including at the route level) enabling services to run
This function could be better described as "providing direction for the operation of the system". We do not agree that signalling or local control constitutes the allocation of capacity and therefore must be within system operation. The important system operation function is to set the *framework* within which these activities take place. For example, this is currently done through the Railway Operational Code, train regulation policies and service recovery/contingency planning. This is distinct from implementing those plans on a real-time basis.

The main purpose of this framework-setting function is to ensure that long distance services (most freight and some passenger services) are not discriminated against where local infrastructure management units may have greater focus on dominant local train operators.

A different way to describe the functions

In a complicated rail network with multiple users there are apparent benefits from a whole-system approach to the planning and allocation of capacity across the whole network. The most obvious arise because demand for transport is not confined to separate geographical regions.

In Great Britain, Network Rail acts to minimise the effect of geographical divisions between our own operational management units, and between our network and other infrastructure managers. We also manage interactions between different types of train service on the same infrastructure, and we generate much (but not all) of the data on which industry parties and funders rely when making decisions.

Managing the operation of core routes across multiple management units of the network

Examples of the first of these include long distance passenger services – for instance, passenger services of the CrossCountry franchise operate over 7 separate Network Rail 'Routes'; conversely the London North Western Route has 14 different passenger and freight operators running on its infrastructure, each with services that cross into neighbouring routes.

Network benefits are even more obvious for freight services. The enormous growth seen in intermodal traffic from Southampton and Felixstowe to the midlands and the north would be hampered if there was not a national planning function and a national control to oversee their operation.

For any long distance passenger or freight service, the co-ordination of engineering work is important across geographical boundaries so that, where practical, a diversionary route is made available around a line closure. This approach has enabled Network Rail to maintain a policy of scheduling engineering access in a way that maintains a London – Scotland route in so far as is possible at all times.

Managing the interfaces with other infrastructure managers

Network Rail is not the only infrastructure manager in Britain. Domestic high-speed services in Kent already operate across both Network Rail and HS1 infrastructure and, when Crossrail becomes operational, services will interact with Network Rail infrastructure to the east and west and, if going to Heathrow, will use a third infrastructure manager's network.

The United Kingdom has also recently joined a European rail freight corridor (at least from the Channel Tunnel to London – but potentially going further) so that pre-arranged freight paths can be provided from an international terminal in West London to the German and Swiss borders and to central and southern France.

In the future, there will be more inter-IM coordination in Great Britain. As devolution progresses and new infrastructure managers join Britain's rail network (Crossrail, HS2, concessions etc) the role of co-ordinating the system in a consistent and transparent way will become more important than ever. Effective system operation will be essential to allow an already heavily utilised system to achieve the outputs (volumes of passenger and freight traffic, reliability, journey opportunities and journey times) needed of it to support the national economy. The costs, disruption, boundary issues and loss of network benefits that could otherwise come with a more fragmented industry will be avoided by a strong and competent core network system operator.

With these factors in mind, Network Rail is establishing a UK Infrastructure Managers' Forum. The forum comprises representatives from Network Rail, HS1, HS2, Transport for London, Heathrow Airport, Merseyrail, and from Northern Ireland both Translink and the Department for Regional Development.

Managing the interactions between different types of train service

A further set of benefits arises from the integrated planning and operation of the railway system across different business sectors. Britain's predominantly mixed-traffic railway, where long distance passenger services share infrastructure with regional and local services and freight trains of many different types, requires a balance of the conflicting requirements of the different services.

Currently, the balance between services provided for the various passenger markets is to some extent decided within the Department for Transport, because it specifies the services to be operated by the majority of passenger franchises. But already this service requirement has to be considered by Network Rail alongside potentially conflicting needs of passenger services specified by other authorities (Transport for London and Transport Scotland), open access passenger operators, and – significant across most of the network – freight operators.

In the future these conflicts will become more pronounced. Devolution is planned to give local government more say in the specification of local services: this will improve the focus on these services, but is likely to lead to increased tension between the differing needs of these and longer-distance services. Those responsible for system operation will need to work closely with devolved authorities as they develop to better understand their needs and their priorities, integrating their local plans into our strategies, whilst also maintaining the cohesion of the national network.

Access to information

The factors inhibiting Network Rail, and other parties, from delivering better system operation right now include ready access to information so that informed decisions can be

taken. The availability and transparency of information is something which Network Rail's parallel consultation seeks to improve.

