

Mandate L2Ni003 Part 2 (second remit)

Review of the embedment of
improvements to the management
of complex railway programmes



24 November 2017
Final Report

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1. Introduction

Background

This is a Nichols report as an Independent Reporter following our review to assess Network Rail's progress in implementing and embedding improvement initiatives in relation to its role in the management of complex programmes that deliver major timetable changes.

The origin of this review lies in an investigation¹ undertaken by the Office of Rail and Road (ORR) in 2015 concerning the planning, management and delivery of its enhancement programme for Control Period 5 between 2014 and 2019. The Independent Reporter mandate CN031 "Assurance for major programmes delivering complex timetable changes" was part of the evidence base that underpinned ORR's 2015 investigation.

Complex programmes in the context of this review are characterised by inter-connected infrastructure, rolling stock and franchise changes that require planning, coordination, integration and management. The CN031 report² provided a number of recommendations for improvements in planning and management by Network Rail.

Since the investigation in 2015 ORR has been monitoring Network Rail's delivery of its Enhancements Improvements Programme, which includes improvements to their management of these complex programmes.

The purpose of this current review is to independently assess whether Network Rail has embedded such improvements and made progress towards addressing the concerns raised by the ORR in 2015 regarding Network Rail's management of complex programmes delivering major timetable changes.

¹ Network Rail's overall planning, management and delivery of its enhancements programme, ORR, October 2015. Available at: http://orr.gov.uk/__data/assets/pdf_file/0020/19505/enhancements-evidence-report-october-2015.pdf

² Assurance for major programmes delivering complex timetable changes: Part 2, Independent Reporter (Part C) Mandate CN/031 Office of Rail Regulation and NR, Final Report, The Nichols Group, 31 July 2015. Available at: http://orr.gov.uk/__data/assets/pdf_file/0005/18851/cn031-nichols-assurance-for-major-programmes-part2-2015-07-31.pdf



Improvement initiatives

Introduction

Since 2015 there have been several Network Rail initiatives that could have led to improvements in the area of focus for this review. The four improvement initiatives that are particularly relevant are described below.

The Enhancements Improvement Programme

At a similar time to the completion of the original CN031 review in 2015, Network Rail was in discussion with ORR about the Enhancements Improvement Programme (EIP). At that time it was Network Rail's intention that part of the scope of the EIP would address concerns and make improvements recommended in the original review. Early this year Network Rail reported completion of the EIP to ORR.

The Department of Transport and Network Rail Memorandum of Understanding

In November 2015 the Bowe Review³ into the planning and management of enhancements was published. This led to a Memorandum of Understanding (MoU)⁴ being agreed between Department for Transport (DfT) and Network Rail in March 2016 concerning their respective roles and accountabilities in relation to the delivery of Government funded railway enhancements in England and Wales. In particular, the MoU and its supporting material:

1. Clarifies DfT is the funder and client and Network Rail is the System Operator and principal delivery partner for enhancements.
2. States principles for enhancement development, based on the funder having clear decision points to permit projects to proceed and value for money being assessed via business case options.

A similar MoU was being considered between Transport Scotland and Network Rail Scotland route at the time of our current review.

In this report we use the term 'client' to refer to collectively DfT and/or Transport Scotland as the ultimate clients and principal funders for programmes in England and Wales, and Scotland, respectively.

³ Available at: <https://www.gov.uk/government/publications/bowe-review-into-the-planning-of-network-rails-enhancements-programme-2014-to-2019>

⁴ Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/509545/mou-dft-network-rail-rail-enhancements.pdf



The System Operator function

Network Rail has created a Systems Operator function as a distinct organisational entity. This is in alignment with the likely regulatory direction for Control Period 6 of Network Rail having a separate settlement and performance measures from the ORR for the System Operator function. The System Operator plays a key role in the effective strategic and operational planning and coordination of the rail system. For example, the System Operator produces timetables that have a significant impact on the services that operators, passengers and freight customers use. It also provides information and analysis to help inform decisions by clients, franchising authorities, operators and ORR about how the network could be used and developed over time. The clarification of these responsibilities is very relevant to the recommendations in the original CN031 review of Network Rail's approach to complex programmes.

GRIP for Programmes

Recommendation 1 from the original CN031 review required that "A programme process suitable for managing route upgrades (comprised of multiple industry wide projects) should be defined and implemented across Network Rail". At that time it was Network Rail's intention that this process would build on their existing GRIP for Programmes method that had been recently published. GRIP is Network Rail's project methodology and GRIP for Programmes is Network Rail's standard methodology for programmes.

Scope of this review

The mandate for this review is enclosed in Appendix A. It was created following another Reporter review earlier in 2017 that assessed the status of completion of the EIP and concluded that not all the recommendations from the original CN031 review had been addressed. Therefore the purpose of this current review was set by ORR to identify current practices, observe improvements and to report improvements against four main concerns highlighted in the outputs of their 2015 investigation:

1. Poor setting of project and programme requirements and change control
2. Accountabilities of client, sponsor and deliverer are blurred through the project lifecycle
3. Lack of programme integration with other industry stakeholders
4. Lack of capability to model timetable performance during and after construction to inform integrated design and development decisions



Our approach to this review has been to assess a sample of six representative complex programmes to identify any common themes and form overall conclusions. The programmes in our sample are:

1. Edinburgh Suburban Enhancement Programme (ESEP)
2. Edinburgh Glasgow Improvement Programme (EGIP)
3. Brighton Main Line (BML) Upgrade programme
4. East Coast Main Line (ECML) Enhancement programme
5. Midland Main Line (MML) Key Output 1
6. East West Rail (EWR) Phase 2

Our methodology

Assessment framework

To undertake the original CN031 review, Nichols developed a Rapid Assessment Framework (RAF) containing five areas of good practice to provide a reference comparison for assessing Network Rail's planning and management of complex programmes leading to major timetable change. The good practice was derived from both within Network Rail, mainly the Thameslink programme, and from Nichols experience with other industries and rail companies. The five areas of good practice in the RAF are:

1. Programme structure and governance
2. Industry programme integration (or rail system integration)
3. Industry readiness
4. Network Rail programme integration
5. Bringing infrastructure assets into use



Assessment framework for this review

For this review we used the same five areas of best practice from the original rapid assessment framework (RAF) to provide a structure to engage with Network Rail programme teams to collect evidence and to enable comparison of the improvements made since 2015. However, later in this report our findings are reported against the four concerns from the 2015 ORR investigation. We therefore needed to map the five areas of the RAF to the four areas of ORR concern, see Table 1 below. We also mapped in Table 1 the four improvement initiatives described earlier to the five areas of the RAF.

We amended the original RAF slightly for this review to account for the changes in accountabilities and responsibilities following the agreement by DfT and Network Rail of their MoU. In particular, the framework was amended to reflect roles and accountabilities stated in the MoU supporting documentation as “Systems and delivery integration (a DfT role but DfT normally asks NR to lead for industry)”.

RAF areas of best practice	Concerns from ORR 2015 investigation	Relevant improvement initiatives
1. Programme structure and governance	2. Accountabilities of client, sponsor and deliverer blurred through the project lifecycle	<ul style="list-style-type: none"> • DfT and Network Rail MoU • Enhancement Improvement Programme • Strengthen governance following 2016 Transport Scotland review
2. Industry programme integration (or rail system integration)	1. Poor setting of project/programme requirements and change control 4. Lack of capability to model timetable performance during and after construction to inform integrated design and development decisions	<ul style="list-style-type: none"> • DfT and Network Rail MoU • Network Rail System Operator
3. Industry readiness	3. Lack of programme integration with other industry stakeholders	<ul style="list-style-type: none"> • GRIP for Programmes • Network Rail System Operator
4. Network Rail programme integration	2. Accountabilities of client, sponsor and deliverer blurred through the project lifecycle	<ul style="list-style-type: none"> • GRIP for Programmes • Enhancement Improvement Programme
5. Bringing infrastructure assets into use	3. Lack of programme integration with other industry stakeholders	<ul style="list-style-type: none"> • GRIP for Programmes

Table 1: Mapping of the assessment framework to ORR concerns and related improvement initiatives



The original RAF was designed to be flexible to apply to programmes that could be at different stages of development or delivery because not all components of the RAF would apply to every programme. For example, during the development stage components 1, 2 and 4 of the RAF are the most relevant. During the delivery stage components 3 and 5 of the RAF are the most relevant.

The six programmes in our current review sample were all undertaking development stage activities and so the main focus of this review has tended towards an assessment of RAF components 1, 2 and 4. However, two programmes, EGIP and the ECML Enhancement programme were also undertaking some delivery stage activities. As a consequence we did receive some evidence for components 3 and 5 that was typically indicative of the approach that Network Rail would follow.

Review methodology

For each of the six programmes in our sample we held initial meetings with representatives of their leadership teams to explain the context and intent of the review and to request evidence of current practices. Typically, we met with Network Rail's lead sponsor for the programme.

The five components of the RAF were used to provide a structure for the evidence requested from the programme teams. This approach provided continuity from the original CN031 review and was intended to make it clearer to us where the four Network Rail's initiatives had made embedded improvements. After we received the evidence requested we then undertook a detailed 'desk review' of the documents provided.

