



Department
for Transport

Report of the Bowe Review into the planning of Network Rail's Enhancements Programme 2014-2019



Report of the Bowe Review into the planning of Network Rail's Enhancements Programme 2014-2019

Presented to Parliament
by the Secretary of State for Transport
by Command of Her Majesty

November 2015



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Covering letter to the Secretary of State

You have asked me, as a non-executive member of the Board of the Department for Transport, to consider and report to you on lessons learned from the planning process for 'Control Period 5' – 2014-19 – for rail investment to be delivered by Network Rail.

In view of the scale of this programme, its huge importance for our economy and society, and the issues that have arisen on which you spoke to Parliament on 25 June 2015, I have produced this Review with some speed, consistent with producing conclusions that are well grounded.

Attached is my report, which I have aimed to make as practical and robust as possible.

You asked for the report to focus on the *planning*, rather than the delivery, of the current investment programme. It does not replicate the work currently (in autumn 2015) being undertaken by Sir Peter Hendy at Network Rail to reset this investment programme. Nor does it raise wider questions about the structure and funding of Network Rail, on which Nicola Shaw will report next year, or of the structure of the industry and the legislative framework that governs its regulation.

I have produced a number of recommendations which I hope will have immediate practical impact in terms of more effective planning and delivery of investment in our rail infrastructure.

I have been assisted in the preparation of this report by a team of colleagues in the Department for Transport, other Government departments, and by many discussions with people in Network Rail, the Office of Rail and Road, and elsewhere in the industry. I would like to thank the Review team who have assisted with the research for, and preparation of, this report. I am immensely grateful for their hard work and professionalism. I would also like to thank all contributors to this Review, for their time and candour.

The contents of this report, and the views expressed in it, are however my responsibility.

I am copying this letter to Philip Rutnam, the Principal Accounting Officer for the Department for Transport.

A handwritten signature in black ink that reads "Colette Bowe". The signature is written in a cursive, slightly slanted style. Below the name, there is a short horizontal line.

Colette Bowe

1. Summary

- 1.1 In its October 2013 *Final Determination*, the Rail Regulator ORR¹ set out Network Rail's funding and the outputs expected of it for the five years between 2014-2019, 'Control Period 5' (CP5). A key milestone of the rail planning process, and encompassing an overall investment for Great Britain of £38.3bn, the Determination included a planned £11.5bn² for infrastructure upgrades in England and Wales, known in the industry as 'enhancements'. Network Rail formally accepted this Determination in February 2014, and the Control Period began on 1 April 2014.
- 1.2 The enhancements planned were intended to deliver the Government's strategic objectives for the railway, which had been published in July 2012. These enhancements included³:
- ongoing funding of the Thameslink and Crossrail programmes already underway;
 - a significant volume of electrification (including the infrastructure necessary for the Intercity Express Project fleet, IEP);
 - investment in capacity, particularly in the North of England; and
 - over £1.2bn allocated to ring fenced funds such as the East Coast Connectivity Fund, and the Passenger Journey Improvement Fund.
- 1.3 On 25 June 2015, the Secretary of State announced that aspects of the enhancements that had been planned were, "costing more and taking longer" than forecast to deliver. He announced that Sir Peter Hendy had been appointed as the new Chairman of Network Rail and commissioned to re-plan how this investment would be delivered. The Secretary of State has asked me to consider the lessons to be learned from the planning process, and the practical steps that might be taken to ensure more effective future planning and delivery. The full Terms of Reference for this work are included at Annex 1. It is important to note that this Review has not been remitted to, nor does this report address, any issues of personal accountability or responsibility.
- 1.4 I conclude in this report that there is no one overarching cause which explains the cost escalation and delays to projects and programmes in the current control period, which

¹ Then the Office of Rail Regulation, now the Office of Rail and Road.

² ORR, *Final Determination*, Table 14.9. Scotland equivalent figure £1.4bn, Table 14.11

³ Figures provided are as included in the *Final Determination* in respect of England and Wales enhancements, 12/13 prices, and therefore may differ from subsequently updated figures

1. Summary

if corrected would prevent it from recurring. Instead, a number of issues have combined to require this programme to be reviewed and elements to be replanned. These include:

- planning processes, which had been thought to have worked successfully at the previous control period, have been shown to be inadequate in the face of the scale and complexity of the CP5 programme – including, very importantly, proposed electrification works on a scale not attempted before in the UK;
- the definition of organisational responsibilities between the Department, Network Rail and the ORR. These were unclear, lacking the relentless focus and clarity required for the design and execution of a major infrastructure programme;
- the fact that the overall plans encompassed a complex portfolio of schemes, subject to poor scope definition from the outset and ongoing ‘scope creep’ which led to cost increases;
- issues of effective internal programme and portfolio management, notably at Network Rail, where a combination of changing internal structures and responsibilities obscured lines of accountability for efficiency and delivery; and
- when it came to delivery, early costing errors, unanticipated interdependencies, lower than expected productivity and the failure to ensure agreed front end scope definition have also contributed.

1.5 Compounding these issues was the change in accounting classification status of Network Rail which took effect in 2014. This has led to Network Rail’s debt being on the Government’s balance sheet (with all the obvious consequences for control). Whilst not a cause of cost escalation, reclassification exposed a previous reliance by all parties on access to financing that was off government balance sheet as a means of managing financial overruns. The establishment by the Department and HM Treasury of a fixed debt limit, compared to a previous ratio driven debt limit, has imported a new financial discipline on Network Rail.

1.6 In seeking to reach practical recommendations, I have been mindful that this Review is considering the outcomes of several years of planning work. In that same period, there have been several changes, of which reclassification, mentioned above, is perhaps the most significant. Also notable are the governance and organisational changes at the Department and Network Rail, which are explored in the report. Given the changed context of reclassification, it is vital that the organisational responsibilities of those involved in the planning process are clear.

1.7 In the light of this reclassification, I recommend that the role of the ORR in respect of enhancements planning should be reviewed. At CP5, risks in relation to the affordability and deliverability of the programme were identified by the ORR – as evidenced, for example, by the introduction of a wholly new process to deal with the fact that significant parts of the proposed programme could not be accurately costed given their immaturity. I further recommend that future regulatory activity should move beyond identification of risk and give more weight to issues of complexity, ambition and delivery challenge, appropriate to the scale of rail enhancement programmes.

1.8 I recommend that the governance and day to day management of the process for planning and overseeing rail investment should be strengthened as between Network Rail and the Department. New governance arrangements between Network Rail and the Department should include more clearly signposted investment decision points,

mutually understood opportunities for amending the programme of work (as occurred effectively during CP4), and a greater role for the Department as primary funder to prioritise schemes at early development phases.

- 1.9 I recommend that consideration should be given to whether major and complex enhancements (in particular), such as those that encompass rolling stock and franchise changes as well as infrastructure upgrades, should be subject to bespoke and integrated governance, such as already in place on Crossrail and Thameslink. This will also have implications for the role of the ORR as highlighted in paragraph 1.7.
- 1.10 Though the focus of the Review has been on enhancements, it is important to note that enhancements investment occurs as part of a much broader regulatory charging review, conducted by the regulator. I emphasise that, I am not proposing ending the idea of a long term planning cycle in rail, given the certainty this brings to both funding and planning of routine work.
- 1.11 In my view, though not a direct cause of cost escalation, there is also a lack of consistent focus throughout the planning process on the delivery challenges of complex enhancements, including recognising the deliverability risks of the whole portfolio, preparing and managing the supply chain effectively, and engaging with system users. Despite the considerable improvement at CP5 in growing industry involvement in developing the priorities for enhancements (and in reflecting these in the HLOS), further improvements can be made. I therefore recommend that:
- considerably more is done to ensure that user priorities, in particular those of passengers, are considered at an early phase of the planning process, not just in determining what enhancements are delivered, but in *how* they are delivered by Network Rail; and
 - in the longer term, there is a more strategic approach to ensuring the appropriate training and availability of the right people, from the outset of planning.
- 1.12 Table 1, on the next page, summarises my recommendations.

Table 1: Summary of Recommendations

- The role and responsibilities of the ORR in respect of enhancements planning should be reviewed. This should include, but not be confined to, its role in providing assurance in respect of affordability and deliverability.
- In light of reclassification, the Department and Network Rail should reset the formal framework of rail enhancements planning, implementation and oversight. This should include:
 - i. a clear and transparent governance process;
 - ii. the Department being significantly more active in prioritising strategic objectives supporting the allocation of funding for schemes in the early stages of development;
 - iii. transparent and mutually understood criteria (including required outcomes) against which schemes can be prioritised and developed;
 - iv. formal development decision gateways and later investment decision gateways (once scope and costs are clearly established), which reflect the fact that projects in the development stage are generally highly immature; and
 - v. re-establishing the flexibility to adjust the programme in response to emerging pressures with both increments and decrements on projects, such as a formal variation process (as seen in the programme during CP4).
- Major and especially complex route enhancement schemes should be subject to integrated governance frameworks, such as those already used on Crossrail and Thameslink, which are contractual and reflect the whole-system requirements of such upgrades (including greater involvement of operators).
- Leading project, programme and portfolio management practices should be introduced throughout the process; noting in particular the key issues of assurance, integration, and risk management.
- A more strategic, long term approach to managing the availability of the right people both within the three organisations and throughout the supply chain is required. This should include in particular identifying long term demands across the entire industry and emphasising opportunities for improved skills development in these areas.
- In planning *how* schemes are delivered and in focussing future investment there should be more consideration of passenger and operator priorities, with regard to both passenger and freight needs. Network Rail should be challenged to prioritise consistently users' needs when delivering enhancement works.

2. Introduction

- 2.1 The purpose of this Review is to make recommendations to improve the outcomes of future rail investment. The full Terms of Reference are at Annex 1.

What this Review is about

- 2.2 This Review was commissioned in recognition of issues of cost escalation and schedule delay on a number of current enhancements projects and therefore the need to learn lessons ahead of future planning. This Review has focussed closely on the planning process during the period 2011 – 2014, which led up to the start of the current control period for rail investment, which is expected to run from 2014 – 19. This is the fifth such control period, “CP5”.
- 2.3 Given the extent of the issues identified, the enhancement delivery programme is, as I write, being reviewed by both Network Rail and by the Regulator (the Office of Rail and Road (ORR)). The ORR, via its Monitor publication, has additionally identified issues of delivery in respect of renewals delivery. I have not attempted to pre-empt the conclusions of their work, but have instead continued to focus on the planning of this programme. My intention has been to identify clear lessons that can be quickly factored in to what should happen next.
- 2.4 It is important to note that the investment in enhancements was only part of the total spend planned by Network Rail for CP5. The total GB expenditure for CP5, which includes network operations, maintenance and renewals, was planned to be £38.3bn (12/13 prices). This Review, as asked for in the Terms of Reference, relates to planning of the enhancements programme.
- 2.5 Throughout this report, my Review refers to the overall size of the enhancements planned for the Control Period. It is occasionally confusing, given the different price bases used in published material, the different ways of presenting information, and the complexity of the programme, to gain a common understanding of the size of the programme. For example, headline figures in the Periodic Review often refer to England, Wales and Scotland, whereas the enhancements of interest to this Review, are solely those in England and Wales. To assist understanding, in section 3, I have set out a table comparing costs at each stage of the process.

What this Review is not about

- 2.6 In line with the Terms of Reference, I have not reviewed the appropriateness or otherwise of engineering options and solutions – though in my view it is clear that, in particular in the case of the Great Western Mainline, conducting delivery in tandem with design has brought about increases in cost⁴.
- 2.7 Nor have I been asked to review the present legislative framework that governs the regulatory structure, or the legislation that governs the structure of the industry. I do however have some reflections on the role of the Regulator in the changed circumstances following the reclassification of Network Rail as part of the Department for Transport's wider financial responsibilities.
- 2.8 This Review is focused on the lessons to be learned, and not on the apportionment of blame. In places, the emphasis is on the 'worst' examples, or on deficiencies, but that should not detract from an appreciation of the significant effort of all three organisations, plus the wider supply chain and industry, over a sustained period, in devising and initiating an ambitious programme of railway improvements, and delivering a rail system which has an excellent safety record. In Autumn 2015, major improvements were unveiled at Birmingham New Street and Manchester Victoria stations. In Spring 2016, the rebuilt and newly double-tracked line between Oxford and Bicester will be reopened. Within the Control Period, both Crossrail and Thameslink are expected to be completed, transforming cross London journeys for millions of passengers.

Wider issues

- 2.9 In addition to the issues relating to the delivery of rail investment, I have observed some wider issues that relate to the framing of the outcomes that we require from our rail infrastructure. In particular, I have been struck by the difficulty of determining when, and how, the wishes and specific needs and interests of different users of the rail system are identified and factored in to the whole process of investment planning. I have more to say about this in my recommendations in Section 6.
- 2.10 I also wish to draw attention to the importance of giving close attention to the development of the workforce and supply chain necessary to deliver these huge infrastructure investments. In this context, the appointment of Terry Morgan to lead the development of a transport infrastructure skills strategy, is a very welcome acknowledgement of these important issues⁵. Again, I comment further in my recommendations.

How this Review was conducted

- 2.11 The basis of the Review has been some 100 discussions with people who were involved in one way or another in the planning or delivery of CP5. This included a broad spectrum of contributors from the Department, Network Rail and the ORR, as well as other contributory bodies.