Consultation question 2

As discussed in section 3, through our work on system operation we want to improve how the railway meets the current and future needs of passengers, freight customers and funders. We think a greater focus on system operation can improve outcomes in six areas:

1. *Continued safe operation*
2. *Getting more from the network*
3. *Making the right trade-offs*
4. *The right services using the network*
5. *Helping train operators to deliver*
6. *Choosing the right investment*

What are your views on the outcomes of good system operation that we have set out in this consultation?

1. Continued safe operation
It is important that there is a consistent and clear system-wide application of fundamental operational principles and standards, e.g. the current Business Critical Rules initiative.

2. Getting more from the network
Figure 8 in the consultation document states that "system operation achieves the most plannable capacity out of the system…" If this relates to getting the most plannable capacity from the available infrastructure then we support this view, and the observations and caveats in our response to question 1 (activity 3: determining capacity from the physical network) apply. Even this should be seen as a trade-off; there is a cost to just 'sweating the asset'.

There is also a danger that this outcome could be misread to mean enabling more trains to run regardless of market needs; the mix of train services (particularly different stopping patterns and speeds) which consumes infrastructure capacity should be the subject of outcomes 3 & 4 below.

3. Making the right trade-offs
This set of trade-offs is well understood conceptually, but measurement of it is challenging as it is always case-specific. It is hard to identify what "right" might mean – it is certain that it will mean different things to different parties affected by the system. Does it mean assessing every decision in terms of socio-economic value – and who would define how that value is assessed where the assumptions are contentious?

4. The right services using the network
Previous comments about "right" also apply here. Even if appropriate criteria exist to make the trade-offs, a key factor for any system operator to consider at this point is how frequently the system should re-optimise. Train operators require a degree of certainty –

that is why their access to the network is contractualised. But too much certainty can ossify the timetable. There is a balance to be struck; recasting many services to permit a particular new service to run might have a positive socio-economic case but if it is done too frequently there is a cost from the unpredictability of the service to its users.

5. Helping train operators to deliver
The outcome implies a question as to what the train operators should be helped to deliver – is it punctuality, customer satisfaction, profit, growth (passengers, capacity)? Delivery should only be seen in the context of the relationship to the system purpose and aims; it is unlikely that even excellent system operation could enable all operators to deliver everything they would like to achieve because some of these objectives will conflict.

One approach would be for this outcome to be about helping public and private sector funders to deliver their objectives.

6. Choosing the right investment
Previous comments about "right" also apply here. In addition, the wording in figure 8 of the consultation document implies that the scope is limited to investment in the "network" – so definition of this should be carefully considered. Because the system is so inter-related, choices about rolling stock can drive choices about depots, which can drive network investment (and have implications for use of the network).

It should also be noted that the location of an investment in infrastructure may not be the same as the location(s) where benefits accrue – examples are given in our answer to consultation question 3 – so a network-wide view is essential.

A different way of describing the outcomes

Network Rail believes that good network system operation (the delivery of the system operator roles for which it is responsible) should deliver a range of outcomes consistently, transparently and efficiently, including:

- balancing competing customer needs
- delivery of whole-network benefits and policies - including avoiding border issues within a network
- bringing consistency and cohesion to decision making through the capacity planning and allocation process
- delivering the planned outputs
- supporting whole-system, whole-life, whole-network planning and decision making
- maintaining fair treatment for all operators within and across different routes and infrastructures
- providing a framework for seamless and efficient network operation – including during extreme circumstances

The fifth bullet point, as an example, encompasses our whole-life approach to asset management on the one hand, and our consistent consideration of all aspects of the system and the whole geography of the network on the other. Our activities thus inform any party making choices within the system, and spread awareness of best practice and lessons learned in one area around the rest of the system.

The capability to understand and model the interactions, to achieve this outcome, is dependent on a deep engineering understanding of the assets and what attributes and external environments affect their life and hence predictability. Better access to information, as highlighted in our answer to question 1, particularly in relation to rolling assets and the wheel/rail interface, could give far better equipment health monitoring that would allow for better pro-active maintenance. This would then be more predictable than it is today, which would drive better planning of engineering access and consequently greater network availability for traffic.