We then conducted a series of meetings with the Network Rail programme teams to clarify questions or issues arising from the desk review and to further understand the context within which each programme was being delivered. These meetings were typically with the Network Rail System Operator, Infrastructure Projects and Sponsor teams. We referred to this part of the methodology as the 'field reviews'.

Following the series of meetings a draft field review report for each programme was produced. The purpose of these reports was to allow the Reporter to confirm its understanding of the evidence provided by Network Rail and to make observations on improvements against the four areas of concern. The field reports were reviewed by Network Rail and ORR and amended where necessary to take account of relevant feedback. For the two Scotland programmes the field reports were also reviewed with Transport Scotland.



For the ECML, BML, MML and EWR Phase 2 programmes, the Reporter met with DfT to capture its perspective as client and principal funder and to share emerging findings from the field reviews. Network Rail has to work closely with its clients on complex programmes that deliver major timetable changes. Therefore the reviews with Network Rail's clients were an important source to identify improvements made and areas where further improvement is required.

The field reports from the sample of six programmes were used to draw together the common themes and findings contained in this Final Report.

Acknowledgement

We would like to recognise the support and openness of Network Rail, DfT and Transport Scotland that enabled this review to take place.

2. Complex rail programmes

In this section we discuss the context for the integration challenges, associated with managing and coordinating major timetable changes, facing the types of complex programmes assessed in this review.

Components of a complex rail programme

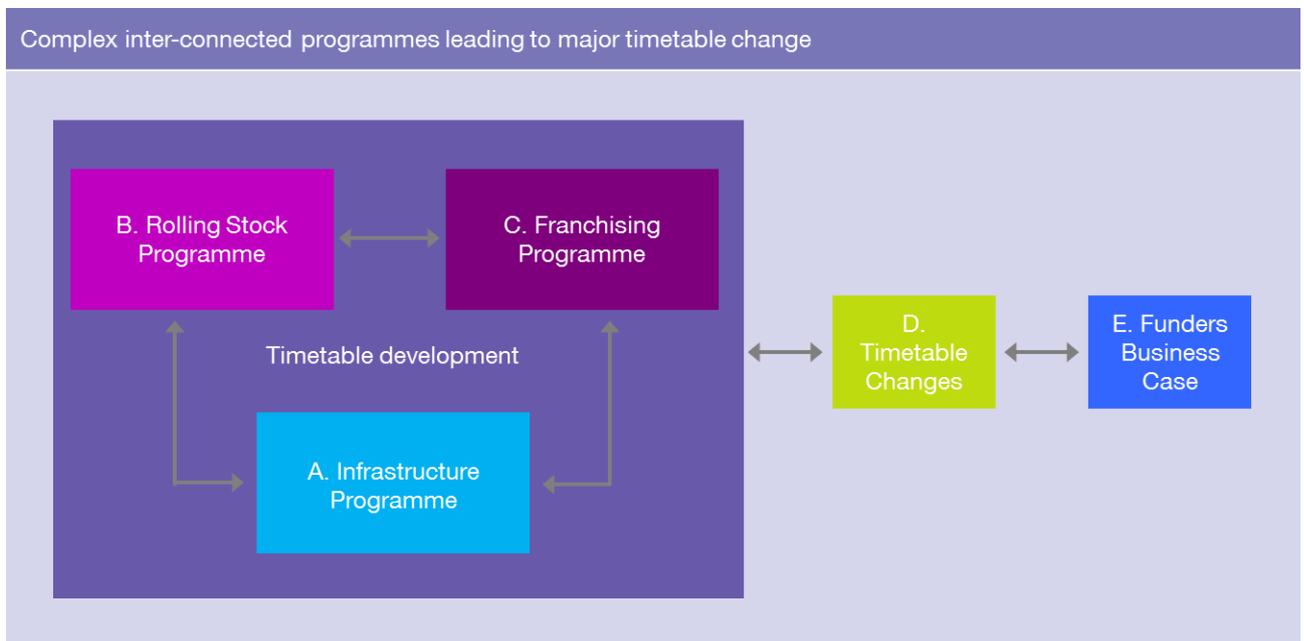


Figure 1: Rail industry (Tier 1) level integration of the major elements of a complex rail programme



Figure 1 illustrates the main components of a complex rail programme and the interactions between them. We use the term ‘Tier 1’ integration in this document to refer to the interaction between the three components A to C, as distinct to integration within each of three components.

A complex programme starts with a client (DfT or Transport Scotland) developing a Business Case (component E) for enhancements to Train Services, for example reduced journey times and extra train paths, which are evaluated as economic benefits offset against the costs of achieving the benefits. The introduction of planned timetable changes (component D) delivers the enhanced train services and therefore triggers the intended benefits. The timetable changes are underpinned by changes in capability of infrastructure (component A), rolling stock (component B) and train services (component C).

Figure 1 also illustrates that the development process can involve iterations between timetable development and development of components A to C, to enable the client to determine an optimal solution. Having a workable ‘indicative timetable’ is a recognised industry method to provide assurance that the interactions between components A to C will deliver the required capacity and reliability. There is often some uncertainty about rolling stock capabilities and train service patterns during the initial iterations of timetable development and this is handled by making considered and reasonable assumptions about them. As time and development progresses, the timetable is updated in future iterations to replace these initial assumptions with the actual capabilities when they become committed.

Integration challenge and component descriptions

The overall integration challenge is to ensure all five components are coordinated and synchronised over time to successfully deliver the client’s business case. We now describe components A to D in more detail.

Component A – Infrastructure programmes. Infrastructure programmes are often major engineering and railway system projects involving track, signalling, power, communications, civil engineering and environmental works. They would be regarded as a complex design and construction challenge in a ‘green field’ environment. However there is an additional complexity of them being delivered as changes to existing railway infrastructure that must be maintained and operated at the same time. This requires disruptive access to the existing network to enable delivery of the changes. The works often require complex consents and land acquisition, which adds to a long gestation period for development of infrastructure programmes. The works are delivered by Network Rail who manage a complex supply chain to ensure there is sufficient capability and capacity to delivery their full portfolio of obligations. The client (DfT or Transport Scotland) can instruct infrastructure works to Network Rail as either a whole programme, a series of discrete projects, or funds established with the intent of supporting a defined outcome. A common feature of infrastructure programmes is the long lead-time required to procure and deliver them.



Component B – Rolling stock programmes. A typical component of a complex rail programme is replacement of existing rolling stock. This can vary from the replacement of life-expired rolling stock with similar trains, to the complete replacement of existing stock with a completely different type of train. For example, the replacement of diesel with electrified rolling stock, which necessitates the provision of electrification infrastructure. New rolling stock may either be procured directly by the client organisations, or via new rail franchises. Given the long development and delivery period for infrastructure programmes and various separate factors determining the timing of franchise competitions, there is often a need to define, procure and implement infrastructure programmes before franchise competitions take place; meaning that the specific details of the new rolling stock may not be known at the time that infrastructure programmes are authorised for implementation.

Component C – Franchise programmes. Under the direct control of ultimate clients Transport Scotland and DfT, franchises are awarded to railway operating companies that, following competition, acquire the right to operate passenger services. When Network Rail is presented with a requirement to implement an 'infrastructure programme' it will typically find itself working with existing franchisees and, with client direction, makes assumptions in relation to the intent of future franchises that might be activated before, during or after the Network Rail infrastructure programme. In the most complex instances, a Network Rail infrastructure programme in one part of the rail network may need to address requirements of multiple franchises or operators with rights to run services on both the route where physical infrastructure is to be implemented and on other routes.

Component D – Timetable changes. Timetable changes are the culmination of complex rail industry programmes, and where the ultimate benefits are enabled. In turn the timetable changes are enabled by capability changes in the three components A to C. Although the industry partners, led by Network Rail, work together from an early stage to conceive, model and agree the end state timetable, this is still subject to the actual outcome from the three component programmes A to C. For example, the actual capability of the infrastructure implemented (component A), the performance of the actual rolling stock procured (component B) and the train services committed to under new franchise agreements (component C). In circumstances where the actual outcome is different to that originally foreseen or assumed, this can lead to different benefit outcomes assumed in the funder's original business case (component E).



Timetable changes are delivered incrementally

Benefits of a complex rail programme are typically obtained progressively by having intermediate timetable changes. These changes result in, for example, better train and station facilities and services providing incremental improvements to capacity, reduced journey time and improved performance. Each of these intermediate timetables requires a 'configuration state' defined to coordinate the changes needed from the constituent programmes A to C. This incremental delivery of changes, illustrated in Figure 2 below, provides an additional level of complexity to the challenge of managing industry integration.