⁴ See transcript of PAC hearing 21 October 2015, <http://www.parliament.uk/business/committees/committees-a-z/commons-select/public-accounts-committee/inquiries/parliament-2015/network-rail-2014-2019-rail-investment-programme-inquiry/>

⁵ <https://www.gov.uk/government/news/building-apprenticeships-in-transport-sector-at-heart-of-government-infrastructure-investment-plans>

- 2.12 Discussions were led by the Government Internal Audit Agency and directed towards understanding:
- the roles, responsibilities and deliverables of individuals and organisations, including the impact of any changes;
 - the programme and project planning assumptions; and
 - the planning and governance arrangements, and project change management in place.
- 2.13 From discussions, the Review team built up a body of provisional views, which were then assessed by:
- document review;
 - follow up discussions;
 - research into specific areas, including the governance of Crossrail and Thameslink, leading practice in Project, Programme and Portfolio Management, and illustrative examples of schemes; and
 - drawing on previous work in respect of rail (the Laidlaw Inquiry⁶ and Brown Review⁷) and roads (the Nichols Review⁸) and relevant enquiries conducted by the National Audit Office (NAO).
- 2.14 The Review drew on the support of a Liaison Board. This Board was chaired by the then Director General of the Rail Executive and comprised members of Network Rail and the ORR, as well as representatives from HM Treasury, Major Projects Authority, Cabinet Office and the Department. Members of this Liaison Board commented on the direction of the Review.
- 2.15 On the basis of the information gathered, I have identified a series of possible causes of cost escalation and schedule delay across the portfolio. These were both directly linked to individual projects and more generally to the conduct of the planning process undertaken. My conclusions, set out in sections 4 and 5, are drawn from the many, and sometimes conflicting, views and reflections that people have offered me and the Review team. These in turn lead to a number of recommendations, which are set out in Section 6.
- 2.16 The Review's scope does not extend to proposing changes to the statutory framework, but, as already noted, does cover how rail infrastructure investment might be planned and delivered within the current statutory framework. In my view, the interpretation by all parties of the periodic review framework has led to an unnecessarily narrow approach to the process, with a lack of whole-system and long term thinking. A consideration of the treatment of enhancements within the periodic review, and the incentives created by

⁶ The Report of the Laidlaw Inquiry – https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/29866/report-of-the-laidlaw-inquiry.pdf

⁷ The Brown Review of Rail Franchising Programme – https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/49453/cm-8526.pdf

⁸ The Nichols Review – <http://persona.uk.com/a5dunstable/deposit-docs/DD-023.pdf>

the current regulatory approach, would offer a significant improvement in CP6 planning. I have set out my thoughts on this in my recommendations.

Structure of this Report

- Section 3 of this report sets out the context of rail enhancements planning, which is embedded within a much broader regulatory process.
- Section 4 sets out what I see as the principal causes of cost escalation and delay, and addresses contextual issues which are also seen as having contributed.
- Section 5 addresses issues of industry engagement in the planning and delivery of enhancements, both along the supply chain and in respect of end users, be they freight and passenger operators, or passengers themselves.
- Section 6 sets out my recommendations to give greater confidence in respect of ongoing delivery and future planning. Annexes provide further background material on some of the key concepts discussed throughout.

A word about the use of language in this report

2.17 The process around this industry is, like that around many other industries, full of jargon and acronyms. The key word in this report is 'enhancements', which in plain English means upgrades to the infrastructure. I did consider whether to try to use plain English instead of regulatory and other terminology throughout. On reflection, this would have imposed a cost in terms of translation, with the risk that some points would be lost in that translation. I have therefore stuck with the recognised jargon, but have sought to make it as clear as possible at the first time it occurs in the text. I hope that those who pay for the investment in the railways either as taxpayers or users of the rail system, will be able to see clearly what I am saying in this report.

3. The Regulatory and Contextual Background

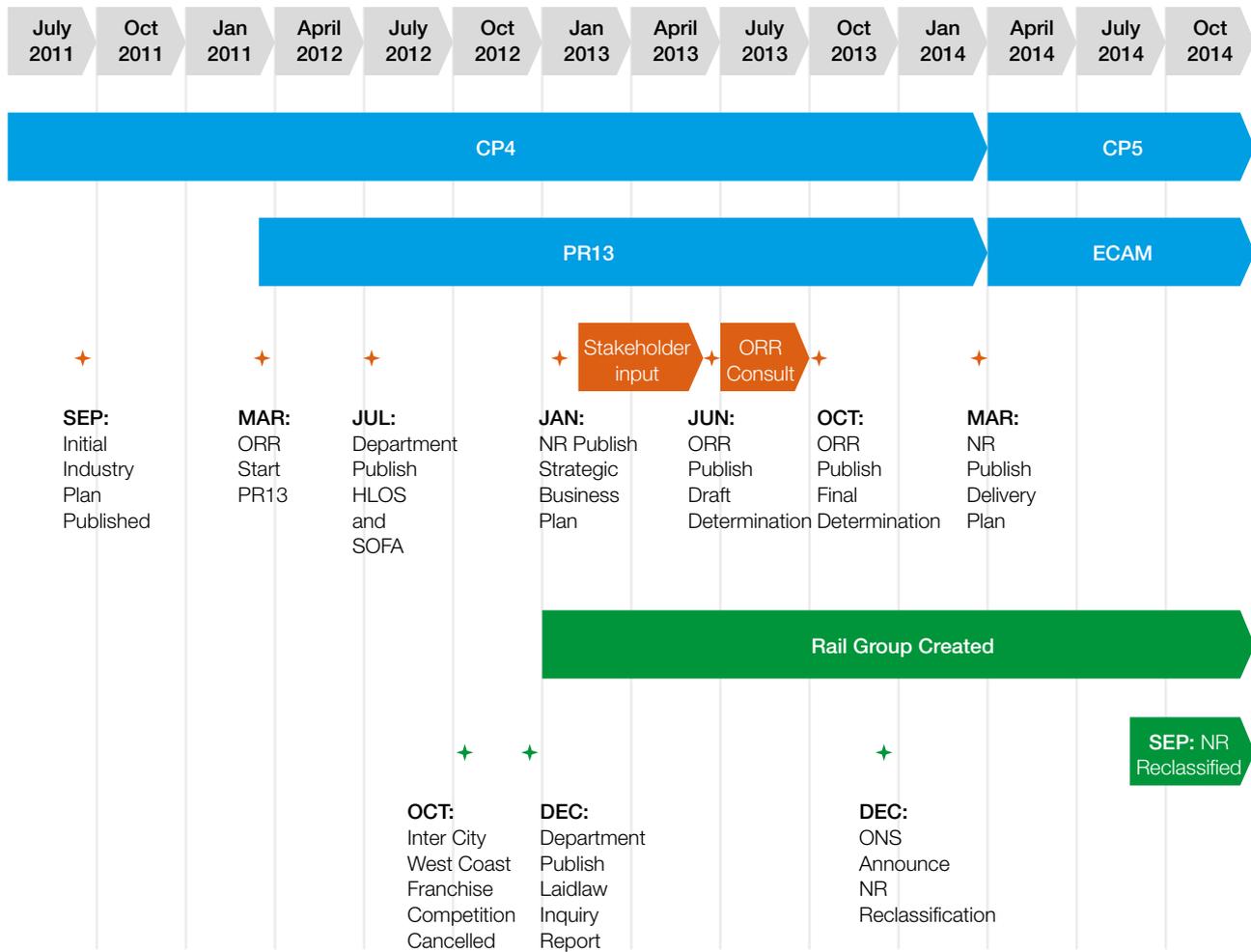
- 3.1 This section sets out the planning of Control Period 5 (CP5), which is planned to run from 2014-2019. It sets out the main stages of the planning process and provides a comparison between the planning process for CP5 and the previous control period, Control Period 4, which ran from 2009-2014. This section is intended to provide a descriptive, high level overview for those not already familiar with the process.
- 3.2 The access charging review process, called a periodic review, is set out in legislation⁹. In this process the regulator (The Office of Rail and Road¹⁰, ORR) determines the outputs expected to be delivered efficiently by Network Rail (the infrastructure manager) in a control period. It sets the access charging structure for Train Operating Companies (TOCs) and Freight Operating Companies (FOCs) and the incentives framework in which Network Rail operates. The process is also designed to provide Network Rail with the opportunity to plan effectively, by providing it with funding certainty for defined periods of time. The periodic review for CP5 is known as PR13. As part of this process the Secretary of State sets out his/her strategic objectives for the railway. In 2012, as in 2007 for the previous control period, this was set out in a High Level Output Specification (HLOS) published alongside a Statement of Funds Available (SoFA).

⁹ See section 4 and Schedule 4A to the Railways Act 1993, as amended, including by Railways Act 2005.

¹⁰ Previously the Office of Rail Regulation to 1 April 2015

3. The Regulatory and Contextual Background

3.3 The key milestones of the periodic review, with the dates of these in PR13, are set out below.



3.4 The planning process covers multiple elements. In respect of enhancements, the responsibilities of the three parties can be broadly summarised as:

- Department – develop a set of proposals for what should be achieved (by Network Rail with respect to infrastructure) during a control period and provide an indication of the public funds available to do this (these are set out in the High Level Output Specification, HLOS, and the Statement of Funds Available, SoFA)¹¹;
- ORR – assess whether the Government’s proposals are achievable given the funds indicated. Indicate to Network Rail, by way of the Draft and Final Determination, the outputs it is expected to deliver, including the regulated milestones it must achieve (and then hold Network Rail to account for delivery against these); and
- Network Rail – own the industry planning process prior to the HLOS (including development of strategies for each route, known at CP5 as ‘RUS’, ‘Route Utilisation Strategies’), and respond to the HLOS with a Strategic Business Plan. Set out how it will achieve what it is required to do during the control period by producing a Delivery Plan.

The Planning of CP5

3.5 PR13 took as its starting point the existing planning structure from the previous periodic review, PR08, but added, based on lessons learned and in line with the expectations of

¹¹ These statements have been renamed the Rail Investment Strategy (RIS) since PR13.

the Government's rail agenda (articulated in the 2012 Command Paper, 'Reforming Our Railways: Putting the Customer First'), a new emphasis on shared industry participation and leadership on cross industry issues.

- 3.6 The Initial Industry Plan (IIP) for England and Wales was published in September 2011 and contained proposals for CP5 and beyond. For the first time this initial planning document was produced under the aegis of the Rail Delivery Group (newly formed in 2011 in response to the Rail Value for Money Study), which consists of Network Rail and passenger and freight owning groups. Development of the IIP was overseen by the Planning Oversight Group (POG), which included representatives of passenger and freight train operators and suppliers, being chaired by Network Rail itself. The IIP built on the cross-industry work developed in Network Rail's Route Utilisation Strategies (RUSs), published at various times before 2011¹².
- 3.7 This planning preceded the official beginning of PR13 process, which was started by the ORR in March 2012 with a Review Initiation Notice.
- 3.8 In July 2012 the Department published its HLOS and SoFA. The HLOS contained the Secretary of State's strategic objectives for the railway over CP5 in terms of performance metrics and enhancements sought (amongst other things), taking account of the IIP. At the same time the Department stated the public money to be made available for the railways over this five year period in its SoFA. The Secretary of State's Guidance to the ORR¹³ was published alongside these, together with a specimen option, Annex 2 sets out further detail about these publications.
- 3.9 In January 2013, Network Rail published its Strategic Business Plan (SBP) for CP5. This plan, together with supporting documentation, was submitted to the ORR. In it Network Rail set out how it envisaged it would deliver the HLOS through CP5, and the expected costs for this. The ORR used the SBP to produce its Draft Determination. The Draft Determination covered the funding and outputs, and included an assessment of the SBP. Following consultation the ORR published its Final Determination in October 2013. In this Final Determination the ORR assessed that total expenditure on enhancements in England and Wales in CP5 was expected to be £11.5bn.
- 3.10 Network Rail accepted the Final Determination in February 2014, and issued its Delivery Plan in March 2014 (this Delivery Plan has been updated subsequently, in April 2014 and March 2015). The Delivery Plan set out what Network Rail would deliver over CP5. The culmination of PR13 was then ORR's Delivery Plan Notice of 31 March 2014 accepting Network Rail's Delivery Plan as a baseline for CP5 and against which Network Rail performance would be measured. CP5 began on 1 April 2014.

Comparison with CP4

- 3.11 The table below sets out the cost of the enhancements programme for England and Wales in CP5 at key stages of the planning process. To set the programme in context I have compared it to the enhancements programme for the previous Control Period, CP4 (and adjusted each to 12/13 prices for ease of comparison). In terms of the overall

¹² RUSs took a strategic look at the rail network and its usage and capability in relation to current and future demand. Where shortfalls in capacity were identified, the RUS identified options for addressing them. Dates of publication varied by route. The RUSs were strengthened following PR08 to feed into PR13. They have now been replaced with 'Route Studies' by Network Rail, fulfilling broadly the same purpose.

¹³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3642/sos-guidance-to-orr.pdf

3. The Regulatory and Contextual Background

determination, at CP4 enhancements spend represented 28% of the overall Final Determination, compared to 32% at CP5. I have looked at three elements in particular:

- the overall size of the enhancements programme at each stage;
- any key differences in size and development of programme that were recognised at the time; and
- (in the next chapter) I go on to address what with hindsight has been recognised as a critical difference, namely the composition of schemes and the extent of the electrification programme.