So, the bullet list above is only a subset of the whole-system picture which is the subject of ORR's consultation. As we have pointed out elsewhere, the extent of the wider system has not been clearly defined in the consultation. Once there are defined boundaries of the system it is easier to define the aims of the system, with the outcomes then delivering these aims. If the boundaries of the system include all parts of the railway industry then these aims have to be very high level, e.g. meeting the objectives/goals of public and private funders. In the absence of stated system aims it is unclear how any outcomes, such as those given in the question, are derived.

Consultation question 3

Can you give us any examples, based on your experience, where these functions improve outcomes? This could include examples of when system operation has helped you in running your business and delivering for your customers. Please also feel free to highlight any areas where you think system operation could help you in the future.

The network system operation activities Network Rail delivers range from very long term (e.g. 30-year market forecasts) to very short term (e.g. co-ordinated incident response) activities. The flow of processes developed by Network Rail (shown on the graphic in Appendix A) improves the line of sight throughout these activities. Each process within the flow has been developed to consider trade-offs within the constraints of earlier decisions; this is driving a demand for better information and better future/scenario modelling capability.

Co-ordinated industry-wide planning

The long term planning process developed over the last decade by Network Rail on behalf of the industry has enabled a holistic view to be taken of the pressure points on the system and the alternatives available to industry parties and funders, from train lengthening to infrastructure investment. The four Market Studies published in 2013 all address demand across the boundaries of devolved management units, there is a programme of Network-wide Studies, and processes ensure that the Route Studies consider cross-boundary requirements.

This is a key requirement, because *the location of investment in infrastructure may not be the same as the location where the benefits accrue*. In order for more passenger trains to run on the North London orbital route, investment was required to permit more freight trains to use the direct route from Felixstowe to the Midlands. In order for more passenger trains to run on the Liverpool – Leeds – Newcastle axis (predominantly benefitting the cities at the periphery of that route) investment was required in central Manchester.

In the medium term, Network Rail coordinates major infrastructure and service changes in future timetables, working with industry parties and stakeholders to develop a project plan and oversee the implementation of each change.

Network benefits are even more obvious for freight and country wide services. The enormous growth seen in intermodal traffic from southern and eastern ports to the midlands and the north could potentially be disrupted without a national planning function and control to oversee their operation. For any long distance passenger or freight service, the co-ordination of engineering work is important across geographical boundaries so that, where practical, a diversionary route is made available around a line closure. This approach has enabled Network Rail to maintain a policy of scheduling engineering access in a way that

maintains a London – Scotland service during times of major work on either of the main routes.

Consistency

The complexities of the railway system create an uneven environment in which to do business. Good system operation has helped to override some of the biases built into the system, for example the tendency of devolved infrastructure management units to have closer relationships with train operators which operate predominantly in the same area. Examples of the checks and balances which 'level' the 'playing field' in this way are:

- for access contract negotiations, the creation of a national Sale of Access Rights panel
- for customer responsiveness, the existence of central customer teams for freight and CrossCountry passenger operators
- in timetable production, the centralisation of capacity planning teams in one location
- for day-to-day operations, the overarching requirements of the Railway Operational Code and the creation of a national freight control.

Co-ordinated systems investment for cost reduction

The National Operating Strategy will centralise signalling and control of the network into regional Rail Operating Centres. Planning and delivering this investment requires whole-network, whole-system thinking and is therefore clearly a benefit of system operation.

Co-ordinated response to disruption

Much of the day-to-day operation of the railway falls outside of system operation. However, our responsibility as the network system operator enables it to be consistently governed by a framework of codes, rules and policies to support decisions about regulation, short term allocation, and operation of contingency arrangements in the event of unplanned disruptions.

In the event of major disruption or high-profile national activities we are able to maximise the response to support the particular requirements of the system. This includes working to maintain a high level of service continuity, provision of information to passengers and freight users, and the ability to redeploy resources at a national level to shorten any disruption.

Recent experience with unexpected sustained unavailability of infrastructure (at Dawlish and Harbury) has demonstrated these benefits.

Co-ordinated planning for major events

A different example is the planning and operational arrangements for major events. When there is multi-party acceptance of an overriding need, system operation can change the

ordinary trade-offs for a limited period. For the 2012 Olympics, a special intensive passenger service was able to run successfully because there were no freight services and no planned engineering works in the affected areas.

Consultation question 4

To regulate and incentivise Network Rail, we use a range of tools, such as regulating and monitoring Network Rail against certain outcomes and providing for a charging regime that should encourage economic and efficient behaviour by all users.