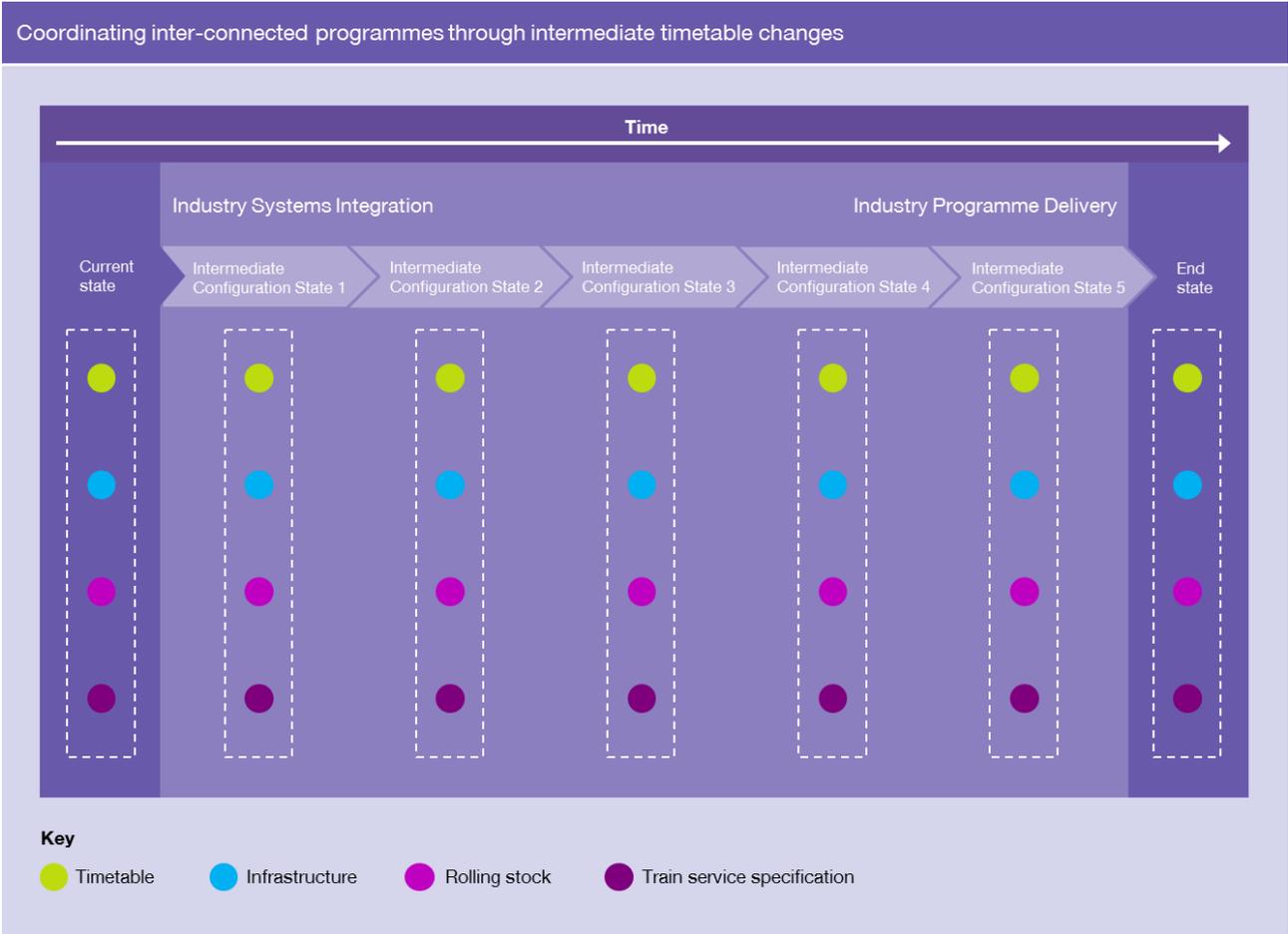


Figure 2: Incremental delivery of benefits through intermediate timetable changes



Managing common complexities

We have discussed above several notable common complexities that the client and Network Rail face on complex rail programmes. Implicitly Network Rail working with its clients needs sufficiently comprehensive methods and processes (a methodology) to consistently manage these common challenges. We now discuss some examples of requirements for such a methodology for managing complex rail programmes.

The long lead-time for developing and delivering infrastructure programmes means that significant funding commitments are sought much earlier before all the other components (B, C and D) of the rail system changes are fully defined. It is therefore necessary to make assumptions about the other components in the client business case at the time of making the investment decision for infrastructure. These assumptions can include:

- An indicative train service specification, needed because the actual service specification will not be finalised until a franchise is let some time later.
- An indicative timetable, needed to demonstrate that the intended outputs of additional capacity or journey times could be achieved with the enhanced infrastructure.
- Rolling stock capabilities, needed because the actual rolling stock capabilities may only become clear when the franchise is awarded.

To manage this uncertainty, a methodology used to manage complex programmes needs to maintain a transparent 'baseline' definition under strict change control of all the components (A to D), at any time during the lifecycle of the programme. As indicated by Figure 3, this baseline needs to be in place at the time that investment approval is given for the infrastructure and it must include the assumptions made about the other components.



Figure 3: Managing uncertainty over time

With reference to Figure 3, assessing the impact and managing changes to the baseline is essential when a significant event occurs that affects one or more of the components in the baseline that underpinned the client business case. For example, a franchise being awarded is a significant event and will confirm the actual timetable to be delivered. After this event there is a need to assess and compare the baseline assumptions made some time earlier with the actual service specification and timetable of the awarded franchisee. Any differences to the assumptions or misalignments between the infrastructure and timetable need to be identified and for the client to provide direction on how to resolve them. The client will refer to its business case and may be required to consider trade-offs between franchises, rolling stock and infrastructure. A methodology used to manage complex programmes needs a clear and appropriate change impact assessment and control process agreed between Network Rail and its clients.



3. Findings

We report our findings in this section under the four ORR investigation concerns described earlier in the introduction to this report:

1. Poor setting of project and programme requirements and change control
2. Accountabilities of client, sponsor and deliverer blurred through the project lifecycle
3. Lack of programme integration with other industry stakeholders
4. Lack of capability to model timetable performance during and after construction to inform integrated design and development decisions

Our findings report on two aspects:

1. Evidence of improvements that have been made since 2015
2. What further improvements could be made



1. Poor setting of programme requirements and change control

ORR concern

A common theme across the programmes reviewed in the original CN031 review in 2015 was that output requirements were not sufficiently defined and were subject to change throughout delivery. Formal change processes that assessed affordability or implications at programme level were absent.

Improvements evident since 2015

In respect of the programmes reviewed in England and Wales the Reporter found that all four programmes were working within the governance structure agreed between DfT and Network Rail, with the following benefits:

- Defining and agreeing requirements
- Identifying where issues exist and working towards their resolution
- Robust change control

On the MML programme, DfT and Network Rail are considering a trial of a 'Tier 1 top level document' to set an agreed baseline in relation to outcomes sought, funding, costs, schedule, roles, accountabilities and behaviours. In view of the complexities noted in section 2, this approach has the potential to enhance clarity of the industry programme and subsequently the detailed baseline agreed between DfT and Network Rail. As discussed below, the MML programme presents key considerations in respect of the need for rigorous systems integration.

Similarly, Brighton Main Line faces a challenge to commit to a major infrastructure intervention in the East Croydon area without absolute certainty of the end state timetable that it must accommodate. Network Rail is working with DfT to define infrastructure requirements on the basis that its commitment to major infrastructure works, including the need for a Transport and Works Act Order (TWAo) and land acquisition, is necessary in spite of the uncertainty of the final timetable the infrastructure must support.

In instances of genuine change, there is evidence of change control, albeit there are challenges driven by complexity, for example where there is an interface between different infrastructure programmes. During 2016-17 EWR Phase 2 undertook significant work to accommodate major requirements change ranging from the removal of overhead line electrification, integration with High Speed 2 and the Secretary of State for Transport's cost challenge. In turn this has resulted in Network Rail taking an exacting approach to



defining requirements, for example in closely defining what electrification enabling scope remains following the removal of core electrification scope.

On the ECML Enhancement programme Network Rail has sought to comply with the intention and direction set out in the detail underpinning the DfT and Network Rail MoU. This programme was originally instructed in the Network Rail Enhancement Delivery Plan (EDP) as a ring-fenced fund (the East Coast Connectivity Fund) that funded discrete projects, rather than as a single programme. Network Rail is now assisting DfT in developing options using business case analysis to determine value for money. There is a recognition that the emerging programme is not directed by an overarching Client or Programme Brief yet, but that this may emerge from DfT's further consideration of the outcomes it requires. There is evidence that Network Rail has positively supported this consideration, for example, its benefits map and the current activity to model four potential timetables in relation to available traction power supply.

In Scotland, where an MoU remains under discussion between Transport Scotland and Network Rail, there is evidence that Network Rail is starting to operate along the lines of providing options in accordance with the strengthened governance arrangements implemented following a review instigated by Transport Scotland in 2016. For example, ESEP is taking a 'corridor approach' conceived from the Scotland route study.

EGIP provides an example of a programme that has been highly developed in respect of requirements definition from its inception. EGIP has encountered delivery challenges and some aspects of achieving the programme outcomes are still the subject of analysis. Potentially, additional infrastructure interventions may be required. However, a robust change control process was evident on EGIP.

In the Reporter's opinion Network Rail has increased its focus on obtaining certainty in its agreements with its client and on ensuring that strict change control is agreed.