	CP4/PR08 (£m, 06/07 prices)	CP4/PR08 (£m, 12/13 prices)	CP5/PR13 (£m, 12/13 prices)
Enhancements Cost at HLOS	7,328 ¹⁴	8,431	9,552 ¹⁵
Enhancements Cost at Strategic Business Plan	8,353 (SBP Figure 10)	9,610	10,960 (SBP page 32)
Enhancements Cost at Final Determination	7,348 (FD table 9.7)	8,454	11,463 (FD table 14.7)

3.12 As the table shows, the planned enhancements expenditure at the time of the respective HLOS' appears to be materially larger for CP5 than for CP4. When CP4 figures are adjusted to 12/13 price base (as in column 2) the difference is approximately £1.1bn, with £9.5bn planned for England and Wales in CP5 and £8.4bn planned for CP4. However it is notable that during the life of CP4, further schemes were added and existing schemes re-scoped in response to emerging delivery pressures and Government priorities. This points to an active and iterative process of managing the scope of schemes; and meant that when planning CP5, Network Rail's expectation was, in its Strategic Business Plan, that it would have spent £10.2bn (also in 12/13 prices) on enhancements by the end of CP4.

3.13 Furthermore in its Final Determination for CP5, in 2013, ORR concluded that on balance, Network Rail had a good track record of delivering enhancements in CP4. This was confirmed at the end of the Control Period in 2014, when ORR indicated that Network Rail had delivered 98 of 118 CP4 regulatory output milestones early or on time, with 16 of these late deliverables assessed as having 'zero' passenger impact. Consequently, given both the size of outturn in CP4, and the perceived success of CP4, there may have been an expectation that Network Rail had the capacity to deliver the larger programme at CP5.

3.14 A difference between CP4 and CP5, however, was the level of maturity of schemes at equivalent stages in the planning process. The "maturity" of railway schemes can be defined according to a process known as GRIP, or the Governance of Railway Investment Projects. For the purposes of this review, I define 'immature' as any scheme not yet at GRIP3 stage, when a single option is selected. In CP5, the schemes were materially less mature than at comparable stages in CP4. At SBP in CP5, some 64% of schemes by value were at these early stages of development. By comparison c.35% of projects and programmes were at the same stage of maturity at the same point in CP4. Markedly, at CP5 these immature schemes included a significant number, approximately 26% by value of the overall proposed portfolio, that were yet to have their

¹⁴ As stated in table 9.2 PR08 FD, and therefore excluding rolling stock investment

¹⁵ Announced in the HLOS in 11/12 prices as 9,400

output defined (i.e. pre-GRIP or GRIP0). This compared to c.12% in CP4. Detail about the definition of projects and programmes are set out at more detail at Annex 2. There is more background on GRIP, and its stages, at Annex 3.

- 3.15 At CP5, because of the immaturity of a high proportion of schemes, the ORR concluded that it was unable to set the 'efficient cost'¹⁶ of the enhancements portfolio at the Final Determination, unlike at CP4. A new mechanism was developed by ORR and Network Rail, building on a suggestion of the Rail Delivery Group, in order to allow "the industry more time to develop projects before [ORR] progressively [fixed] the funding baseline"¹⁷. This was the Enhancements Cost Adjustment Mechanism (ECAM). Of the £11.5bn projects and programmes planned, approximately £6bn of immature projects and programmes were due to be assessed via ECAM¹⁸. At the time of the Final Determination ORR aimed to complete the ECAM process by March 2015. The ORR expected that the aggregate cost of enhancements would not exceed the envelope set in the Determination. However the Determination allowed for Network Rail to be funded for additional sums through the ECAM process (as long as the government still wanted to proceed and the ORR was satisfied that the costs were both efficient and eligible to be added to the regulatory asset base).

Context

- 3.16 In the course of this Review I have asked a number of questions about the assumptions made during the planning process, looking both at those issues which were identified at the time or might reasonably have been perceived as risks, and any issue that have subsequently come to light. I have also considered contextual factors and the importance of these.
- 3.17 Given the timeframe under consideration, there have been, of course, a number of important concurrent events. Two are particularly important to highlight at this point, given their impact and complexity.
- 3.18 The first is the October 2012 cancellation by the Department of the Intercity West Coast franchise competition. The investigation of this cancellation highlighted a number of governance and organisational issues within the Department as contributory factors to the failure of the procurement. This led to significant organisational change in January 2013, including the creation of a dedicated Rail Group, renamed (and with some further re-organisation) in April 2014 as Rail Executive. These internal changes were taking place at the time when CP5 was being developed.
- 3.19 The second was the reclassification by the Office of National Statistics (ONS) of Network Rail as a public sector body. This change, brought about by a change in European requirements on public accounting (ESA10), resulted in Network Rail moving from being a private sector company to an Arms-Length Body of the Department. The reclassification was announced on 17 December 2013 and took effect from 1 September 2014. The impact and importance of this change is explored in detail in Section 4.

¹⁶ ORR defines 'Efficient cost' as the cost that a best practice infrastructure manager would be expected to incur in delivering a project.

¹⁷ http://orr.gov.uk/__data/assets/pdf_file/0007/14938/ecam-summary-presentation.pdf

¹⁸ A further £1bn in Scotland was due to be similarly treated.

Subsequent re-plan of CP5

- 3.20 On 12 June 2015, the ORR announced that it was to investigate the 'slow start' to a number of CP5 enhancement projects and programmes. ORR wanted to identify key issues Network Rail needed to address to help it achieve by 2019 the targets it agreed to for CP5. Although ORR noted that there had been some real success for the industry, it launched investigations into Network Rail's performance and capability.
- 3.21 On 25 June 2015, the Secretary of State for Transport announced that, in the light of the delays and cost increases identified, the new Chairman of Network Rail, Sir Peter Hendy, would develop proposals by autumn 2015 as to how to take forward the enhancements programme. Work on two large electrification schemes, the TransPennine route east of Stalybridge and the Midland Main Line, was paused, (pending replanning in Sir Peter's proposals.)
- 3.22 The Secretary of State also announced that he had asked me to lead a review of lessons to be learned from CP5 planning and that, in the light of the extent of the issues identified, this Report would be published.

4. The Causes of Cost Escalation and Scheme Delay in Control Period 5

- 4.1 This section of the Report sets out my view of the causes of cost increases and delays throughout the planning cycle, as identified during the review.
- 4.2 I address the following questions:
- what was included in CP5, and was it materially different from previous programmes?
 - were the full risks around the programme of activity in CP5 understood by all the parties in the planning process?
 - what was the impact of reclassification?
- 4.3 I conclude that there is *no single cause* which led to the increases against cost estimates and the delivery delays now apparent in CP5. Instead, a number of factors can be identified. In summary, these are:
- from the outset of the planning process, even before the High Level Output Specification (HLOS) publication in July 2012, there was a lack of clarity in roles, responsibilities and governance among, and sometimes within, the Department, Network Rail and the Office of Rail and Road (ORR);
 - that the overall plans encompassed an unusually complex portfolio of schemes, subject to poor scope definition from the outset, and ongoing ‘scope creep’, leading to cost increases; and
 - when it came to delivery, costing errors, unanticipated interdependencies, a lack of consideration given to deliverability, engineering issues and a poorly managed supply chain also contributed.
- 4.4 None of these factors was necessarily unique to the planning of CP5. Many of the same industry structures were in place for the previous control period, which had been considered largely successful in terms of enhancements delivery. The perceived success of the previous planning round, which had been attested by the ORR, may have contributed to an underlying assumption that the structures in place were sufficient. But in CP5, planning weaknesses were exposed by:
- the complexity and size of the electrification programme, which formed approximately 25% (by value) of the CP5 enhancements portfolio; and
 - the reclassification of Network Rail.

4. The Causes of Cost Escalation and Scheme Delay in Control Period 5

4.5 It should be noted that this Review has examined what happened in a three-year period up to December 2014, during which some of the issues I discuss here were identified. Steps have been taken and are being taken, as I write, to address many of them. The Report should be read with this in mind.

Was CP5 materially different from CP4?

4.6 Network Rail during CP4 was perceived by ORR as delivering a generally successful enhancements programme, and this set the context for CP5. During the course of this Review a number of participants have suggested that the CP5 enhancements portfolio was materially larger and more difficult to deliver than the CP4 portfolio. This view is an over-simplification. As paragraph 3.12 suggests, the outturn of CP4 enhancements was similar to that planned for CP5. So size of the programme itself should not have added to the complexity of CP5.

4.7 However, there were three critical differences between the control periods as outlined in Section 3:

- the size of the CP4 Final Determination was smaller than the CP5 Final Determination, with the value of the enhancements portfolio growing during the life of the control period, as schemes were added once delivery had begun. The CP5 Final Determination was more ambitious than the CP4 Final Determination had been;
- the ORR's Final Determination for CP4 contained schemes that were materially more developed in terms of 'GRIP' stage than the programme proposed and agreed for CP5 (which I will call 'scope uncertainty' below and for which the ECAM process was introduced); and
- the CP5 programme included approximately 25% by value of electrification schemes, notably Great Western, TransPennine and the 'Electric Spine', which includes the Midland Main Line. There had been no recent programme of electrification of this size and scale (although there were a few individual examples to draw upon, including the first phase of the North-West triangle and, in Scotland, the Edinburgh-Glasgow Improvement Project, EGIP). Network Rail's SBP highlighted the amount of electrification as one of four main factors constraining deliverability. In the Final Determination the ORR re-iterated this risk, noting in particular the volume and value of activity on the Great Western Route Modernisation.

4.8 So I conclude that CP5 was in some respects materially different and more ambitious from CP4, and included a large programme of work unlike that undertaken in recent years, namely electrification, which industry and Network Rail had actively sought and welcomed.

Were the risks associated with the CP5 programme understood?

4.9 The cost and scope uncertainties of the CP5 programme, and some of the delivery challenges, were acknowledged in ORR's Draft Determination and throughout the review process. But it is clear that there remained some material differences of view of scope, even after the Final Determination. It appears to me that there was a difference of views about what was included in CP5 funding for delivery.

4.10 It is of crucial importance that all parties to the planning and delivery of enhancements to the rail infrastructure take steps to establish and work within a clear and common understanding of the scope of projects and programmes; and how to both escalate and

act on any concerns that they have that scope creep or a lack of definition may exist. See Illustrative example 1, below, for more detail.

Illustrative Example 1 – TransPennine

TransPennine route improvement works were initiated in 2007 by the Department, responding to a report by a collaboration of three Regional Development Agencies seeking rail improvements around Manchester. The 2011 Initial Industry Plan presented a number of options for improvements in the TransPennine region. It listed electrification of the North TransPennine routes from Manchester to Leeds via Huddersfield, York and Hull; Temple Hirst Junction to Selby and Northallerton to Middlesbrough as electrification schemes that should be prioritised for delivery in CP5.

The 2012 HLOS specified electrification, by listing them as major projects for delivery, of the TransPennine route, Manchester Victoria and Guide Bridge – Huddersfield – Leeds – Colton Junction, as well as the route between Micklefield and Selby (an option not presented in the 2011 Initial Industry Plan) with appropriate links to the East Coast Main Line. The HLOS also included a commitment to increased capacity into Leeds and Manchester, specifying the number of arriving passengers to be accommodated on services into these cities, and others, by the end of CP5.

But by the time of the Final Determination, the ORR considered that only the electrification was agreed for delivery in CP5 and this was reflected in the settlement made by the Final Determination. Discussions between the Department and Network Rail over the inclusion of journey time improvements and delivery of the capacity metrics continued into 2014. By this time, the electrification project had reached GRIP3 without any such improvements being included, which would have required substantial other infrastructure investment. In hindsight, this development of electrification in isolation from agreement over other infrastructure upgrades on the route and firm agreement over the capacity and journey times required has resulted in delay and may have resulted in nugatory expenditure. It is clear that all parties should have sought to reconcile differences as to scope much sooner and with due consideration of the available funding.

I include this example to illustrate my point that a lack of clarity of scope and communication has led to unclear outcomes and to lend weight to my recommendation that there is a need to clarify the roles and governance within enhancement planning. Critically, this includes the need to make whole-system decisions that integrate planning across multiple projects, as well as across franchising and rolling stock investment choices.

- 4.11 There were also some signs that Network Rail's delivery was not as robust as may have been anticipated. For example, although CP4 enhancements delivery was largely judged by the ORR to have been successful, renewals delivery had a more mixed picture. In several aspects of renewals during CP4, planned outputs were revised and in some cases reduced with the agreement of the ORR during the Control Period. Two

4. The Causes of Cost Escalation and Scheme Delay in Control Period 5

areas in particular were identified by ORR in their final Regulatory Report for CP4¹⁹ as underperforming. These were:

- electrification renewals work, where only 60% of the planned work on DC power systems was delivered during the control period, and
- track renewals, where a 7% underperformance across the control period was attributed, at least in part, to lower than expected productivity from High Output Plant.

4.12 The final CP4 Regulatory Report was published in July 2014. It is therefore not clear whether the warning signs about ongoing renewals delivery were fully visible to the ORR at the time of the CP5 Final Determination in October 2013. But the issue of planning immaturity was recognised and the ORR introduced a new Civils Adjustment Mechanism (CAM) to deal with uncertainty around the exact work Network Rail would deliver for renewals in the final three years of CP5.