Do you have any views on what the desired outcomes and functions associated with system operation might mean for the regulation and incentivisation of network system operation?

Please highlight any particular areas where you think a different approach to regulation or incentivisation of system operation could help you better run your business in the future, and why.

Regulation and incentivisation have grown incrementally over recent years, so new regimes have been added without substantial change to the pre-existing ones. We would welcome a wholesale review of the various regimes and hope that this system operation consultation is a precursor of such an approach. The observations below should not be taken as prejudging Network Rail's input to ORR's 2018 periodic review.

The consultation document makes it clear that some decision makers within the railway system are outside the regulatory regime, notably national and devolved government (and ORR itself). It is unreasonable to hold the regulated organisations accountable for outputs when these are directly affected by decisions made by unregulated bodies. Some form of regulatory "re-opener" short of an Interim Review would be beneficial to permit the adjustment of regulated outputs during a control period.

Incentive regimes for the various tradable outputs should be related. At present Network Rail has a strong financial incentive to be risk-averse over train performance, even where performance is good; a weaker 'after the event' incentive to increase volumes; and no incentive on journey time other than contractual protection of specific maxima by operator.

A 'shoulder' penalty regime where penalties reduce or cease at the level that is deemed acceptable for the area/services/time period concerned – e.g. performance penalties could taper off above a 'satisfactory' level set by service group. The key thing is that incentive regimes exist for each area and are designed with the potential trade-offs in mind.

At a more basic level, incentive regimes acting on different industry parties could be better aligned. Funders require train operators focussed on urban areas to measure train performance differently from long-distance operators, because different factors are important to their passengers. We are working with the industry on proposals to move away from a 'one size fits all' PPM measure, so that Network Rail's incentives could better support delivery of train operators' objectives.

In considering ways to improve the coherence and alignment of incentives, it would be worth considering what has been achieved in other industries with this shift in approach. There are examples in the manufacturing sector where companies have moved from a traditional 'original equipment manufacturer' supply chain, based on time and materials, to a service-based approach that has benefited all players including customers.

Appendix A – activity chain in Network System Operation

The activities Network Rail delivers range from very long term (e.g. 30-year market forecasts) to very short term (e.g. co-ordinated incident response) activities. Across all of this range, decisions must be made about the balance of outputs the system is to deliver. These decisions are not all made by Network Rail, but as network system operator Network Rail plays a critical role in informing decisions where these are made by other parties.

We lead *long term planning* for the rail industry. The Long Term Planning Process brings together industry parties, funders and stakeholders to develop market studies, network-wide studies and route studies which present choices to funders about the mix of outputs deliverable at different levels of cost.

Where funding has been agreed for major investment, this is managed by a geographically-defined programme board comprising industry parties and funders. The programme board remits an *industry planning group* to identify the practical delivery stages of the programme. These may be called 'configuration states' or 'key outputs', and may span several years as a major programme is delivered in stages. Each configuration state describes an indicative train service against a particular infrastructure specification, to demonstrate that the outputs justifying the investment can be delivered.

Event Steering Groups

New Franchise

Major events

We maintain a 'calendar of events' which logs forthcoming significant timetable changes. An *event steering group* is set up for each big change, to develop a project plan and oversee the implementation of that change. This acts as a forum for involving industry parties and funders in analysis to support access allocation decisions being taken through the usual processes.

Sale of Access Rights panel

Ongoing contractual change requests

Through our process for the *sale of access rights*, we decide with our customers whether we can support their applications for access to the network. ORR decides whether to grant any access application made to it, whether or not the application is made with our support. On an increasingly congested rail network, we must advise ORR on the interaction between potentially conflicting access applications.

Capacity Planning team

NetworkRail Working Timetable

Our *capacity planning* team constructs the timetable twice a year in accordance with the Network Code and applicable track access contracts. The flexibility provided within most access rights means that there are occasions when conflict must be resolved and allocation decisions made. This applies equally to short term timetable alterations, which are planned up to the day before operation.

Operations, Maintenance & Renewals

Route Asset Mgt Plan

Although much of the *day-to-day operation* of the railway is mechanistic, some of it includes decisions about allocation. Examples include setting and interpreting train regulating policies, and the preparation of contingency plans in the event of unplanned disruptions.