The Reporter considers that these improvements have been supported in part by improvements to the Network Rail EDP during Control Period 5 (CP5). At the start of CP5 the EDP presented a long list of Network Rail project obligations and it appears that this was driven in part by the drafting of the 2012 High Level Output Specification (HLOS). Following the Sir Peter Hendy Review of 2015 the EDP has seen some helpful restructuring by providing industry context within which Network Rail's obligations exist and improved clarity in respect of the distinction between discrete projects, programmes and funds, how investments interface with each other and key assumptions. It is evident that the EDP is subject to change control and, in the Reporter's opinion, provides a reliable regulatory baseline document for Network Rail's enhancement obligations. Although the approach to developing and authorising Government funded railway enhancement investments will change for Control Period 6, the Reporter considers that the rigour provided by an EDP process should be maintained.



Further improvements that could be made

We note that programme governance between Network Rail and its client has improved and is now providing a routine forum for discussing requirements.

Section 2 earlier titled “Complex rail programmes” set out some of the challenges of defining requirements for complex railway programmes. In the sample of six programmes included in our review we observed Network Rail having to deal with these challenges. For example on the EWR Phase 2 programme, where the franchisee is not yet appointed, the final rolling stock strategy is currently uncertain. This means that the requirements for depot and stabling facilities within the Network Rail infrastructure requirements are not yet defined. Consequently, provision for these requirements is not included in the TWAO proposals for the programme. There is a similar timing challenge on the MML programme whereby the precise nature of the train fleet is also not defined. This means there is a risk of changes being necessary to the infrastructure requirements later in the programme after the franchise has been subsequently awarded.

The Reporter observes that each programme has its own set of constraints in respect of infrastructure, franchising and rolling stock. It is the synchronisation and control of each of these elements that is necessary to attain certainty of the final outcome.

Across all of the six programmes reviewed we found clear evidence that the Network Rail sponsors were aware of these challenges. However, we did not find a consistent method for clearly defining baselines necessary to ensure continued integration of the main components (A to D) through the programme lifecycle. The examples discussed above clearly indicate the need to document and maintain under change control a baseline set of requirements for each of the components, specifically to include the assumptions made for rolling stock and train services during the development of indicative timetables. These assumptions would form part of the baseline until the related franchises are awarded or rolling stock procurements completed. A standardised process for creating and maintaining a baseline of requirements, to include assumptions made, with associated change control could be standardised by Network Rail for use with its clients (see Figure 3 above).

Although there is evidence of improved requirements management the Reporter considers that the following further improvements could be made by Network Rail:

1. All of the programmes appear to be aligning with the expectation of the new Operating Model in respect of presenting options to the client and agreeing client requirements. However, the programmes reviewed in our sample use various different practices depending on the accumulated history of their programme. This is partly due to the way the programmes were originally instructed to Network Rail. At the extremes there are instances of prescriptive, input-specified requirements and output-focused requirements at the other end. Options to clients might be available in either case, but Network Rail should reflect on whether the correct balance of requirements are being stated. The requirements



agreed will have a bearing on the detail of change control required for the remainder of the programme. If the objective of a client is to buy an infrastructure output from Network Rail, requirements must be written at an appropriate level.

2. Endorsement of key requirements or specification control documentation remains variable. We note that the Infrastructure and Projects Authority (IPA) identified this issue specifically in relation to the Rolling Stock Assumptions document for the MML programme. DfT endorsement in that case was forthcoming, however, this practice could be subjected to greater rigour to ensure that key control documentation is actually agreed as part of a transparent baseline. Potentially, a document such as the 'top level document' being considered for trial on the MML programme could offer a solution if its function is to act as the top level baseline control document that defines the overall outcomes sought by the programme and the expected outputs from Network Rail. Other supporting control documentation, for example, the Rolling Stock Assumptions Document and the Industry Level Schedule, could form subsidiary supporting documents. Using different terminology, the Reporter notes that EGIP was set-up on a basis similar to this.

2. Accountabilities of client, sponsor and deliverer blurred through the project lifecycle

ORR concern

This concern related to the roles and accountabilities between the ultimate client (DfT and Transport Scotland) and deliverer (Network Rail), particularly in relation to the governance.

Improvements evident since 2015

The Transport Scotland and Network Rail MoU was under discussion at the time of this review. However, it was evident that affirmative change has been implemented in Scotland resulting from a review commissioned by Transport Scotland in 2016. This has resulted in alterations to governance of enhancements programmes in Scotland, which resemble those established between DfT and Network Rail.

The DfT and Network Rail MoU was implemented in April 2016 for programmes delivered in England and Wales. During this review the Reporter has generally found a high degree of understanding amongst Network Rail and DfT in relation to the roles and accountabilities expressed by the MoU. Network Rail in particular has invested effort in briefing and guiding its leadership and teams in understanding that the focus for future enhancement investments should shift from early agreement based on limited analysis and evidence to one which is driven by business case development.



The ESEP and the BML Upgrade programmes offer examples of where this approach appears to be working well in developing business cases at an appropriate pace and level of detail. Although both of these programmes are early in their development, they appear to benefit from changes arising from the formation of the System Operator that are attuned to the approach.

The Reporter notes that the launch of the System Operator organisation is recent but there is a high degree of briefing and guidance now forthcoming as a result. Similarly the professionalisation of the sponsor function is gathering pace. In every instance the Reporter saw evidence of the Network Rail sponsors seeking to 'do the right things' in spite of a lack of coherent guidance and process being available. As discussed below, some additional effort appears necessary to bring improvement initiatives into line with some of the actual practice being observed.

During the review it became apparent that the System Operator function fulfils the role of internal client and holds accountability for deriving benefits from enhancements programmes delivered on behalf of Network Rail. This makes sense in relation to the network-wide approach that is necessary in determining Network Rail's strategic position, for example, where services use one or more Network Rail route.

System Operator staff (both development managers and sponsors) are particularly engaged in the Long Term Planning Framework and may undertake very early development work with clients to develop enhancement programmes.

At a point in the development process System Operator development managers and sponsors expect to hand over development activities to a Network Rail route sponsor who will in turn engage Network Rail Infrastructure Projects, or potentially another delivery organisation as project manager and deliverer. Remits within Network Rail between the respective roles were in clear evidence and suggested that process was being followed.

Further improvements that could be made

Whilst the process and principles suggest that the System Operator is in ultimate control of decision-making, it appeared to the Reporter that, in practice, it was typically the route sponsors that acted as Network Rail's lead in all key matters with the client. Whilst the internal accountabilities may be clear to Network Rail, the Reporter observes an IPA comment on one programme that it was unclear which role within Network Rail held the single point of accountability for execution of the programme in question. The Infrastructure and Projects Authority (IPA) acknowledged that Network Rail's Route Devolution and System Operator function had recently been developed and implemented and did not recommend any immediate change. Furthermore, DfT noted that it would welcome some greater clarity of the various accountabilities between the different Network Rail roles.



The Reporter considers that Network Rail should reflect on the emerging interaction between route and System Operator leadership and, where necessary using its clienting principles model, clarify roles, responsibilities and competence so that it is clear to all industry parties where its accountability exists when engaging with clients.

One of the key EIP initiatives implemented by Network Rail since 2015 is GRIP for Programmes. This was initially evident in outline to the Reporter during its 2015 review. The expectation was that GRIP for Programmes would provide a programme process suitable for managing route upgrades, clarifying the roles and accountabilities of industry partners in the governance of a programme, the input required from the parties at each stage, including any inputs derived from franchise awards and the timetable development process. Returning to the concepts illustrated in Figures 1, 2 and 3, the Reporter would expect that GRIP for Programmes would provide a framework of management control throughout the lifecycle of programme development and delivery starting at the point where the client makes choices to invest in the development of a programme.

Through the programmes reviewed the Reporter observes that:

- GRIP for Programmes exists as an instructed standard and it is applicable to any new enhancement programme. However, GRIP for Programmes had not been universally briefed to all programme teams reviewed. Network Rail's Peer Review process (another initiative under EIP) has demonstrated that programme teams have been directed to consider using GRIP for Programmes guidance retrospectively.
- Some of the leadership representatives of the sample programmes demonstrated a high level of capability in programme management as a result of their accumulated experience and determined the appropriate management approach on that basis.
- Other leadership representatives of the sample programmes stated that GRIP for Programmes is not a strict requirement and offered little in the way of standard document artefacts. They therefore found it difficult to justify its application when interfacing with the client that would have to agree to its use. One comment suggested that it would be more helpful to Network Rail programme leadership if GRIP for Programmes was prescribed as a 'doctrine' rather than issued as guidance.
- During Control Period 5 it is evident that the EDP has evolved from a document driven by the 2012 High Level Output Specification (HLOS) that listed Network Rail's obligations on a project basis, to one restructured as a consequence of the Hendy Review. The EDP now describes output drivers, before stating Network Rail's obligations, largely on the basis of programmes characterised by the specific projects and funds that support them. Network Rail has therefore been dealing with a legacy of restructuring projects into programmes as appropriate. However, the Reporter could not identify any



aspect of process that triggers a decision by Network Rail to treat a collection of project obligations as a programme. The Reporter suggests that this is clarified to ensure that appropriate development and delivery management structures are defined.

The Reporter concludes that although some progress has been made with GRIP for Programmes, it is the enhanced governance arrangements between Network Rail and its client that have had the greatest impact since 2015 in enhancing the approach to programme development and delivery. However, without a clear and suitable method and guidance to follow there is a tendency for each programme to proceed with bespoke approaches. This means there are some process gaps to completing an acceptable and comprehensive approach and method for managing complex programmes delivering major timetable changes.