4.13 Likewise, on enhancements, the ORR introduced a new process dealing with cost and scope uncertainty on enhancements, the Enhancements Cost Adjustment Mechanism (ECAM). Building on the suggestion of the industry, this mechanism postponed the setting of efficient costs for individual projects, and thus the total cost of the whole enhancements portfolio, until the point when each project reached GRIP3.

4.14 Given the desire to implement the periodic review to the planned timescales (remembering that the periodic review process relates to the whole access charging framework) ECAM seemed at the time to be a reasonable solution to the problem of uncertainty. The ORR's aim at the time was that ECAM would be complete by March 2015 and that the overall cost of the portfolio would remain within the envelope set at the Final Determination. In the event that costs increased above this level, the ORR noted there would have to be agreement from government as to the way forward, and that there would be the possibility of further funding, "as long as [the ORR] are satisfied that the costs are efficient and the scheme is eligible to be added to the regulatory asset base"²⁰.

4.15 The majority of schemes submitted for ECAM have increased in cost, and not all schemes scheduled to go through ECAM have yet (autumn 2015) done so. Where schemes have gone through ECAM, the ORR has typically not made material reductions to Network Rail's revised, higher, cost estimates at that stage.

4.16 As part of each ECAM process the ORR receives a letter from the Department confirming continued support for a project in the light of revised costs. Although ECAM has been described as being to allow government decide to proceed on a scheme by scheme basis, it does not allow interdependencies between schemes to be fully taken into account. In effect, Sir Peter Hendy's Review now provides an opportunity for the enhancements programme as a whole to be assessed.

4.17 In February 2014, Network Rail accepted the Final Determination. In theory, Network Rail could have chosen instead to reject the entire Determination and refer it to the Competition Commission – an action which would have created huge uncertainty for

¹⁹ Network Rail Monitor, Quarter 4 of Year 5 of CP4: 5 January 2014 – 31 March 2014 – http://orr.gov.uk/__data/assets/pdf_file/0004/13792/network-rail-monitor-2013-14-q4.pdf

²⁰ ORR Final Determination, paragraph 9.67

the industry²¹. This option was considered by Network Rail. Certainly the ORR applied a challenging set of efficiency targets to Network Rail, (building on the findings of the 2011 McNulty Rail Value for Money Study). In its letter accepting the Final Determination in February 2014, Network Rail did not mention concerns surrounding the delivery or projected cost of the enhancements portfolio, suggesting that this was not one of its principal concerns. I surmise, though there is not clear evidence for this (it can be inferred from paragraph 9.67 of the Final Determination), that ECAM was one factor influencing Network Rail's view of enhancements and therefore its willingness to accept the Final Determination despite some scheme uncertainty.

- 4.18 Network Rail did, however, observe that the overall draft determination was “unbalanced and unrealistic.” Network Rail cited particular concerns around renewals, performance targets, property income and the cost of financing. This led to changes in ORR's final determination regarding the implementation of these requirements.
- 4.19 I conclude therefore that the development of the ECAM device, although intended to cope with the uncertainties in the CP5 enhancements programme, did not enable the management of schemes at an immature stage of development as a portfolio.

What was the impact of Reclassification?

- 4.20 On 17 December 2013, the Office of National Statistics (ONS) announced that, with effect from September 2014, Network Rail would be reclassified into the public sector, with the change being incorporated into the Department's 2015-16 accounts. This change occurred as a result of the ONS interpretation of new European requirements (ESA10) on public sector classification. A framework agreement was drawn up to help to manage the relationship between the Department and Network Rail, with the overarching principle that the relationship would be changed as little as possible²². In June 2014, the Department issued a loan agreement to Network Rail, which set out how it would receive funding. This included a hard debt ceiling of £30.3bn, which was designed to cover Network Rail's funding requirements for CP5 (with known changes, a buffer of approximately £1.8bn included).
- 4.21 The change to both the funding and the control mechanisms that reclassification brought about irrevocably changed the incentives operating on each of the three entities involved.
- 4.22 Previously, where there was no fixed debt limit²³ on Network Rail, the ability to borrow at a very low cost meant that the short term affordability of investment decisions could be based largely on the financing cost of schemes. Within this system, cost escalation of schemes could be absorbed, as only the financing cost (which was of course a small proportion of the capital cost) had to be considered in an assessment of affordability, not the overall capital expenditure. Further, and crucially, this ability to make changes to

²¹ The Competition Commission closed on 1 April 2014. Its functions have transferred to the Competition and Markets Authority (CMA).

²² The framework states, “The Department and Network Rail have drafted this document on the basis of the Memorandum of Understanding between both parties, to make changes only where they are: required to satisfy Government and Parliamentary budgeting and accountability requirements; or justified to deliver value for money. Therefore the key principle in developing this Framework Agreement has been the preservation of Network Rail's ability to continue to manage its business with enough commercial freedom within effective regulatory and control frameworks appropriate for a company in the public sector.”

²³ Prior to reclassification, Network Rail's capital borrowing was limited on a basis made in proportion to the value of its Regulated Asset Base. For CP5, this ratio was set at 75%. In practice this meant that as enhancements were added to the RAB, further borrowing became possible.

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scheme funding at a relatively late stage in the development of each project meant that there was a weak incentive to get the forecast cost right in initial estimates. In restricting the ability to change the size of the funding envelope, the hard debt limit meant that the ultimate deliverability of the programme in the time proposed lost the ability to deploy flexibility of funding, which had been seen in previous control periods.

- 4.23 When setting the borrowing limit, the adequacy of this loan facility was agreed by the ORR and by Network Rail, though with a clear reference to the need for projects to pass through ECAM before their cost was finally agreed. The ability of the Department to make a decision, at the time of ECAM, that the revised cost of a particular project was no longer acceptable, (and subsequently to de-scope or cancel projects on a case by case basis), was also stressed by Network Rail when the loan facility was finalised.
- 4.24 Under the system in place before reclassification, when the ORR assessed affordability at CP5, they were not, by their definition, considering whether the programme could be delivered within a set capital figure, but rather considering whether Network Rail could borrow sufficient funds and whether this borrowing cost could be serviced within the financial settlement for the period.
- 4.25 Alongside their Draft Determination, the ORR published their Long Term Regulatory Statement. In this statement the ORR highlighted that the pre reclassification funding approach to rail investment “is sustainable for so long as governments decide that it is affordable and choose to provide support to Network Rail in this way. In order to maximise the options available to future governments one of the most significant long-term challenges facing the industry is how to deliver the enhancement and modernisation of the railway in the most efficient and sustainable way, so as to minimise the accrual of on-going cost and risk to taxpayers”.
- 4.26 Since reclassification, Network Rail, and by extension the Government, is no longer insulated from the immediate impact of increased capital expenditure. The Department now needs to make scope choices or provide additional funds from its budgets or from HM Treasury if Network Rail’s debt ceiling is forecast to be exceeded.
- 4.27 It is clear that there was substantial cost immaturity and lack of definition of many of the enhancement projects at the start of CP5. If a rigid debt ceiling were to be effective, therefore, the costs and scope of the projects that the funding was expected to cover needed to be much better defined. The previous method of assessing efficient cost and sanctioning sufficient borrowing as projects matured was no longer tenable. The imposition of a debt limit, in particular, should act as an effective incentive in future planning to prioritise issues of affordability and hence improve the planning process.
- 4.28 In terms of the effects of this change on the escalation of costs in CP5, I do not consider reclassification on its own to be a causal factor in explaining why the costs of CP5 have escalated so quickly, or why there have been delays in the execution of the programme. However, it seems clear that the sudden, and to many participants unexpected, imposition of a hard debt ceiling very quickly exposed the highly uncertain nature of many of the cost estimates that were contained in CP5.

4.29 In my view the full impact of reclassification was not initially appreciated, though contributors to this Review at the Department, ORR and Network Rail now attribute fundamental importance to the role of reclassification and the associated loan agreement.

Organisational Responsibilities

4.30 In the planning of CP5 enhancements, I have found that there was a lack of clarity among and within the Department, Network Rail and the ORR about their respective responsibilities, despite these roles nominally being set out in legislation. This was exacerbated by inconsistent communication between the organisations, allowing misunderstandings to persist.

4.31 Organisational change in Network Rail occurred throughout the period. This occurred for a variety of reasons, usually to strengthen previously identified weaknesses, but it may have contributed to a lack of clarity or continuity in roles. Examples of this change include:

- route devolution which began in late 2011, with regional areas assuming increasing autonomy. As route-based managers did not hold the budgets for enhancements, but only for the operations, maintenance and renewals spend for their routes, there was no incentive for them to reduce the scope of local enhancements. If anything, the opposite incentive may have emerged. In effect, control of costs and control of performance was separated;
- at roughly the same time, in 2011-12 the 'Infrastructure Projects'²⁴ group in Network Rail (which did control enhancements budgets) was proposed for restructure with a view ultimately to divesting it. This project was subsequently cancelled, but both the level of uncertainty and the changing relationships between IP and routes meant that project sponsorship was not as well defined as it could have been.

4.32 In the Department, the Rail Group, which had been separated into policy and delivery functions in 2010, was restructured in 2013, with all rail activity (excluding HS2) coming under the remit of a single Director General in January 2013. In April 2014 the Group was renamed Rail Executive, with some further functions (including Finance) being incorporated. Though there was some continuity in terms of individual roles, there was not always continuity of responsibility, or clarity around accountability.

4.33 The organisational changes during the CP5 planning period at both the Department and Network Rail suggest that the two organisations recognised and saw opportunities for strengthening oversight and accountability. But I consider that it led to a lack of consistency in governance as the enhancements programme progressed. This lack of consistency has been a contributory factor in failing to recognise and bear down on risks before they crystallised.

4.34 These weaknesses had, in my view, previously been partly masked by the way in which project, programme and portfolio management in some areas appears to have been more reliant on relationships than good governance. There are long-standing employees in both the Department and Network Rail who have spent significant proportions of their working lives in the area of rail planning. This gives both organisations the benefit of extensive knowledge and expertise and deep links between the organisations. But it

²⁴ Infrastructure Projects (IP) lead on the planning and delivery of major infrastructure improvements at Network Rail.

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also appears to me that it had led to unhelpful informality, with unclear assumptions and a working culture that tried to solve project problems in a localised and on an ad hoc basis without regard to implications across the rail portfolio.

- 4.35 Compounding this, the Department's own interpretation of its role has varied, including considering the extent to which it, as funder of the network, monitors and ensures delivery of schemes. In this context, it is important to note the corporate status of Network Rail. Until 2014, Network Rail was a private sector company, and, in the view of some participants in this Review, this heavily conditioned the way in which the Department wished to deal with operational and other issues arising in Network Rail.
- 4.36 With respect to the ORR, it has become apparent to me in this Review that parties to the planning process ascribed to the ORR functions it was not undertaking. The clearest example of this is the ORR's role in assuring affordability, as explored above. The Secretary of State's Guidance to the ORR, published at the same time as the HLOS in July 2012, asks the ORR to note that, "the statement of funds available [to secure the HLOS] represents the maximum level of funding the Government is able to commit". Views provided to the Review also indicate that within the Department, it was expected that ORR was assuring that the portfolio of schemes developed could be delivered within the funding envelope.
- 4.37 Yet in the Final Determination, ORR states that it is assuring the affordability of the financing of the enhancement portfolio. This difference between financing cost (i.e. debt servicing) and scheme costs became more critical following reclassification, where Network Rail became subject to more rigorous capital controls, and the role of assurance of affordability materially more significant.
- 4.38 I conclude that the reclassification of Network Rail fundamentally increases the oversight required in assuring the affordability of rail infrastructure investment. At CP5 the ORR's role, in hindsight, was unclear; and, given reclassification, I conclude that the role of the regulator for future rail enhancement planning needs to be rethought.

Governance and Programme Management

- 4.39 Scheme immaturity should not of itself result in cost escalation and delays to the programme. But the lack of definition of schemes is symptomatic in my view of the shortcomings in the project, programme and portfolio management practices followed by both Network Rail and to a lesser extent by the Department. These include, in planning:
- unclear scope definition, coupled with inconsistent change management. The Review has found evidence that scope changes were not always managed through formal processes, leading to scope creep, a cause of some of the cost escalation (and identified by Network Rail in its SBP as responsible for the majority of a £300m increase in costs on Great Western between the HLOS and the SBP, see illustrative example 2);
 - inconsistent assurance of project management products²⁵, as reflected in the poor cost estimates used at Final Determination;
 - inconsistent understanding, management and in particular escalation of risk; and

²⁵ An example of a project management product is a 'Client Remit' or 'Environmental Action Plan'.

- the failure to recognise the full impact of schemes and to integrate projects into programmes²⁶.