3. Lack of programme integration with other industry stakeholders

ORR concern

The 2015 CN031 review identified that guidance should be developed for systems integration both at industry and Network Rail level for use across all major programmes.

Industry level systems integration (see Figures 1, and 3) is a key process ensuring that all elements of the complex rail programme, including infrastructure, rolling stock, franchising and timetabling, come together at the right time at each configuration state to ensure that the programme benefits are achieved. This is a process that should start in the Long Term Planning Framework and complete with the physical implementation of the end-state timetable. Throughout the lifecycle of gateway points during development where decisions are made, industry level systems integration considerations must be included. For example, to check the validity of assumptions made about all aspects of the programme. Once in delivery, the discipline of industry level systems integration must be maintained to ensure that key points of action or reaction are addressed to ensure that all elements of the programme remain synchronised.

Improvements evident since 2015

In preparing for this review Network Rail advised the Reporter that under the DfT and Network Rail MoU, DfT remains accountable for systems integration at industry level. The MoU itself is silent on the matter of systems integration but the explanatory notes supporting the roles and accountabilities agreed states that Network Rail, in its delivery role, is accountable for: “Systems and delivery integration (a DfT role but DfT normally asks NR to lead for industry)”.



This appears to be the only statement on the systems integration, although our understanding from DfT is that it recognises its role as the controlling mind of the strategic interaction of infrastructure, franchising, and rolling stock. This role includes the benefits that arise from any new investment developed via the lifecycle and joint decision gateways for any new enhancement of the national rail network.

Network Rail advises that it is unable to undertake key aspects of the systems integration role at industry level, as it is not privy to confidential matters relating to franchise and rolling stock procurement.

Amongst the six programmes reviewed there was general awareness of the need for a formal industry level systems integration approach and actual practice ranged as follows:

- **No formal approach instructed to Network Rail but elements of systems integration evident.** In the EWR Phase 2, ESEP and BML Upgrade programmes elements of industry systems integration are executed through Programme Board submission papers and decisions and are done so through the diligence of Network Rail and its client to 'do the right things'. Industry Planning Groups are in evidence, as are some elements of Level Zero Industry Planning and capability modelling. At the time of the review reliance appeared to be placed on the joint decision gateway to align the necessary decisions.
- **A formal systems integration function actively under consideration.** The MML and ECML Enhancement programmes are considering a joint approach to resourcing a systems integration function. The details of this are still developing but this appears to have been initiated in late 2016 in view of the foreseeable challenges on MML and the challenges now encountered on ECML. The proposals do not delegate full industry level systems integration accountability to Network Rail.
- **A formal systems integration function in existence.** The remit for systems integration used on EGIP exemplifies the type of approach that the Reporter would expect in principle and it was evidently given a great deal of consideration at the outset with Network Rail appointed to undertake the function. However, Transport Scotland has advised that that the function has not operated consistently throughout the lifecycle of the programme.

Further improvements that could be made

We observed a range of complex industry systems integration challenges during our review of sample programmes. These challenges were discussed as general concepts earlier in section 2. Our conclusion is that the approaches, processes and methods for industry level systems integration need to be further developed to deal with these complexities. Examples from the sample programmes include:



- **Infrastructure programmes may often require early initiation in relation to franchise and rolling stock development.** BML and EWR Phase 2 are both examples where the infrastructure programmes face demanding early schedules to acquire the necessary consents and land. This presents a challenge in that development of other key elements of the industry programme must keep sufficient pace, or make sufficiently robust assumptions to allow instruction of the infrastructure programme to be justified. EWR Phase 2 appears to face an additional challenge at present in that the absence of a rolling stock and franchise strategy leaves it uncertain as to whether key infrastructure such as depot and stabling facilities are required. At present no such facilities form part of Network Rail's consents strategy.
- **Franchises may be awarded at different timings throughout the delivery of the infrastructure programme.** The introduction of new franchises late in the delivery of an infrastructure programme and before a major timetable change presents a challenge for both Network Rail and the successful franchisee. On the MML programme the Reporter is given to understand that this scenario will leave Network Rail and the successful franchisee 16 months between franchise mobilisation and the first timetable change that will release benefits. This presents a significant task for Network Rail and the successful franchisee to integrate the development of the completion of the infrastructure, derive the final timetable, cascade rolling stock and accredit drivers to operate them. A second timetable change is expected to occur with the procurement and introduction of hybrid trains at a later date, but decisions pertaining to this may be fixed at the time of franchise award.
- **Franchise agreements ultimately define the end-state timetable.** In the absence of the actual end state timetable early in the development of a programme, the industry partners work from the basis of an Indicative Train Service Specification (ITSS) which states the baseline of passenger and freight services sought and is used as the basis for the development of draft timetable options, rolling stock, depot and train crew proposals. The ITSS itself will be subject to iteration alongside the development of infrastructure programme and rolling stock programme options. It may also be affected by multiple franchises. In this respect the ITSS must be controlled rigorously throughout the life of any industry programme. ECML Enhancement programme, the MML programme and the BML Upgrade programme all demonstrate further complexity in that the ITSS used in each case will be impacted by the actual end-state of the Thameslink programme in 2018. EWR Phase 2 demonstrates further complexity in that it is one element of a wider EWR vision which, in total, will be subject to the franchise services running over four Network Rail routes.



- **Rolling stock procurement under franchise agreements encourages innovation but place infrastructure programme assumptions at risk.** It is understandable that a key premise of franchise competition is to encourage bidders to propose innovative solutions. A potential conflict that may arise from this is incompatibility between the rolling stock proposed by the successful franchise bidder and the infrastructure capability. Network Rail advised that whilst assumptions are made to inform the confidentiality of franchise competitions, there is potential for late issues to arise in this context. The MML programme is a potential example of this.
- **During programme delivery the quality of integration is variable.** The ECML Enhancement programme is an example where rolling stock decisions were made early, however, the industry programme proceeded on the basis of incomplete understanding of the infrastructure capability. This has resulted in infrastructure scope, cost and scheduled delivery challenges, but affirmative action is evident in recovering control through reactivation of the Industry Planning Group to resolve decisions on the final outcome sought. On EGIP, Network Rail was prompted by Transport Scotland following its review of 2016 to enhance its approach to integration and the detail of its preparation for 'entry into service'.

The issue of timing of franchise competition, award and mobilisation, and the confidentiality that surrounds this process until its completion, was a recurring matter of issue for Network Rail in respect of the uncertainty created in relation to its obligations. This issue is described in general terms in the common complexities in section 2 earlier. To manage this complexity it is important that Network Rail maintains transparency and clarity of the assumptions it has made when gaining approval for its infrastructure component. This further strengthens the need identified earlier in this report to maintain requirements baselines that contain any key assumptions made at the time the infrastructure component is approved for delivery.

The timing issue was raised several times, which indicates that further improvement should be sought. We recommend therefore that Network Rail works with its clients to clarify how it can most effectively provide advice on the implications of potential changes to the infrastructure arising from the franchising process. This would form part of the Reporter's wider recommendation that Network Rail engages with its clients to develop the definition of the different layers of systems integration and, consequently, the roles and accountabilities. The detail of this approach would be at the discretion of Network Rail and its clients, but should include:

1. Developing a systems integration model that describes each of the different types (or functions) of integration needed.
2. Identifying accountabilities and responsibilities for each type of integration function. Including to what extent responsibilities could be delegated to Network Rail.



To add clarity to the meaning of this recommendation, we noted during our review of the six sample programmes a requirement for at least four different types of integration. We have recorded these four types of integration below for Network Rail to consider as part of discharging the above recommendation:

1. Strategic and 'Tier 1' commercial integration. This is the accountability of the client funding body, for example DfT or Transport Scotland. 'Tier 1' is explained in Figure 1 (section 2 above). This function is informed by the other integration functions but makes the ultimate decisions, which encompass policy and industry level or 'Tier 1' commercial matters. Commercial matters below 'Tier 1' are the accountability of the parties responsible for each of the components. For example, Network Rail is accountable for commercial matters with its supply chain.
2. Rail system integration. Led by Network Rail as the System Operator, but drawing on the necessary engagement of other industry parties, this function provides a focus for all modelling and analysis that is used to exercise foresight in developing the timetable configuration and end states. This role is particularly critical in assessing the synchronisation between infrastructure, rolling stock and timetabling and for defining the assumptions included in the baseline. This function must be sustained throughout the whole programme, from conception to delivery.
3. Technical system integration. Network Rail, Train Operators and Rolling Stock providers already have responsibilities for this under existing industry processes, for example, compatibility forums. This activity is technically complex in its own right.
4. Programme integration. This function would support the input of all industry parties with a role in developing and delivering the programme outcomes and is similar to a Programme Management Office (PMO).

In the Reporter's view Network Rail has made progress with items 2 and 3, albeit process and people capability and capacity challenges remain. In respect of item 4 the Reporter detects caution on the part of Network Rail to commit to this fully until it is certain that it is funded for it and can resource the role adequately.



4. Lack of capability to model timetable performance during and after construction to inform integrated design and development decisions

ORR concern

In 2015 it was observed that the process of developing Indicative Train Service Specifications (ITSS) through Industry Planning Groups should be reviewed and controls strengthened to ensure that decisions are not made without first assessing the affordability, feasibility and impact on infrastructure.

It was anticipated that resolution of the role of systems integrator (discussed in concern 3 above) would be instrumental in achieving this change.

Improvements evident since 2015

Positive progress observed by the Reporter through the six programmes includes:

- The improved industry governance between both DfT and Transport Scotland, and Network Rail, provides a focus for ensuring that appropriate levels of modelling are progressively performed to inform the three business cases up to the point of an investment decision.
- The formation of the Network Rail System Operator has organised Network Rail's capability modelling and timetabling expertise on a route basis and the route teams provide each other with assurance oversight of capability analysis performed.
- There was evidence of a considered process of remitting of capability modelling work by Network Rail development management and sponsors. This often appeared to be a collaborative exercise and the Reporter viewed good evidence of System Operator seeking to provide evidence-based analysis of the forecast capability derived from infrastructure options and rolling stock assumptions against a proposed ITSS. ITSS' are typically conceived from a combination of committed train services (for example from existing franchise and freight access) and aspirational train services (the additional paths sought for passenger and freight services).
- Although there is evidence that Network Rail is still reliant on capability modelling services procured from its supply chain to cope with peaks in demand, it was evident that the Network Rail System Operator itself provides assurance of any work performed externally. One of the programmes reviewed identified issues with externally procured capability analysis that was subsequently corrected.



- In instances where programmes had experienced challenges with infrastructure delivery and with a consequential impact on the ultimate outcomes being sought, the Reporter observed strong evidence of affirmative action being taken by the Network Rail sponsor with the System Operator to reassess the capability achievable.

Further improvements that could be made

On the basis of the evidence seen the System Operator appears to have made a positive start to addressing its role in how it 'delivers today's system and tomorrow's system'. Its ability to support Network Rail's sponsors in developing choices for the client is founded on knowledge of the former and its ability and capacity to analyse the latter.

From the programmes reviewed the Reporter observes that the following actions may help Network Rail to build on this initial progress:

- Feedback from clients stated that it felt at times decision-making on the use of the rail network was weighted towards Network Rail's capability analysis teams and that decision making about how to use the network should instead be made at the appropriate level. This may be driven by the way analysis outputs are presented. The Reporter suggests that Network Rail and its clients should resolve how best to present options for determination. Like any analysis, the detail must be distilled to a sufficient level to ensure that clear decisions can be made.
- The Reporter observed a common format and fairly consistent approach to the production of capability analysis across all programmes. However, the reporting was often comprised of multiple reports on a variety of specific modelling issues. The extent and timing of the modelling effort required throughout the development and delivery of the programmes was not always clearly set out. Linked to the Reporter's observations on systems integration and GRIP for Programmes there still appears to be a gap in exercising foresight early in the development of a programme and setting-out a clear modelling strategy that deals with both active and reactive points where re-modelling is deemed necessary by the Network Rail System Operator. For example, active points of future modelling would be necessary at each iteration of business case development and major milestones such as franchise invitation to tender and award. Reactive modelling milestones would be expected should any unforeseen circumstance arise, for example an infrastructure constraint that is unaffordable to resolve, requiring a timetable solution.



- In one particular case it was evident that the role of the Industry Planning Group had dwindled and had to be reinstated in order to address material issues that had arisen between infrastructure, rolling stock and franchise programmes, and the timetable that might be achieved. The programme is moving back to a position of control with the reinvigoration of collaboration between the industry partners. The Reporter reiterates that the role of systems integration is one that must not cease throughout the delivery of a programme; maintaining assurance of integration throughout development and delivery is imperative to the delivery of the outcomes sought.
- Network Rail should review its capability and capacity to support robust timetable development to meet the demands across the whole portfolio.

The Reporter considers that Network Rail should address these matters in its emerging development of the System Operator function.



4. Recommendations

No.	Recommendation description
1	<p>Network Rail to further develop and agree with its stakeholders a comprehensive approach with supporting methods and processes to manage complex programmes delivering major timetable changes.</p> <p>This revisits recommendation CN031-1 of the 2015 review, whereby Network Rail should now work with its stakeholders to address this previous recommendation in full.</p> <p>See the section on key concern 2 in this report for more context.</p>
2	<p>Network Rail to further develop and agree with its stakeholders a consistent approach to specifying and managing both a full industry programme and a baseline of requirements.</p> <p>This revisits recommendation CN031-3 of the 2015 review, whereby Network Rail should now work with its stakeholders to address this previous recommendation in full.</p> <p>See the section on key concern 1 in this report for more context.</p>
3	<p>Network Rail to further develop and agree with its stakeholders the definition of the different layers of systems integration and, consequently, the roles and accountabilities.</p> <p>This revisits recommendation CN031-4 of the 2015, whereby Network Rail should now work with its stakeholders to address this previous recommendation in full.</p> <p>See the section on key concern 3 in this report for more context.</p>
4	<p>In the context of emerging interaction between route and System Operator leadership, Network Rail should clarify roles and responsibilities so that it is clear to stakeholders where the respective accountability lies.</p> <p>This should extend to clarifying Network Rail's roles and accountabilities in its engagement with its clients under relevant agreements. This should recognise the complexities of Network Rail's matrix organisation and the need to review the existing Network Rail clienting model to ensure clarity for all.</p> <p>See the section on key concern 2 in this report for more context.</p>
5	<p>The formation of the System Operator function has improved Network Rail's capability to model timetable performance to inform integrated design and development decisions. Network Rail to consider the suggested areas for further improvement described in the section on key concern 4 in this report.</p>



Appendix A – Review Mandate

Clarification to mandate for Independent Reporter Lot 2 – Draft V1.0

Title	CP5 enhancements 3 rd line assurance – addendum
Unique Mandate Reference Number	L2Ni003
Date	24 April 2017
ORR Lot Lead	Feras Alshaker
ORR lead for this inquiry	Matt Wikeley
Network Rail Lot Lead	Jon Haskins
Network Rail lead for this inquiry	Phillippa Andell & Yaelle Ridley

Background

This is a clarification for the next stage of the CP5 enhancements programme – 3rd line assurance review. The purpose of this paper is to explain ORR’s requirements and provide the remit for the next phase of this Independent Reporter (IR) review.

Network Rail is nearing completion of the Enhancements Improvement Programme (EIP) delivery phase, reported for completion in July 2017. The ORR requires evidence that the embedment of these improvements in projects and programmes (with any local initiatives) are addressing the concerns raised, when the ORR found Network Rail in breach of licence in October 2015.

This is aligned with the original purpose of this review, as can be seen from the extract below from the original mandate (background section) agreed with Network Rail in May 2016.



“Network Rail has, and continues to implement a large number of improvement initiatives that aim to strengthen its ability to deliver projects on time and to cost. Some of these are being managed as part of the EIP, but many are project-specific. Projects are therefore implementing improvements as they are generated from EIP work-streams, and in response to other internal management actions.

The success of these improvements may be hard to measure and will take a period of years to achieve all the intended benefits.

We need assurance that incremental improvements are being achieved in the medium to long term, to help build confidence in the challenges for CP5 and CP6. To achieve this we propose to follow-up the two IR reviews referenced above [3rd line assurance’ of the Hendy review & assurance for major programmes delivering complex timetable changes] to provide both assurance to industry, and constructive challenge to Network Rail’s continuous improvement.”

This clarification paper is focused on the concerns we raised in our 2015 investigation regarding the management of major programmes to deliver timetable changes, following the IR review on this subject. These concerns included:

- Poor setting of project/programme requirements and change control
- Accountabilities of client, sponsor and deliverer blurred through the project lifecycle
- Lack of programme integration with other industry stakeholders
- Lack of capability to model timetable performance during and after construction to inform integrated design and development decisions

Network Rail is now reporting it has completed two EIP workstreams to improve:

- Clienting and governing the enhancements portfolio
- Project governance (including GRIP for programmes)



Purpose

The purpose of this paper is to clarify that we expect Network Rail to provide evidence that it has effectively embedded improvements in its enhancements programmes, to address our concerns (raised in 2015) regarding the management of major programmes to deliver timetable changes.

The review should:

- Build on the effectiveness of the previous IR review on this subject
- Gain confidence that Network Rail's current improvement actions (EIP and others) are having the expected impact
- Build confidence for the wider industry that Network Rail is building capability to successfully deliver in the remainder of CP5 and beyond

The above objectives are consistent with the original objectives of this wider review.

Scope

The scope of this review is to review six projects or programmes to provide evidence if improvements to capability have been embedded since we last reviewed in 2014/15.

The review should be based on the rapid assessment framework used for the previous review, which was concentrated on the following five areas:

1. Programme governance structures
2. Industry programme integration
3. Industry readiness
4. Network Rail programme integration
5. Bringing infrastructure assets into use



The IR should adapt the rapid assessment framework (from the 2014/15 study) to take into account changes since the last review, to focus on Network Rail's role in the industry process. For example, a Memorandum of Understanding (MoU) has been agreed between Network Rail and DfT since the last review, which included the focus on DfT accountabilities, but assess if Network Rail is fulfilling agreed actions (to support these accountabilities) in line with good practice.

It should be noted the MoU described above only applies to England & Wales enhancements. Network Rail and Transport Scotland is currently in discussions about an equivalent MoU for Scotland enhancements.