- 4.40 The failure to integrate projects into programmes is significant in discussing the realisation of cross-project synergies, and is increasingly important given the level of ambition for the railways over coming years. Although the GRIP process (see Annex 3) has been used by Network Rail since 2003, and is seen as a robust framework for managing projects, it is not designed for management of complex programmes. A complementary framework to govern the management of programmes above the level at which GRIP operates is clearly needed. Network Rail recognises this and has, at the time of writing, begun the development of a GRIP process for programmes.
- 4.41 The periodic review focus on infrastructure projects, in isolation from rolling stock, refranchising, or operational considerations may also hamper effective planning and delivery. For large, lengthy, or complex enhancement programmes such as electrification, the Review found that the consideration of infrastructure upgrades took place in isolation from decisions about the wider system or due regard to interdependencies, meaning that the Department in practice carried greater risk across the whole railway system.
- 4.42 The obvious exceptions to this are Crossrail and the Thameslink Programme, where a whole system approach is evidence. The Review has looked at the possible lessons to be learned from the alternative governance structures employed by the Department in these programmes, and in the Roads programme. I make recommendations on this in section 6.
- 4.43 Finally, the Review has not looked in depth at the way Network Rail decides whether a scheme is a renewal or an enhancement. Within Network Rail, capital expenditure is divided between these in a manner which is not always fully clear to me. As a result, it has been suggested that at CP5 the imposition by the ORR of a 20% efficiency overlay on renewals expenditure may have encouraged route budget owners (responsible for renewals) to re-brigade renewals expenditure under enhancement projects (for which they did not hold the budget). This is not fully evidenced but speaks to some perverse incentives operating on the flow of funds and responsibilities within Network Rail, and also to the lack of scope clarity of schemes. This is not a comment on the merits of devolution within Network Rail but one outcome of the way it was implemented²⁷.

Delivery Issues

- 4.44 The Review has looked primarily at planning of schemes. The Review has not sought to duplicate the work of the ORR in ECAM submissions, where it has addressed issues of engineering efficiency; or the work being considered in more detail at Network Rail by the Board Sub-Committee on Major Project Delivery; or the ORR investigation into Network Rail's delivery of its enhancement programmes²⁸. I have, however, identified the

²⁶ Integration in this context is the amalgamation of related projects into a single programme. For example, bringing electrification projects, signalling upgrades and station improvements on the same route under the same programme governance. It is important to integrate related projects into programmes in order to manage the interdependencies between the projects, and it also allows the programme manager to better manage resources across them.

²⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/476449/the-future-shape-and-financing-of-network-rail-the-scope.pdf

²⁸ http://orr.gov.uk/_data/assets/pdf_file/0009/18684/network-rail-delivery-of-enhancement-programmes-2015-08-06.pdf

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following key points where cost increases were driven by delivery issues, which should be addressed more clearly in future planning. These include:

- inconsistent recognition and informed application of technical standards by Network Rail. In places this necessitated retrospective compliance work which added cost;
- productivity issues, where achieved rates were significantly lower than planned rates. This was identified by the ORR in the September 2014 ECAM decision on Great Western as a factor in respect of the High Output Plant (HOPs) used;
- a lack of consistency in status and cost reporting, together with shortcomings in risk management, which meant that problems were not identified as early as they could have been; and
- at least one example (Great Western) where planning was being carried out in tandem with scheme delivery.

4.45 It is my view that, throughout the process, insufficient consideration was given by all three parties to the deliverability of the enhancement programme, as distinct from its affordability or strategic desirability. In this context, deliverability means the ability of Network Rail and the supply chain to deliver the whole portfolio of enhancements to the anticipated timescales.

4.46 I have not seen evidence that the Department explicitly considered deliverability when it populated the HLOS in 2012; though there were discussions at the time with industry associations, which identified and addressed issues of smoothing delivery profiles, and the readiness of the UK supply chain. It is notable that advice to Ministers throughout 2012 and 2013 focused on affordability and efficiency rather than deliverability, which was raised rarely.

4.47 Several participants to the Review suggested that the Department expected the ORR would assess deliverability as part of the Periodic Review. At CP4, ORR had been perceived as fulfilling this function. Yet ORR's statutory duties do not include explicit reference to making an assessment of the deliverability of enhancement schemes. The Guidance issued to ORR by the Secretary of State implied that ORR should consider deliverability by way of reference to the Treasury's standard model for assessing projects (which includes deliverability within the 'management' case). Despite this, in its Draft Determination, the ORR stated, "Assessing deliverability in the context of a periodic review does not fit neatly with any established frameworks, such as HM Treasury's tool kit for assessing a project's management case...[owing to the immaturity of many schemes]...we have therefore reviewed Network Rail's process of assessing and managing the risks, and commissioned some specific reviews of our own to test Network Rail's conclusions."

4.48 In its Final Determination, ORR devoted a relatively small proportion of its analysis to deliverability, adopting a similar approach to that outlined in the Final Determination for PR08. First, it compared the total volume of engineering work expected in CP5 to that delivered in CP4, and found these to represent broadly the same level of activity. Second, ORR reviewed and assessed Network Rail's own assessment of capability, and supplemented this with specific analysis in areas considered complex or of high risk – including the electrification programme. It commissioned 'deep dives' of specific areas

of concern, including deliverability of the Great Western Electrification Programme, and of ETCS, an in cab signalling technology.

- 4.49 Overall, ORR assessed Network Rail's deliverability assessment as credible. This assessment of credibility was based on a package of enhancements known to be immature so the ORR required Network Rail to provide updates to their assessment as above, in part reflecting the immaturity of some schemes, and indicated that it required (and continued to seek throughout 2014) further assurance over the Great Western Route Modernisation programme.
- 4.50 Only a handful of respondents to ORR's consultation on the Draft Determination raised concerns about deliverability. Those who did were mainly concerned about affordability and meeting operational performance targets, considering that the efficiency savings ORR were requiring of Network Rail might not be achievable if the full CP5 package was to be delivered. Respondents noted the need to consider the resources available to deliver the engineering works, making reference to particular skill or equipment needs and suggesting Network Rail work with suppliers to resolve these issues.
- 4.51 Network Rail published an assessment of the deliverability of the entire CP5 programme (including enhancements) alongside its Strategic Business Plan in January 2013, which profiled the availability and cost of the resources required to deliver CP5, and the impact works might have on operational performance. The assessment stated that Network Rail had a high level of confidence that measures could be taken in the timeframe to allow the successful delivery of CP5. Network Rail continued to provide updated deliverability assessments to ORR. Some significant challenges were identified, most particularly with signal testing resources but to an extent also with electrification personnel and physical assets such as wagons and cranes. Despite this, in its June 2014 assessment Network Rail reported that overall confidence in deliverability was still high.
- 4.52 In summary, therefore, I conclude that at CP5:
- planning processes which had been thought to have worked successfully at the previous control period were inadequate in the face of the scale and complexity of the CP5 programme – including, very importantly, proposed electrification works on a scale not attempted for some years;
 - organisational responsibilities between the Department, Network Rail and the ORR were for a variety of reasons, including cultural ones, unclear, lacking the relentless focus and clarity required for the design and execution of a major infrastructure programme;
 - the change in status of Network Rail during the planning period, which has led to the imposition of a hard debt ceiling, and to its debt being on the Government's balance sheet, with all the obvious consequences for control, exposed a previous reliance on access to off government balance sheet financing as a means of managing financial overruns; and
 - the assessment of deliverability of the complex CP5 programme, both by ORR and Network Rail was insufficiently thorough.

Illustrative Example 2 – Great Western Route Modernisation

The Great Western Route Modernisation is electrifying and upgrading the main line out of London Paddington. This modernisation will upgrade assets last updated 30-40 years ago, including the signalling system, and allow new electric trains to run. In 2009, the cost of this modernisation (excluding rolling stock) was estimated at approximately £1 billion but recent (21 October 2015, PAC Hearing) estimates put the cost in a range of £2.5-2.8 billion. A number of different causes of delay to the programme have been identified, but these can be summarised as changes in scope and changes in design, exacerbated by inconsistent integrated programme management. Throughout the programme, costs have grown, though it is also undoubtedly true to state that the original cost estimates were immature and, were not robust to changes in scope and design as the programme developed.

The modernisation was announced in July 2009, but the scope of the programme has changed over time – originally the works consisted of electrification on the core route, but over time other elements have been added, such as the extension to Swansea, Thames Valley electrification, a connection to the West Coast Main Line (WCML) and a range of smaller infrastructure works. In early 2015, the scope had still not been finalised.

The electrification works themselves are also complex. The Great Western works represent the first major mainline electrification for two decades in the UK and the design work for new overhead line equipment took much longer than had been anticipated – with delivery occurring in tandem with design. This problem was compounded by operational issues with the innovative mechanised equipment purchased by Network Rail (the High Output Plant, or HOPs) to install the electrification masts, on which the required output productivity depended.

Finally, a lack of governance and robust project management has meant that significant dependencies were not identified early enough for corrective action to be taken. There was no effective mechanism for risks to be identified and escalated within Network Rail or the Department until a cross-industry programme board was instituted in early 2015.

5. The Role of Wider Industry and Rail Users in Planning

- 5.1 As section 3 explained, at CP5 there was an intention on the part of the industry, exemplified in the use of Route Utilisation Strategies (RUSs) and within the Initial Industry Plan (IIP), to engage more widely with the supply chain and users in identifying planning priorities. This represented a welcome development. However, in the course of this review I have found that there is more to be done in respect of engaging both the supply chain and rail users in effective planning, both of identifying the desirable high level outcomes and then determining the means to achieving them.

Capacity and Capability in the Supply Chain

- 5.2 Participants to this Review have suggested that the supply chains for signalling and electrification have not been managed in a connected fashion by Network Rail, with consequent impacts upon enhancement work. Specifically:
- signalling framework contracts awarded in 2012 covered renewals work only, and were based on a predicted workload forecast in 2011, before the HLOS was published. Even within these framework contracts, geographic restrictions on which contractor can be used have further constrained the available resources. Enhancement work has only subsequently been added onto these framework contracts;
 - in 2012, the electrification market was immature, as a result of the lack of similar work undertaken in the UK over the preceding decade. Network Rail took steps to develop the market, but framework contracts were only awarded in 2014;
 - some participants noted an historic pattern at Network Rail of phasing the delivery of work until later years of a control period, with the aim of achieving efficiency targets by aiming to create more favourable contracting environments (though this assertion is difficult to evidence); and
 - there is a suggestion that Network Rail did not have a full understanding of the required specification of projects, and therefore have been unable to generate robust cost estimates. There may have been a tendency towards over-design of schemes, and in some cases, specifications have varied across similar schemes. This can be seen to have been exacerbated by a perceived reluctance to accept new methods or materials that could reduce cost.
- 5.3 Whilst the use of framework contracts has had some benefits, contributors to the review suggested that they had not, of themselves, created the overall environment that

5. The Role of Wider Industry and Rail Users in Planning

encouraged suppliers to build up capacity. For example, by tendering maintenance, renewals, and enhancements separately, contractors were restricted in their ability to train staff using comparatively easier maintenance work before tackling enhancements. Piecemeal contracting has been cited, in certain programmes, as contributing to a sense that whilst delivery of work is underway, this is not driven by an overall sense of direction towards completion of a functional enhancement.

- 5.4 There is some evidence that contractors to Network Rail experienced a reduction in work volumes as CP4 was replaced by CP5, making it challenging to retain skilled staff and to train new employees. This was exacerbated by a turnover in staff at Network Rail responsible for directing enhancement works as well as by a growth in demand for skilled workers in other sectors of the economy.
- 5.5 As well as the overall approach to contracting, the issue of interface management has been raised as an issue hampering effective delivery. Enhancement projects within the CP5 programme usually involve both the Route and the Infrastructure Projects Directorate of Network Rail, passenger and freight operators, the Department, multiple supplier contractors and, in many instances, other local stakeholders. Within this, it is imperative that there is internal clarity on projects and the ability for suppliers to communicate with those who will be directly impacted by work. Instances cited to the Review of successful enhancements preparation invariably emphasise the ability of suppliers to work with train operators at early phases of the design and planning process. Consistently, the message has been that best practice enhancements management involves early engagement, with clarity of accountability and oversight, and a collective approach to problem solving. It is not clear that these have always been hallmarks of the CP5 programme.
- 5.6 Beyond the planning function, the industry has recognised for some time that there are capacity constraints within the wider supply chain, particularly in signalling and electrification. Addressing these constraints has a long lead time, with many years required to recruit and train the right people. Plant can also take years to procure. These markets cannot be quickly expanded to cope with fluctuating demand. At present, I see little incentive for the industry to invest in developing the necessary resource.
- 5.7 In this context, I believe long-term visibility of the Government's requirements for infrastructure projects would assist the industry to develop resource to meet these requirements. This is also a key theme emerging from the work of the Rail Supply Group, which is developing a sector strategy setting out how the Government and the supply chain can work more closely together to boost productivity and support UK-based suppliers. There is plainly an important role for the Department, and for the Government in general, here. I have more to say about this in my recommendations, including drawing on lessons from the contracting model on Crossrail, which required and incentivised upskilling via apprenticeships as well as the implementation of their Training and Underground Construction Academy.
- 5.8 In this context, the August 2015 appointment of Terry Morgan, the chairman of Crossrail, to lead the development of a transport infrastructure skills strategy, is a very welcome acknowledgement of these important issues.
- 5.9 The skills strategy, will set out how government and industry will increase the transport workforce, increase diversity and raise the level of skills, including by delivering on the Government's ambition for 30,000 apprenticeships in roads and rail over the 5 years to

2020. Another important element of the strategy will be providing young people with a positive view of transport as a career option and laying the foundations for making 2018 the Year of the Engineer.

- 5.10 It is plain to me from this review that this work to establish the future requirements for skilled people, at all stages of their working lives, and to provide the basis for the planning of our future national requirements for engineering resources is of very high importance for the rail sector and by extension for the transport industry generally.