The ORR is proposing the following programmes are in the scope of the review:

- Edinburgh to Glasgow Improvement Programme
- Edinburgh Suburban Enhancement Programme
- Midland Mainline Key Output 1
- East Coast programme
- East West Rail Phase 2
- Brighton Main Line upgrade

Exclusions: There are several other areas of ORR concern regarding Network Rail's management and delivery of the enhancements portfolio that are not in the scope of this clarification paper. For example, cost planning is currently being reviewed as part of the PR18 efficient costs workstream.

Methodology

The reporter should first complete a document review of the current governance arrangements (and underlying agreed processes) and adapt the rapid assessment framework based on this review. This proposed assessment framework should be sent to ORR and Network Rail before the reviews start. A review meeting should follow this stage to agree the assessment framework and process for engagement with Network Rail programme and project teams.

The methodology should prioritise the review of documents already available (for example, programme board papers and peer review reports) first, minimising the time required for discussions with the project team.



The reporter should schedule its timing of reviews, based on the lifecycle of each programme, considering when it will add value and when it will reduce the burden on the Network Rail programme team.

Dates should be scheduled for a review workshop and follow-up (if required) with the project team and out a request for information, so the document review can be completed before the workshop to make sure the conversation is informed and makes best use of time. This document review should have a strong focus on any recent internal Network Rail assurance activities (for example, peer reviews) and governance documents so the IR avoids duplication where possible.

The outputs of each assessment should be completed in a 'field report' for comment by the Network Rail project team and then shared with Network Rail and ORR. Once the complete sample of six assessments are completed and 'field reports' reviewed, the results should be collated into a complete report which is suitable for publication on the ORR website.

The reporter should consider that an integrated (DfT/Network Rail/ORR) assurance model is currently being piloted for Midland Mainline and East West Rail. Therefore, the reporter should look to work with other parties providing assurance to avoid duplication, ensure reviews are timed sensibly and to reduce burden on Network Rail project teams.

Timescales and deliverables

The required deliverables for this addendum review are:

- Regular progress updates (frequency and format to be agreed when review commences)
- Field reports of each assessment (not for publication), it is recommended these are reviewed in three tranches, but this is for discussion in planning phase
- Presentations of emerging findings as required
- Draft report submitted to ORR and Network Rail for review and comment
- Final report submitted to ORR and Network Rail

The report shall detail all findings and conclusions.



Activity	Week commencing
Planning meeting with ORR and Network Rail	1 May 17
Tranche 1: Draft field reports by:	12 June 17
Tranche 1: Final field reports by:	26 June 17
Tranche 2: Draft field reports by:	31 July 17
Tranche 2: Final field reports by:	14 August 17
Tranche 3: Draft field reports by:	11 September 17
Tranche 3: Final 'field reports' by:	25 September 17
Draft complete report	9 October 17
Final report	23 October 17

Independent Reporter proposal

The Reporter shall prepare a proposal for review by the ORR and Network Rail on the basis of this mandate.

Given the importance of this inquiry, the Reporter shall provide qualified personnel with direct experience in the respective disciplines to be approved by the ORR and Network Rail. The contractor is asked to submit details of the previous experience and qualifications of such personnel as part of their proposal.



Appendix B – Summary of field report findings

Overview

Below, the Reporter summarises its observations from each of the six programme field reviews undertaken.

Edinburgh Suburban Enhancement Programme (ESEP)

ESEP was defined as a corridor in the Scotland Route Study and so lends itself to taking a programme approach as envisaged in the CN031 review. The characteristics of ESEP are it a series of relayed infrastructure projects, however it does not require coordination with major rolling stock introduction.

The Route Investment Review Group (RIRG) endorsed the use of funding from Scottish Network Improvement Fund (SNIF) and Future Network Development Fund (FNDF) to develop CP6 projects, including ESEP in its meeting on 23 November 2016.

The Network Rail team developing ESEP is taking a programme approach to coordinate the various projects that make up the ESEP programme corridor. We reviewed evidence of this approach in a draft of the business case and also the client requirements documents.

A draft Strategic Outline Business Case (SOBC) has been developed for ESEP describing the programme as a capacity and resilience upgrade of the Edinburgh Suburban Line, proposed to be implemented in stages between 2020 and 2024. The business case has been prepared in the government standard five case structure. The draft SOBC includes three packages, which are intended to illustrate options for costs and benefits to inform choices for the client.



The focus on cost and benefits has already been successful with regards to reducing the scope of the scheme at Slaford Junction. The senior development manager had a clear understanding of the need to coordinate the projects to be able to measure benefits at the corridor level and is taking a common sense approach. We observed a mindset of wanting to do the right thing. The Developing Leaders training was cited as being an inspiration along with the culture being set by the leadership of the new System Operator organisation.

The senior development manager had been trained in GRIP for Programmes in September 2016 and this helped with establishing some generic principles; however the material we examined and discussed was not easily relatable to planning and managing ESEP.

Various elements of corporate guidance relevant to planning and managing programmes now exist in various states of development, which Network Rail reports are proceeding to plan. Some of this guidance has only has been distributed in mid 2017 and will need to be assimilated before it can be applied to ESEP. Relevant guidance includes:

- Sponsorship material on training, Sponsorship Academy and center of excellence
- System Operator guidance, including an end to end process and capability analysis
- Requirements

The requirements approach has been used since the start of ESEP development and was cited as being applicable and usable. The support and training provided by the center for this guidance was also commended. The other guidance has only started to emerge in mid 2017 and we detected an overload due to the volume of material being distributed.

We interviewed the capability analysis support allocated to the Scotland route and observed good practice in the specification of remits for their support work. The resultant reports from capability analysis were also commended as being understandable. How much modeling of options and what tools to use would benefit from some guidance for sponsors. There are a variety of tools being used including Vision and Railsys. Implicit is taking a programme approach and focusing on options that illustrate Value for Money using cost and benefit ratios.

The team developing ESEP are taking a programme approach as recommended by CN031. This approach follows naturally from the work undertaken on the Scotland Route Study, which indicated a focus on corridors. The team is using its initiative, common sense and experience to navigate through developing the programme. Corporate guidance is still being developed and is not yet coherent enough to be useful to a development manager or sponsor to navigate through planning and managing a complex programme.



Edinburgh to Glasgow Improvement Programme (EGIP)

EGIP is presently a long way into the delivery phase and in respect of Key Output 1 (KO1) electrification is now entering its final preparations to energise in October 2017 compared with its original date of December 2016. KO1 has experienced significant delivery issues and change which has, in-turn, presented challenges to operational stakeholders. Key Outputs 3 and 4 (K03, K04) are subject to detailed analysis and change control.

It is within the context of these intense delivery pressures and challenges that the appropriate embedment of central improvement programmes, like the Enhancement Improvement Programme (EIP), should be considered. The Reporter does not expect that programmes in delivery will make every conceivable change as a result of EIP initiatives, but will at least consider them and implement those that are either strict requirements or where the application of guidance will benefit delivery of Network Rail's obligations sufficiently to justify the effort. In the case of EGIP there is overlap between the changes prompted under EIP and the findings of Transport Scotland's review of Scotland's Rail Major Projects Portfolio in 2016.

It is evident that the Network Rail EGIP team has implemented a range of EIP and local initiatives since November 2016 to make improvements to Network Rail's contribution to the outcomes sought by the Scottish Government for EGIP. Local led improvements appear to have been in response to the 2016 EY review commissioned by Transport Scotland, but there is evidence that these have been mapped alongside EIP and ORR Monitor actions. Change has been concentrated on improving programme controls. EGIP was also subject to a Network Rail Peer Review in February 2017.

Some initiatives, such as GRIP for Programmes are understood conceptually by the Network Rail EGIP team, but have not yet been applied given the immediate delivery challenge faced. The Reporter recognises that there is a balance to be struck by programmes already in delivery and the introduction of new process. In the case of EGIP we note that some key programme decisions remain to be made and EGIP might consider whether any of the new initiatives could assist all industry partners with remaining decisions.

The trial and imminent roll-out of the Scotland Rail Reporting Tool in response to Transport Scotland's requirement for better integration across the whole Scotland portfolio is a good example of local improvement which may benefit Network Rail nationally.

Although the Network Rail Infrastructure Programme is now a long way into the delivery phase on all key outputs, the Reporter considers that systems integration still has a key role in achieving the outcomes sought. For example, we are aware that resolving the 42 minute (peak) journey time capability by balancing train performance, timetabling and line speed upgrades is a key time critical integration issue that needs to be addressed; a decision is needed whether to implement line speed upgrades in sufficient time to achieve the milestones. KO3 has been re-baselined to December 2019 in respect of 8-car platform 1 extension



works and KO4 to March 2020 for the Queen Street station concourse and station frontage works. Analysis to accelerate completion against the new KO3 baseline for platform 1 lengthening is subject to analysis to overcome operational constraints.

Transport Scotland owns the EGIP business case and is therefore accountable for benefits realisation. To assist Transport Scotland, informative, considered advice and guidance from Network Rail in its role as systems integrator and overall Programme Manager is still required to resolve industry-wide integration issues. Whilst the delivery challenges of the Network Rail Infrastructure Programme are intense and potentially very consuming of management effort, the programme management task still exists.