Illustrative Example 3 – Crossrail

The Department and Transport for London (TfL) are sponsoring a £14.8 billion programme to deliver a completely new rail service for London and the South East, boring tunnels through central London, building new tracks and stations, and upgrading connecting lines from the existing network. Crossrail Ltd has been set up to deliver the majority of the programme, with Network Rail contracted to deliver the required enhancements to the existing network. Crossrail Ltd has significant autonomy and a formal agreement with the Department and TfL to deliver the programme. The Department has also formalised its relationship, and that of Crossrail Ltd, with Network Rail through the use of a regulatory Protocol, similar to that used on the Thameslink programme.

Crossrail Ltd (a wholly owned subsidiary of TfL) manages the delivery of the programme, including the management of contractors. The top level governance body for the programme is the Joint Sponsor Board, with the Department and TfL sharing the voting rights equally. In addition to the Joint Sponsor Board, a 'project representative' has been appointed by the Department with a duty of care to both sponsors. This is a team of senior engineers that provide commentary and assurance on Crossrail Ltd's regular progress reports, as well as carrying out focused reviews of particular aspects of the programme, strengthening the Department's ability to effectively oversee the programme on an arms length basis.

Crossrail Ltd has achieved most or all milestones set for each six month period during its delivery, with the programme running close to schedule and predicted to come in under budget. Through its position on the Joint Sponsor Board and the reports provided by Crossrail Ltd and the project representative, the Department has maintained effective oversight of the programme and a clear view of Crossrail Ltd.'s progress. The NAO considers that the Department has done well to protect taxpayers' interests on the Crossrail programme.

There are lessons to be drawn from the tight governance established for this programme, with a link between clear roles and responsibilities, effective oversight and programme success. What is more, Crossrail Ltd's inclusion within tender requirements of the provision of apprenticeships has resulted in more than 450 apprentices being trained across a variety of disciplines, and 10,000 trainees have passed through the Tunneling and Underground Construction Academy.

The Participation of Rail Users in Planning

- 5.11 The following paragraphs relate to an issue that is outside the Terms of Reference for this Review but is nevertheless of fundamental importance. I have been struck, as I have considered all the evidence provided to the Review, by the lack of any clear view about who

5. The Role of Wider Industry and Rail Users in Planning

is responsible for articulating the specific interests of users of the rail system and in particular passengers. I would include in these interests safety, reliability, punctuality, affordability, and comfort, including cleanliness and the availability of good communications.

- 5.12 It is of course the case that the Government has the overarching responsibility for determining the broad shape of rail outcomes, and for taking system-wide decisions about what might be called the economic geography of enhancements. It is also the case that passenger operators and freight operators would be expected to have insights into the needs and priorities of their users. Transport Focus also carries out research addressing and quantifying passenger priorities.
- 5.13 In franchising, the need to deliver better and include passenger priorities was recognised in the 2012 Command Paper 'Reforming Our Railways – Putting the Customer First'. Richard Brown's Review of the Franchising Programme recommended increased use of National Passenger Survey indicators in the awarding of passenger franchises, and the tendering process now starts from a deep, and locally specific, understanding of user needs.
- 5.14 Infrastructure planning can be contrasted with this approach. At the early stage of planning, and within the high level objectives for the railway, there is good evidence that passenger views and user priorities are sought and considered. For example, the Rail Delivery Group's 'The Way Ahead' shows that the industry recognises and is responding to the challenge of identifying and listening to the needs of different user groups and the ORR also consults as part of its determination. As a result, the Final Determination highlighted the importance of passenger engagement in scheme selection. In the early stages of planning for CP5, the Route Utilisation Strategies were drawn up with input from local user groups, as well as Transport Focus and operators (both passenger, freight and open access). The HLOS itself prioritises outputs that are key drivers of satisfaction for passengers – for example, punctuality. There is also evidence of how some funds, for example the Strategic Freight Network Fund, are managed in conjunction with industry partners.
- 5.15 However, there is less evidence that passenger and user views are fed into the planning of *how* enhancements should be delivered, as distinct from what those enhancements should be. In most cases, the delivery of enhancements involves disruption to existing services, either via short term possessions of the network, longer term closures and diversions or, as at London Bridge during the Thameslink works, extensive modifications to service patterns.
- 5.16 The failure to engage effectively with users in this planning of delivery has had two impacts. First, it can be seen as contributing to cost escalation, via inefficient planning of possessions and the associated performance payments required to operators through their track access agreements with Network Rail. And second, it may contribute to passenger dissatisfaction on the occasions when things do go wrong.
- 5.17 This is a necessarily broad-brush approach to what is a complex issue, with a variety of stakeholders who have varying opportunities for and capabilities to articulate their priorities and influence outcomes. But it is notable that many of the examples cited to this Review of good practice in enhancements planning and delivery, from the Wessex Capacity scheme, to the Nottingham Station blockade, to the management of ring fenced funds such as the East Coast Connectivity Fund, have all had at their centre a clear role throughout for operators and a focus on the needs of users.

6. Recommendations

- 6.1 As section 4 argued, the causes of cost and schedule delay have been complex, with a number of specific contextual factors also influencing the outcomes. In my view there are some key areas where action can significantly increase the likelihood that future planning is more effective, and ensuring that plans are both deliverable and affordable.
- 6.2 These can be summarised as:
- clarifying the organisational *responsibilities* of the three organisations, particularly in light of the reclassification of Network Rail, which has changed the context significantly, and ensuring that the necessary capabilities are in place;
 - ensuring significantly *more robust programme governance and oversight* of the planning process, with clarity around schemes at all stages of development, and considering whether bespoke arrangements for major and complex elements of the enhancements programme should be more widely used;
 - incorporating the views and needs of *end users*, especially in respect of how enhancements are delivered; and
 - much stronger focus on *deliverability*, including the implications throughout for the supply chain, and the availability of people with the right skills (in all three organisations).
- 6.3 In developing recommendations, I have been mindful of Nicola Shaw's ongoing review of Network Rail and of the work being undertaken by Sir Peter Hendy at Network Rail in respect of current schemes.
- 6.4 I have made these recommendations with a view to issues of prioritisation and resilience within the Department. The recommendations focus on planning and performance oversight of matters within the Department's control, and not, for example, on engineering solutions, nor on Network Rail major projects management. Consequently this report should be seen as operating in conjunction with, and not in isolation from, the recommendations of Network Rail's own internal analysis, and of the ORR investigation into CP5 Delivery. Moreover, the focus on recommendations to the Department should

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not be read as implying that the Department is the only organisation with lessons to learn from the CP5 planning process.

- 6.5 Some of my recommendations are, strictly speaking, outside the Terms of Reference for this Review but are, in my view, critical to ensuring the long term health of the rail industry and ensuring that taxpayers and customers receive value for money.

Organisational Responsibilities

- 6.6 For the ORR, especially in light of reclassification, my recommendation is that its role and responsibilities in respect of enhancements planning should be reviewed. This should include, but not be confined to, its role in providing assurance in respect of affordability and deliverability in the planning process. A review of the role of the ORR would need to be mindful of Nicola Shaw's findings in respect of the structure and financing of Network Rail, but any such Review should be complete ahead of any proposed Draft Determination for the next Control Period (expected in 2017).
- 6.7 For the avoidance of doubt, I am not suggesting that those statutory safety duties carried out by the ORR should be included in such consideration.
- 6.8 The reclassification of Network Rail also gives the opportunity for the Department to re-set its relationship with Network Rail, including clarifying lines of accountability. Though this Review has looked specifically at enhancements planning, it is my view that this clarification should also encompass operations, maintenance and renewals activities. Again, for the avoidance of doubt, I am not recommending a move away from long term funding models for the rail industry that generate certainty of budgetary planning.
- 6.9 I therefore recommend that the Department should look afresh at the overall responsibility and accountability for the management of rail enhancements planning and delivery (excluding for HS2). The Department and Network Rail should formalise the framework of rail investment planning, implementation and oversight.
- 6.10 Such an approach might have several possible forms. One would be a Memorandum of Understanding, possibly supported by an Operating Agreement or Project Delivery Agreement. Clarity of governance is a hallmark of the approaches taken on Thameslink and Crossrail, and the same rigour can be imported to general rail infrastructure investment. Regardless of form, such an agreement should contain, at a minimum:
- a clear statement of roles and responsibilities of the two organisations;
 - a definition of the process of investment planning that identifies and aligns respective gateway²⁹ points at the two organisations (including GRIP stages);
 - a clear mechanism for project prioritisation that is aligned to the Government's strategic objectives;
 - an approach to scoping projects and programmes such that there is clear front end definition, including the agreement and definition of key terms;
 - a clear change control process that applies from the outset of investment planning;
 - a defined role for technical assurance and advice which supports, rather than drives, decision making (one option is the use of a 'project-representative' function

²⁹ Review and/or key decision point.

that provides the project sponsor with technical advice and assurance, as used on Crossrail and HS2);

- a comprehensive approach across the portfolio to status and cost reporting; and
- a clear and mutually agreed assurance framework.

Illustrative Example 4 – Thameslink

The Thameslink programme is a Department-sponsored programme to increase passenger capacity through central London by running higher frequency, higher capacity trains. Substantial infrastructure upgrades are required alongside new rolling stock, including improving the tracks and stations and introducing new signalling technology. The infrastructure programme was planned to cost £4.6bn, making it comparable in magnitude to the largest programmes in CP5.

In 2008, the Department established an integrated governance arrangement for the enhancements required for the Thameslink Programme, known as a Protocol. This Protocol stipulates the relationship between the Department, Network Rail and the ORR for the programme. It defines clear outputs, formal governance arrangements, detailed financial incentives, a reporting and change control framework and encompasses systems integration. This Protocol is not standard for enhancement projects, with only Crossrail using a similar arrangement, and it was designed to offer the Department greater control and oversight of the Thameslink programme.

The Thameslink programme has encountered some difficulties with execution, which continue, and so it cannot be considered as an unqualified success. In particular, work is required to improve the definition of the roles of Network Rail and the Department as well as enhancing financial reporting. The NAO suggests, however, that the Protocol has been a beneficial framework. It provides a strong basis for managing the infrastructure elements of the programme by establishing greater Departmental oversight and assurance, providing early opportunity for risk escalation across multiple interfaces, and an agreed document to refer to in the event of disputes. In addition, the introduction of the systems integration function in support of managing the integration of the rolling stock, infrastructure and systems requirements of the scheme has enabled cross-party understanding of emerging risks in good time to address them. By doing this, the governance structure achieves several of the necessary steps required for programme success – a number of which have been missing from other CP5 programmes.

- 6.11 For ongoing CP5 work, the re-plan proposed by Sir Peter Hendy's Review will set out the deliverables proposed, but as a priority, the Department should indicate at an early stage:
- its priorities for delivery;
 - the pipeline for development of future schemes against these priorities;
 - the protocol for a reporting mechanism, on a project by project basis, of delivery and cost forecasting of enhancements; and
 - the protocol for change management on schemes.

- 6.12 I have noted the lack of “whole system thinking”, in both planning and in delivery, as a contributory factor to cost escalation and delay. In establishing clearer responsibilities

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internally, the Department should be mindful of ensuring that infrastructure planning is properly integrated with other investment choices, both within rail (for example rolling stock and franchising) and cross modally. The establishment in early 2015 of a cross-industry programme board for the Great Western Route Modernisation, which looks holistically at the outputs sought and the passenger benefits that need to be achieved, is a step forward which should be built on.

- 6.13 A new approach to Departmental oversight of Network Rail, and the development of a new and formalised set of arrangements for this oversight, would plainly have a number of consequences which would also have to be addressed by the Board of Network Rail. As already noted, my recommendations are addressed to the leadership of the Department, who have commissioned this Review. I therefore do not in this section go further into these governance issues for the Board of Network Rail.
- 6.14 One very specific recommendation that flows from the findings however relates to the point that at Network Rail, my understanding is that the relationship between the corporate centre and devolved routes remains a work in progress. Clarifying this relationship and making its operational implications clearer will, I would expect, make many issues around risk ownership and consequent budget implications more tractable.
- 6.15 In order to deliver these recommendations, all three bodies must consider the skills and capabilities they require. The question of roles and responsibilities must inevitably be settled before this capability workforce planning can be carried out to ensure appropriate resources are in place. The following questions (and more) will need to be addressed:
- What is the appropriate mix of expertise in each organisation?
 - What is the role of interchange in building the skills of individuals?
 - Is the right management response to make more use of outside consultants at times of peak demand, such as the planning of a control period, or should the three organisations develop their own cadre of skilled individuals, and which bodies could support this?

Governance of the Investment Programme

- 6.16 Section 4 of this Report discussed the extent to which scheme immaturity, including poor scope definition, was a factor in cost escalation and schedule delay. In improving the management of scheme development, it is my recommendation that the future investment governance process should be led by funders (i.e. primarily the Department). To give practical effect to this I make the following two recommendations.
- 6.17 The investment governance process should include (at a minimum) a development decision gateway as well as an investment decision gateway to de-risk the construction phases. The early stage of maturity of many schemes in 2012 meant that cost estimates provided carried low levels of confidence, although this was not clearly understood by all parties at the time. It is inevitable that schemes will be at differing stages of development when an investment cycle is tied to long term funding allocation. It is important that there should be an opportunity for the project funder and delivery partner to review jointly whether or not to proceed with a project before construction begins. This can only happen once cost estimates and scope have reached an

appropriate level of maturity that would allow for ongoing and progressive assessment of schemes against the criteria of desirability, affordability, and deliverability within the overall portfolio of investment. Development of schemes between these gateways should be governed within the change management protocol outlined above.