EGIP has seen recent key changes to governance and it would be beneficial to review whether the changes are proving effective or not. For example, an early test of the new governance occurred during the period taken to develop and assure delivery, engineering access, procurement and cost proposals for the Stirling, Dunblane, Alloa (SDA) electrification project (a project required to deliver EGIP KO3).

East Coast Main Line (ECML) Enhancement programme

The Network Rail Sponsor team is seeking to fulfil the intention and direction set out in the detail underpinning the DfT and Network Rail MoU. This includes developing options using business case analysis to determine value for money. There is a recognition that the emerging programme is not directed by an overarching Client or Programme Brief yet, but that this may emerge from DfT's further consideration of the outcomes it requires. There is evidence that Network Rail has positively supported this consideration, for example, its benefits map and the current activity to model four potential timetables in relation to available traction power supply.

DfT has progressed its intention to procure system integration support from Network Rail since autumn 2016. This remains subject to agreement but Network Rail is now preparing a case as to how this may be resourced. Whilst some infrastructure has been delivered, other key elements remain in early GRIP stages with some potential trade-offs required against the backdrop of an affordability challenge in Control Period 6. Elements of the industry level systems integration function are being performed, but further clarity of the respective roles for DfT and Network Rail are required.

The Network Rail sponsor team recognise the benefits of potentially re-shaping the integration and delivery of its own infrastructure obligations (currently discrete projects) as one programme. This will be driven by DfT's resolution of its priorities. It would appear that with a combination of infrastructure modelling, affordability, new technology and delivery challenge, coupled with the demands of committed and aspirational service objectives, there would be benefit from 'standing back' and applying programme management and systems integration techniques to test what best outcome could be achieved. On a



practical level, the instruction of discrete projects to Network Rail should not prevent it from organising delivery in the most effective way and a programme-wide approach across the infrastructure elements may be beneficial and necessary in view of the challenges faced.

The route sponsor team and the new System Operator function are working closely to undertake analysis of options and outputs. Following the discovery of the power supply issues north of Bawtry that are expected to impact the committed and aspirational services for East Coast, there is evidence of Network Rail taking an affirmative approach to modelling four potential timetable options. This analysis effort is not yet complete to support decision-making but it is structured to provide confidence in the interim states and end states that will be achieved based on assumed timings of delivering new infrastructure and rolling stock.

As identified in our previous Reporter mandate, the corporate processes are not yet embedded to guide the local route sponsor teams as to how to approach development adopting all the new principles of decision points. The ECML sponsor team has yet to benefit from using GRIP for Programmes. The team are encouraged by the central initiative to improve the professionalism of the Sponsor function within Network Rail.

Brighton Main Line (BML) Upgrade programme

The BML Upgrade programme is characterised by a huge civil engineering and rail systems intervention in the East Croydon Area that the client has sought to further develop including readiness to submit a TWA application over the next 18-24 months. Network Rail's work so far suggests that the expected scope of this intervention is fairly certain in spite of some of the end state train service outputs not being fully agreed at this point in time. Network Rail must also deliver a range of other infrastructure interventions that will be driven in part by asset condition, and by the end state as the requirement becomes clear. Network Rail and DfT's present work to refine and agree a Client or Programme Brief is important in shaping the understanding of the baseline from which Network Rail is expected to work and, when DfT is able, to confirm the actual end state required.

The Network Rail Sponsor team is seeking to fulfil the intention and direction set out in the detail underpinning the DfT and Network Rail MoU. This includes developing options using business case analysis to determine value for money. There is recognition that the governance of the programme requires shaping in the near future.

DfT has not yet instructed Network Rail to perform a formal industry level systems integration role for the overall BML Upgrade programme. This may form part of the considerations in relation to the Client or Programme Brief and refined governance arrangements. The Reporter observes that there are already some key industry level systems integration challenges to resolve.



The Network Rail route team undertaking the development work are part of the new System Operator function and are being supported closely by the central function in Milton Keynes to undertake analysis of options and outputs. The Reporter reviewed evidence of Network Rail's intent to perform analysis that will justify that the proposals are deliverable whilst limiting the impact on post-2018 (after the conclusion of Thameslink) services. Network Rail is therefore placing particular emphasis on demonstrating both the capability and performance of the network during the disruptive construction phase from around 2022 onward.

As identified in our previous Reporter mandate, the corporate processes are not yet embedded to guide the local route sponsor teams as to how to approach development adopting all the new principles of decision points. GRIP for Programmes has been briefed followed the Peer Review. However, the Reporter does consider that the local team have used their own initiative to navigate the programme challenges faced.

Midland Main Line (MML) Key Output 1

The MML programme is at a critical point in its lifecycle with a decision to be made by the Secretary of State in respect of final investment decision in KO1. In the context of the Reporter mandate we consider that the MML programme is at an advanced stage of its early development and has positively benefitted from improvements arising the various initiatives instituted since 2015.

The programme appears to have benefitted from both the governance introduced under the DfT and Network Rail MoU and the integrated assurance performed. Although the latter has resulted in the effort of accommodating multiple assurance reviews, the consistent message is that, although key benefits realisation and delivery challenges remain, the level of preparedness in relation to the KO1 final investment decision is high.

The MML programme is trialling a 'top level document' between DfT and Network Rail to set an agreed baseline and to clarify roles, accountabilities and behaviours. This is an important initiative as clarification of Network Rail's infrastructure baseline is important in relation to the East Midlands franchise and the intent to procure bi-mode trains.

Network Rail has been funded to provide a systems integration function and the resource that Network Rail is procuring will serve both the MML and the ECML Enhancement programme. The function being procured should provide Network Rail and DfT with the basic information and controls it requires, but the function will be reliant on cooperation and transparency from all parties. The potential appointment of a 'shadow operator' also appears beneficial in this respect.



Several industry level programme integration challenges remain relating to realisation of benefits following the cancellation of KO2 including:

- The need to retain some KO2 scope in KO1A to enable KO1
- The need to accommodate bi-mode trains scope in KO1A
- The potential need to accommodate additional infrastructure scope in KO1A to address the interaction of the Thameslink end-state with the intended MML programme

Integration of Network Rail's own infrastructure obligations is forming at GRIP 3 following an effort to extract learning from other programmes. Network Rail is subjecting the London to Corby (L2C) element of the infrastructure programme to an annual internal Peer Review. This has reportedly had varied benefits depending on the capability of the Peer Review teams deployed. Network Rail regard L2C as a multidisciplinary project rather than a programme, although the apparent level of control in relation to programme and integration between disciplines suggests that a programme delivery method might result. The resolution of KO1 and KO1A and the evident need for strong industry level programme integration, all of which is being addressed by DfT and Network Rail, suggest to the Reporter that a programme approach is in evidence.

East West Rail (EWR) Phase 2

EWR Phase 2 appears to have significant stakeholder support via the EWR Consortium and the National Infrastructure Commission has recommended affirmative action to deliver it. Against this backdrop DfT and Network Rail have been engaged in a heightened period of consideration of the outcomes sought from the programme and revision of infrastructure proposals to enable its implementation by 2024 in an integrated manner with HS2. The EWR Shadow Company provides potential to implement a new model for running part of the rail network since privatisation of the UK rail industry between 1994 and 1997.

In the context of this review the Reporter has found evidence of the implementation of the DfT and Network Rail MoU operating effectively. Although Network Rail is clear that it only takes instruction from DfT, the client and key stakeholder arrangements for EWR Phase 2 suggest that it would be beneficial to concisely state the governance relating to all key parties including: Network Rail, DfT (both for EWR Phase 2 and HS2), HS2, the EWR Consortium and the EWR Shadow Company.



There is evidence of industry level systems integration activity in relation to EWR Phase 2 however, beyond the basic accountabilities described by the DfT and Network Rail MoU, no formal agreement of specific roles and accountabilities are evident. Network Rail and DfT appear to be using the Output Specification developed between them as the vehicle for controlling Network Rail's obligations for delivery. Network Rail is progressing on this basis but with DfT business case development ongoing and the EWR Shadow Company proposals for the future of EWR yet to emerge, there is the potential either for additional infrastructure to be required (for example, depot and stabling facilities) or for anticipated benefits to be eroded (for example, if Network Rail's on-going study of capacity and performance identify timetable aspirations that cannot be achieved without adding to the infrastructure envisaged).

The Reporter considers that it would be beneficial for EWR Phase 2 to clarify accountabilities and roles in relation to industry level systems integration, agree a systems migration plan and perform a gap analysis to check that Network Rail and DfT are content with the approach agreed in the current Output Specification.

In respect of Network Rail's integration of its own delivery obligations it has taken affirmative steps through the EWR Alliance to foresee and address key aspects of delivering EWR Phase 2 by 2024. However, significant challenges remaining in relation to consents and integrating in sufficient detail with HS2 to enable early construction start dates in September 2018. The mobilisation of the EWR Alliance at this stage of development is a positive mitigation to the development challenges experienced.

Network Rail exhibit a high degree of understanding and application of a programme approach in relation to EWR Phase 2, however, the Reporter considers that this is because of the specific experience of Network Rail's leadership assigned to the programme, rather than the specific implantation of GRIP for Programmes.