- 6.18 In CP5 planning, project, programme and portfolio management at the early stages has been inconsistent. I am encouraged by contributions to the Review which indicate improvements in project, programme and portfolio management at the delivery stage and a growing recognition that alternative project, programme and portfolio management practices can be introduced to the planning phase of future enhancements. Leading project, programme and portfolio management practices should be introduced throughout the process; and these should reflect the fact that projects in the development stage are generally highly immature. This should include ensuring that:
- portfolio deliverability assessment is carried out. This should be carried out by the Department, as risk holder, rather than relying on ORR or Network Rail assurance. This assessment should look at capability across the industry, a point addressed further below;
 - the risk management maturity model applied reflects Network Rail's latest work in this area and the work being done to assess the durability and robustness of early GRIP planning, as well as ensuring that the GRIP process is adequately scalable to programmes as well as projects;
 - appropriate contingency and risk estimation is applied. An example of a mechanism for applying contingency bias given to the Review is reference class forecasting. This might be an appropriate technique to consider; and
 - appropriate levels of resource are applied to projects in early GRIP stages, and the capital allocated to these projects is prioritised and specified by the funder, as discussed above.
- 6.19 In relation to funds allocated to early scheme development at the pre-HLOS stage, the Department should be responsible for specifying the strategic objectives for that funding, and the stage of scheme maturity such development is expected to reach. This is important in order to ensure that the options developed by Network Rail match the Department's strategic funding objectives. At present, development pots of significant size (up to £144m in the Final Determination for CP5, which was divided between three workstreams) can be allocated to indeterminate schemes. Within this prioritisation framework Network Rail should retain flexibility in early development work, particularly in involving local route experts and stakeholders in the process. This greater clarity in early scheme development that I am recommending is especially important given the increasingly important nature of interdependencies between Network Rail and other parts of the rail infrastructure.
- 6.20 Likewise, careful consideration should be given to the allocation and governance of ring fenced funding, which in CP5 amounted to almost £1.2bn. These pots, such as the Passenger Journey Improvement Fund, or the East Coast Connectivity Fund, must be carefully governed in order to ensure that the selected outputs match the priorities of funders and rail users and deliver value for money of at least the same level as that which might otherwise be achieved by specified schemes. With such governance in

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place there is no evidence to suggest that this is not an effective and flexible way of funding enhancements.

Deliverability

- 6.21 CP5 is an ambitious programme of enhancements. In my view, the funding structure in place, and the regulatory approach that flowed from it, led to a framework of incentives in PR13 that placed the emphasis not on affordable and passenger-focused delivery but on improving the efficiency of expenditure. Whilst reclassification may in part alter this framework through the application of a debt ceiling, these incentives expose a deeper issue within the access charging cycle. This is that, whilst price setting may be appropriate for some schemes, and is certainly a recognisable and standard regulatory mechanism, significant and complex upgrades, such as Great Western Route Modernisation, TransPennine electrification and the Northern Hub, and Midland Main Line electrification, may be better served by an alternative approach.
- 6.22 These highly complex schemes, which in planning and delivery may extend well beyond the duration of a control period, would in my view benefit from focused and bespoke governance, such as with Thameslink and Crossrail. The Department should consider whether major route enhancement schemes (in particular) should continue to be tied to the periodic review cycle or whether they should be handled under bespoke arrangements such as those in place for Crossrail and Thameslink. This would provide Ministers with opportunities to decide how to progress schemes as deliverability and affordability is progressively assured, rather than artificially accelerating schemes to meet the requirements of the access charge review and would incentivise better early planning and programme oversight.
- 6.23 It is extremely important to note, however, that medium-term funding certainty for Network Rail, and by implication the supply chain, is both welcome and necessary, as reflected in EU and domestic legislation. In other words, I do not recommend replacing the periodic review system for operations and maintenance and renewals expenditure.
- 6.24 The HLOS is only one mechanism for planning investment. There is a clear opportunity for synergies to be achieved in other ways:
- between enhancement and renewal funding; and
 - between franchising decisions, rolling stock and enhancement planning.
- 6.25 No party can do this in isolation, although as noted above it is the Department which ultimately carries risk in respect of each of these. Decisions to progress major enhancement schemes should only be taken when the impact on other parts of the railway are clearly understood; in other words, a whole system, whole life approach. I do not make any recommendation about precisely how this increased coherence in the oversight of the whole system should be achieved. But this is a point to which I attach importance.

Stakeholder involvement: passengers' views

- 6.26 Given the inevitable impact of enhancements on the operational railway, key stakeholder involvement from the earliest stages of project conceptualisation should be a standard. Central to this consideration, and in my view conspicuously absent or ineffective within the CP5 approach, is consideration of passengers' priorities in planning how to deliver enhancements. Network Rail Route Utilisation Studies (RUSs) were designed

to encourage local input to strategic enhancement planning and the ORR does consistently consult, thereby bringing the views of organisations such as Transport Focus into the planning process. But these measures, in my view, have not resulted in a programme of work that fully reflects passengers' priorities for rail travel, in particular in preparing for disruption on the network. I recommend that the Department and industry do considerably more to ensure that future investment is targeted with consideration of these passenger priorities.

- 6.27 In enabling the Department to make informed decisions about scheme development, Network Rail should be required to demonstrate that it has actively involved operators (passenger and freight operators) and the supply chain in the development of investment schemes including specifically in the planning of how they will be delivered. The use of project alliances, or route alliances, across the network, which have been seen as delivering operational improvements could be furthered.

A long term approach to developing our skills base

- 6.28 Central to deliverability, is the availability of the right sort of resource, both within the three organisations and also within the wider workforce. A more strategic, long term approach to managing the availability of the right people is required. This approach must have two strands. These are in anticipating and managing resource requirements, where CP5 delivery has manifestly underperformed, particularly in respect of signalling; and in developing skills throughout the supply chain.
- 6.29 The Government's Productivity Plan, 'Fixing the Foundations', published in June 2015, highlights the importance of addressing shortfalls in professional and technical skills if UK productivity is to improve. This is plainly a resonant issue for the parts of our economy which are delivering large infrastructure projects, and a significant number of these are in one way or another, under the wing of the Department.
- 6.30 There are already a number of important initiatives in hand (see below). I have noted in section 5 the work currently being led by Terry Morgan. Strong, imaginative, central leadership is required to enable people to rise to the challenges ensuring the right skills are acquired and developed through education and training. I recommend that the Department should take a prominent role in such leadership, working closely with the education sector.
- 6.31 The approach should include:
- the Department articulating the likely requirements of the whole rail portfolio, including HS2, the possibility of 'Crossrail 2' and the implications of the Northern Transport Strategy, to give the supply chain notice of the volume, timing and type of work anticipated, and entering into a dialogue with the supply chain to consider how this portfolio might most effectively be phased and delivered. The impact of Departmental announcements on the long term development of the supply chain should also be considered. The plans in place for a new High Speed Rail Academy from 2017, with sites in Birmingham and Doncaster, represent a positive step forward;
 - Network Rail demonstrating the ability to forecast demand on scarce resources across both renewals and enhancements work within control periods, including the impact of major projects over a longer period, which should be a minimum of ten years. Network Rail should also be looking to incentivise skills development throughout its supply chain, including perhaps looking to the model adopted by

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Crossrail Ltd., which is including skills development as a requirement of subcontracts and exceeded its target of delivering 400 apprenticeships; and

- the industry as a whole encouraging the shaping of a skills development pipeline that demonstrably anticipates future demand requirements (notably in respect of signalling software engineers, which will be required in order to deliver the ‘digital railway’ aspirations). I am encouraged by the Rail Supply Group’s work in this area, including plans for a rail skills strategy, due for completion in 2016. This will support greater productivity, reduce skills shortages and facilitate the introduction of new technology.

Conclusions

6.32 The problems that have arisen with rail infrastructure investment in CP5 are, plainly, significant and of deep concern. But, as I hope these recommendations show, they are tractable.

6.33 In my view, solutions can be developed to the questions of organisation, resourcing, planning and delivery. They will require sustained effort and a strong focus on deliverability, and on the strategic needs of the whole rail system in support of economic growth right across the UK.

6.34 What is also important is that, in re-planning the investment needed for the rail infrastructure of the 21st century, a very determined focus is placed on the national need to develop the skills and resources that all our infrastructure plans – not just in rail and indeed not just in transport – require. It is clearly a national imperative to develop these skills and I very much hope that the Department for Transport, working with the transport industry, will take a leading role in this development.

Colette Bowe
November 2015

Annex 1 – Terms of Reference

1. The purpose of the Review is to inform government policy and processes used to develop, agree and plan the delivery of the enhancements programme for future Network Rail control periods. The Review will identify the lessons to be learned from the process undertaken for Control Period 5, looking at processes within the Department for Transport (DfT), Network Rail and the Office of Rail Regulation (ORR). It will have regard to the parallel processes in respect of renewals, and to Network Rail's role in leading wider industry engagement.
2. The Review will examine the processes followed in planning for Control Period 5, from the development of DfT's High Level Output Specification (published in July 2012) to ORR's Final Determination (published in October 2013) to Network Rail's Enhancements Delivery Plan (published April 2014) and the Enhancements Cost Adjustment Mechanism managed by ORR.
3. The Review will seek to identify:
 - a. The causes of the increases against cost estimates and delays to projects within the Control Period 5 enhancements programme, including looking at the treatment of schemes in an early stage of development
 - b. The extent to which Network Rail's plans include the creation of capability and skills in the company and its supply chain to deliver the programme
 - c. Lessons to be learnt from different delivery models for rail infrastructure enhancements (for example the Thameslink Programme).
 - d. Changes to process and practice that will lead to improved outcomes for Control Period 6.
4. Out of-scope for this Review is:
 - a. The appropriateness of engineering solutions identified by Network Rail for enhancement projects
 - b. The merit of specific schemes included in the rail enhancement plans (though this should not proscribe review of the appropriateness of the enhancements plan as a whole) and
 - c. The statutory framework for the rail investment process.

5. The Review should make recommendations on the basis of its findings, in such a way as to enable DfT, Network Rail and ORR to take practical steps to improve the development, agreement and planning for the delivery of rail enhancements.
6. The Review will be led by Dame Colette Bowe, a Non-Executive Member of the DfT Board, she will be supported by Richard Brown, Non-Executive Member of the DfT Board. She will draw on others as she sees fit, both within DfT and externally. The Review will be managed by DfT and will involve Network Rail and the ORR, and other industry parties as necessary. DfT officials will liaise with HMT and Cabinet Office.
7. The Review will provide a report to the Secretary of State and Principal Accounting Officer, DfT, by autumn 2015.

Annex 2 – HLOS, SOFA and Guidance to the ORR

1. Schedule 4A to the Railways Act 1993³⁰ sets out the process for periodically setting the financing of rail infrastructure. Paragraph 1D requires the Secretary to State to provide the ORR with: ‘information about what he wants to be achieved by railway activities ... during the review period’. The Act lists areas the Secretary of State may include objectives and standards in respect of. These are³¹:
 - a. the capacity of the network;
 - b. the frequency of railway passenger services;
 - c. journey times;
 - d. reliability of railway services (both in terms of punctuality and otherwise);the taking of measures to prevent or mitigate overcrowding;
 - e. level and types of fares;
 - f. the quality of information provided to passengers;
 - g. the accessibility of railway services to people with disabilities;
 - h. the carrying out of major projects to improve railway services; and
 - i. the protection of persons from dangers arising from the operation of railways.
2. At both PR08 and PR13 this information was provided by the Government through the publication of a ‘High Level Output Specification’ (HLOS). At PR13 the HLOS was published on 16 July 2012 in a document entitled ‘Railways Act 2005 Statement’³².
3. In the 2012 HLOS the areas in which the Secretary of State made specifications included:
 - a. **Safety**, with the expectation being that the railway should continue to improve “as far as reasonably practicable”;

³⁰ As amended, including by the Railways Act 2005. In addition, the general approach to at least 5-yearly planning for rail infrastructure is now required by EU law, including Directive 2012/34/EU (Recast).

³¹ Paragraph 1D(4) of Schedule 4A to Railways Act 1993.

³² <https://www.gov.uk/government/publications/high-level-output-specification-2012>

- b. **Reliability** of railway services – the HLOS set an overall CP5 target Public Performance Measure (PPM) of 92.5% and Cancellation and Significant Lateness (CaSL) target of no more than 2.2% of trains³³
 - c. **Capacity** of the Network – Annex A of the HLOS set out the increased passenger capacity to be delivered into cities across the UK; and
 - d. the carrying out of Major Projects, or infrastructure enhancements, under the title **Supplementary High-Level Specification of Major Projects**. In the funding statement that accompanied the HLOS, provision was also made for six Ring Fenced Funds
 - e. **Financial Sustainability, Customer Satisfaction and Environmental Performance.**
4. The section on Major Projects was further broken down into six sections explained below. The HLOS does not reference source or scope documentation for these major projects.
- a. Committed Projects – there were 12 projects committed to prior to the start of CP5. Three of these schemes were electrification schemes:
 - i. the Great Western Main Line to Cardiff, Oxford and Newbury;
 - ii. the ‘North West Triangle (Manchester – Liverpool via Chat Moss, Huyton – Wigan, Manchester – Euston Junction and Blackpool North – Preston);
 - iii. the ‘North TransPennine Line’ (Manchester Victoria and Guide Bridge – Huddersfield – Leeds – Colton Junction).Other committed projects included those already in the construction phase (e.g. Thameslink, Crossrail, the Intercity Express Programme, and the Birmingham and Reading Station upgrades), ‘East West Rail’ and ‘Elements of the Northern Hub’.
 - b. The Electric Spine – this was described as a project to ‘increase regional and national connectivity and support economic development ... from the South Coast via Oxford and the Midlands to South Yorkshire’. The description of the scheme in the HLOS included the routes to be electrified as part of the Spine, for example Bedford – Nottingham and Derby, and Derby – Sheffield (Midland Main Line);
 - c. Other Electrification Projects – there were four electrification projects which extended both electrification projects mentioned in committed schemes and the Electric Spine. The projects were listed under this heading by geographical location. They were electrification of:
 - i. a number of South Wales local railway lines together with an extension of the electrification of the Great Western Main Line from Cardiff to Swansea;
 - ii. an extension of the Great Western Main Line, to include Acton – Willesden, Slough – Windsor, Maidenhead – Marlow, Twyford – Henley;
 - iii. the route between Walsall and Rugeley Trent Valley;
 - iv. the route between Micklefield and Selby: ‘to maximise the value of the previously announced TransPennine electrification’

³³ PPM and CaSL are industry performance metrics. PPM indicates the percentage of trains that arrive at their terminus station within a permitted ‘on time’ period. For intercity long distance trains, this can be up to ten minutes after scheduled arrival time. CaSL measures the percentage of trains that are more than 30 minutes late to the terminating station or cancelled at origin or on route.

- d. Airport and Port Access – this section included projects to improve airport (Heathrow and Gatwick) and port access, for example improved rail access to Gatwick Airport through capacity enhancement at Redhill;
 - e. City Capacity Projects – these were projects designed to improve capacity typically of stations, for example Bristol Temple Meads; and
 - f. European Rail Traffic Management System – this section indicated that the Secretary of State wished: ‘to see further implementation’ of the ERTMS. This is a signalling system which communicates with compatible trains rather than a visual based system as used at present.
5. In order to assess whether the specifications made in the HLOS were affordable within the money the Government made available, the infrastructure enhancements necessary to deliver the specifications were costed by the Department. The costing used for these infrastructure enhancements came direct from Network Rail, the IIP and internal DfT work. The total reached was £9.4bn (in 2011/12 year pricing).
 6. The costing for infrastructure enhancements was modelled together with other areas of Government rail spend e.g. fares policy data, franchising contract commitments, to calculate a Statement of Funds Available figure. This figure, commonly referred to as the SoFA, was the public funding the Government envisaged as being available or likely to become available for CP5. It was published in the same document as the HLOS.
 7. Since the funding Government provided to the rail industry was either provided directly to TOCs to support franchised passenger services, or as a direct grant to Network Rail, the SoFA was split into three lines – Total Funds Available, Franchise Support and Network Grant. Although the total level of funds available was indicated as being final, the narrative accompanying the SoFA indicated that the split of total funds available between Franchise Support and Network Grant was an indicative split. This was because it was for the ORR to decide the most appropriate funding mechanism for Network Rail, and therefore the method by which funds would be received (either direct from Government via the Network Grant or from Government via the TOCs).
 8. Alongside its ‘Railways Act Statement 2005’ the Department published ‘Secretary of State for Transport Guidance to the Office of Rail Regulation’³⁴. The seven page document, issued under section 4(5)a and section 4(5B) of the Railways Act 1993, sets out guidance to the regulator from the Department in 16 areas.
 9. A number of these sections, including the ‘Role of the ORR’ and ‘Reducing the Regulatory Burden’, were little more than a paragraph long. However others, such as ‘Value for Money and Efficiency’, were more detailed. This Guidance did not ask the ORR to conduct an assessment of Network Rail’s ability to deliver the portfolio as set out in the HLOS.
 10. In one of the more detailed sections of the guidance, ‘Value for Money and Efficiency, the need for the ORR to: ‘to have regard to the funds available ... for the purpose of [the Secretary of State’s] functions’ was noted. It was highlighted that the Secretary of State did: ‘not wish to incur additional expenditure beyond allocated budgets and that she [wished] to be consulted about expenditure which is not, or is low, value for money’.

³⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3642/sos-guidance-to-orr.pdf

Annex 3 – GRIP and ECAM

1. The Governance of Railway Investment Projects (GRIP) is Network Rail's management and control process for delivering infrastructure projects that enhance or renew the operational railway. GRIP was introduced by Network Rail in 2003 to provide a tailored project management framework suitable for the rail industry.
2. The approach was based on best practice within industries that undertake major infrastructure projects and practice recommended by the major professional bodies. These included the Association of Project Management (APM) and the Chartered Institute of Building (CIOB).
3. GRIP divides a project into eight distinct stages from output definition (GRIP1) through to project closeout (GRIP8). These GRIP stages, which typically run sequentially throughout the lifecycle of a project, are set out in Figure 1.

Network Rail's Governance for Railway Investment Projects (GRIP) framework

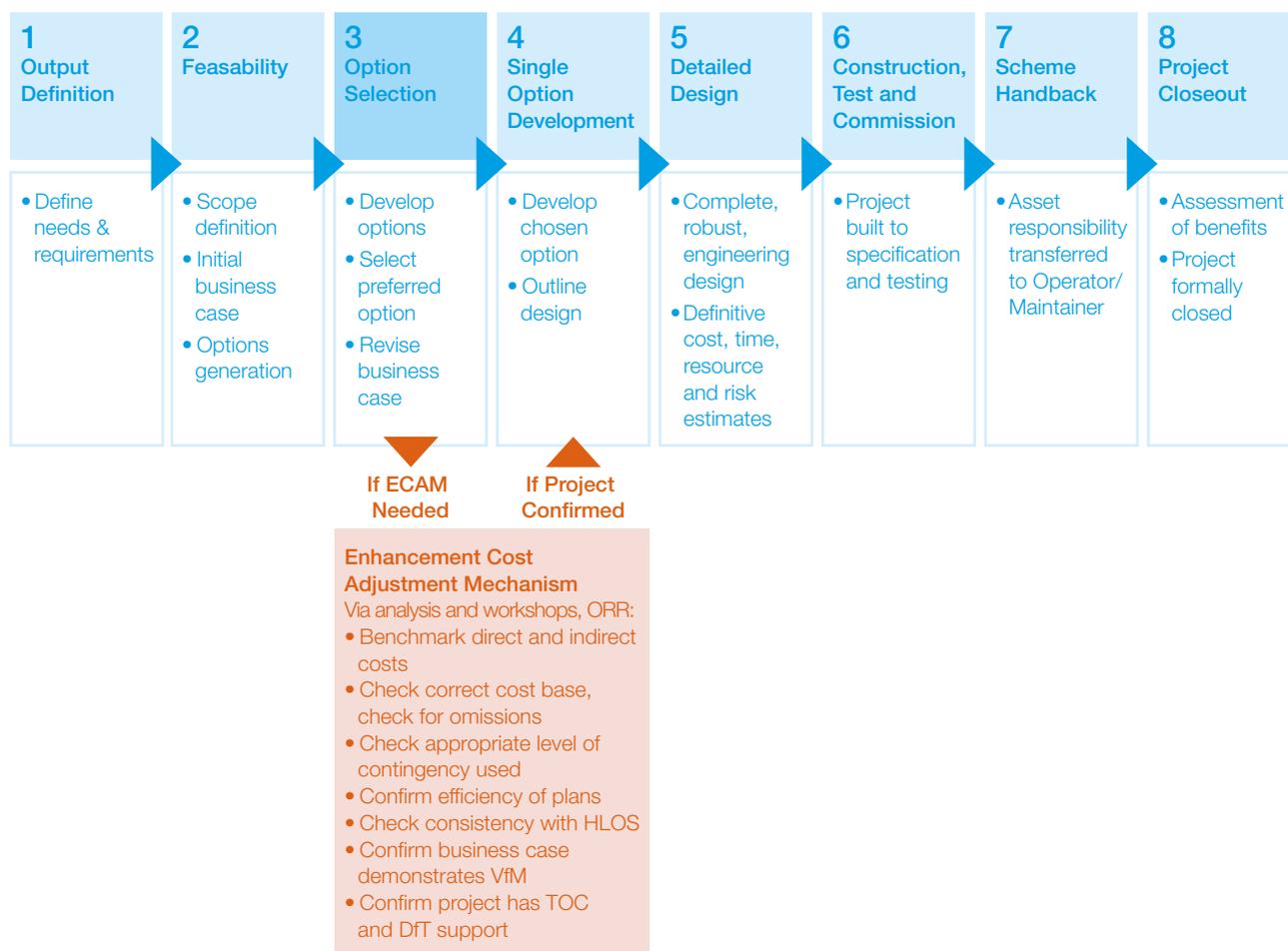


Figure 1: GRIP phases – displayed in blue text. ECAM, introduced in 2014 and described below, is set out in yellow.

- GRIP is a product driven framework. In order to satisfy a GRIP stage, a series of products have to be produced. Examples of products include a 'Client Remit' and an 'Environmental Action Plan'.
- GRIP mandates that all projects are subject to Stage Gate Reviews. These are formal reviews conducted at the end of certain GRIP stages. They are designed to provide assurance that a project has successfully completed the requirements of the relevant stage.
- A risk and complexity assessment of a project (Level of Control categorisation) is used to determine the minimum number of Stage Gate Reviews required. Network Rail currently has four Level of Control categories of projects. Projects that fall into the highest two categories are required to undergo four Stage Gates – at the end of GRIP1, 3, 4 and 7.
- At a Stage Gate Review, Stage Gate Reviewers check that required products have been produced and are an appropriate quality. If products are below a certain quality, GRIP guidance indicates that the project should not be allowed to proceed to the next stage. In order to reduce the occurrence of poor quality products, the most recent GRIP

guidance, issued in June 2014, recommends reviews of products between GRIP stages for health checks or in preparation for Stage Gate Reviews.

8. Project, programme and portfolio management good practice normally requires assurance reviews such as the Stage Gate Reviews to have a degree of independence. However at present GRIP does not require independent Stage Gate Reviewers to undertake the work, Network Rail is considering plans to introduce this.
9. Although there are certain products which are universally required across all projects, others are optional. This provides flexibility, allowing GRIP to be used across projects of ranging complexity and size. The exact GRIP products required for a specific project are decided upon at the beginning of a project, or prior to commencement of an individual GRIP stage. Several of these GRIP products are used by estimators to produce a cost estimate, which in turn becomes a GRIP product.
10. Larger projects or programmes are sometimes divided into sections to go through GRIP. This division is typically done on a geographic basis. Perhaps reflecting the difficulty of using GRIP for large complex programmes, Network Rail is currently developing a 'GRIP for Programmes'.

Enhancements Cost Adjustment Mechanism

11. GRIP3 is an important stage with regard to cost estimates because prior to this, i.e. at GRIP stages 1 and 2, and in the pre-GRIP conceptualisation phase (sometimes called GRIP0) costs are based on indicative scope. At GRIP3 the most appropriate project scope in order to deliver a defined output is decided upon. At the Final Determination for PR13, the ORR noted that “the (enhancements) portfolio is less mature than [...] at the same point in the previous control period”, and indicated that: “of the £6.7bn costs that [they] examined there was about £6bn based on an indicative definition of scope and risks”. This £6.7bn excludes £1.2bn of ring fenced funding and £3.1bn allocated to Thameslink and Crossrail³⁵.
12. To determine the efficient cost of schemes at PR13, the ORR introduced a new step. Building on the suggestion of the industry, it agreed to delay the setting of efficient cost envelope for the enhancements portfolio until after the ORR's Determination. The intention was to give both the Department and Network Rail the opportunity to agree what was needed and how it would be delivered. It included a mechanism to allow train operators to challenge and contribute to the specification of projects in an effort to improve whole-system operational efficiency.
13. The process introduced was named the Enhancements Cost Adjustment Mechanism, or ECAM. The criteria against which projects were assessed by ECAM are set out in the diagram above.
14. The intention was that once all projects had undergone an ECAM assessment (when they reached GRIP3) the ORR would be able to set an enhancement funding envelope. This would be achieved by adding together the relevant efficient costs of different projects and applying a suitable portfolio adjustment.

³⁵ Excluded from this figure were the £1.2bn of ring fenced funding, and £3.1bn allocated to Thameslink and Crossrail which were subject to separate regulatory protocols designed to incentivise efficient delivery

15. Although the efficient cost of the CP5 enhancements portfolio was not generated at Final Determination stage a level of enhancement spend was assumed as part of the Final Determination. This was to enable Network Rail's Revenue Requirement for the control period to be calculated and access charges to be set. This was necessary in order to allow the periodic review process to continue as envisaged.
16. In an attempt to ensure that projects were going through ECAM at an appropriate rate, the achievement of GRIP3 by projects, and therefore the point at which ECAM was to occur, was made a regulatory milestone by the ORR. All projects were due to have achieved this milestone by March 2015.

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