



Review of Network Rail's SBP Infrastructure Enhancement Proposals for CP5

Final report - redacted

11 June 2013



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Executive summary

In September 2012 the Office of Rail Regulation (ORR) asked a URS / Nichols / Turner & Townsend Review Team to 'check whether Network Rail's Strategic Business Plan (SBP) submission for CP5 enhancement portfolio is robust and represents an efficient cost'. This report sets out the results of that review, to enable ORR to determine an adjusted 'efficient' cost for the enhancement projects included within its scope.

This review comprised a benchmarking study of costs within the rail industry and external comparators, and a desk-top 'Assurance Review' assessment of documents provided by Network Rail, undertaken between January and April 2013. It addressed 60 infrastructure projects within the England & Wales SBP and a further 7 within the Scotland SBP. The review was structured and delivered via a seven step process as shown in Figure 1.



Figure 1: Review process steps



Findings

The main findings from the review are:

The package of SBP documents and cost estimates submitted by Network Rail contained a number of gaps and errors, some of these significant. There were instances of poor quality data that have inhibited the ability to determine an efficient cost for some projects.

The development maturity of Network Rail's CP5 enhancement portfolio is relatively low compared to the corresponding point in CP4. This is, in part, due to the introduction of new schemes within the HLOS for CP5. Consequently there is greater uncertainty in the costs required to deliver the enhancements portfolio, notably for schemes that are in the early stages of development.

We have identified four categories of projects in relation to their robustness and efficient price. 'Blue' projects are in the early stages of development. These have poorly defined outputs, for which no review is possible and hence no adjustments have been made. 'Red' projects have defined outputs, but uncertain scope and cost where we cannot determine an efficient cost. 'Amber' projects are those for which there are some issues and uncertainties with cost estimates, and finally 'Green' projects, exhibit good quality cost data.

There are further opportunities for Network Rail to reduce its costs for enhancements in addition to the efficiency and other savings it has already identified. These include reductions in direct construction costs, indirect costs and risk provisions, as well as improvements in 'efficiency overlays', which is the mechanism whereby Network Rail has applied a top-down efficiency challenge to individual projects.

We have found insufficient evidence that defines how Network Rail plans to convert its efficiency targets into specific practical actions. Efficiency overlays have been developed centrally, and do not feature in project documentation, indicating a potential disconnect between the central SBP management process and Network Rail's projects. So whilst there is considerable potential for efficiency improvements, this is at risk unless clear plans are developed and cascaded to all projects, with results integrated, learning shared and leadership and influence continuously applied through the Control Period.



Conclusions

We have reviewed Network Rail’s plans for 67 enhancement projects totalling £7.2bn¹ of expenditure in CP5 and confirm the following:

- £1.1bn are Blue projects, for which the only adjustments represent baseline changes agreed with the ORR to align costs with DfT estimates
- £0.8bn represent Red projects, where we cannot determine an efficient cost
- £5.3bn is a combination of Green and Amber projects for which we have identified an adjusted efficient cost of £4.7bn.

This is illustrated in Figure 2.

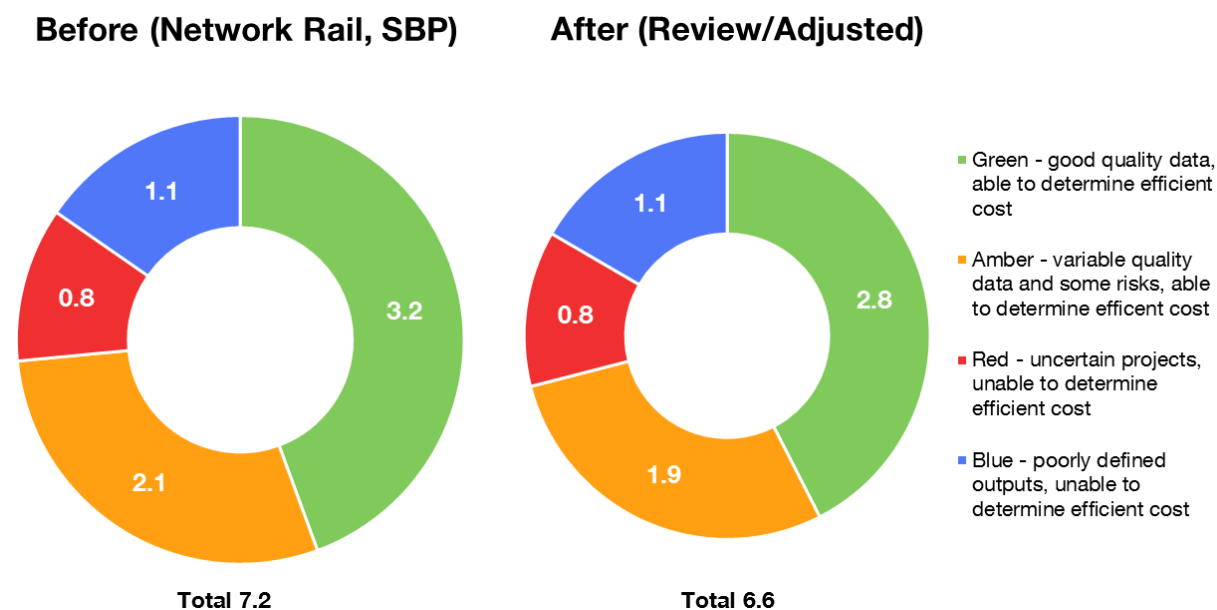


Figure 2: Project split by review finding (£bn)

A ‘waterfall’ summary explaining the proposed adjustments, by category of cost, to move from the £7.2bn start point to the £6.6bn figure proposed by this review is described in Figure 3.

¹ The price base for costs within the review is 4Q12. All figures are expressed as such, unless stated otherwise.

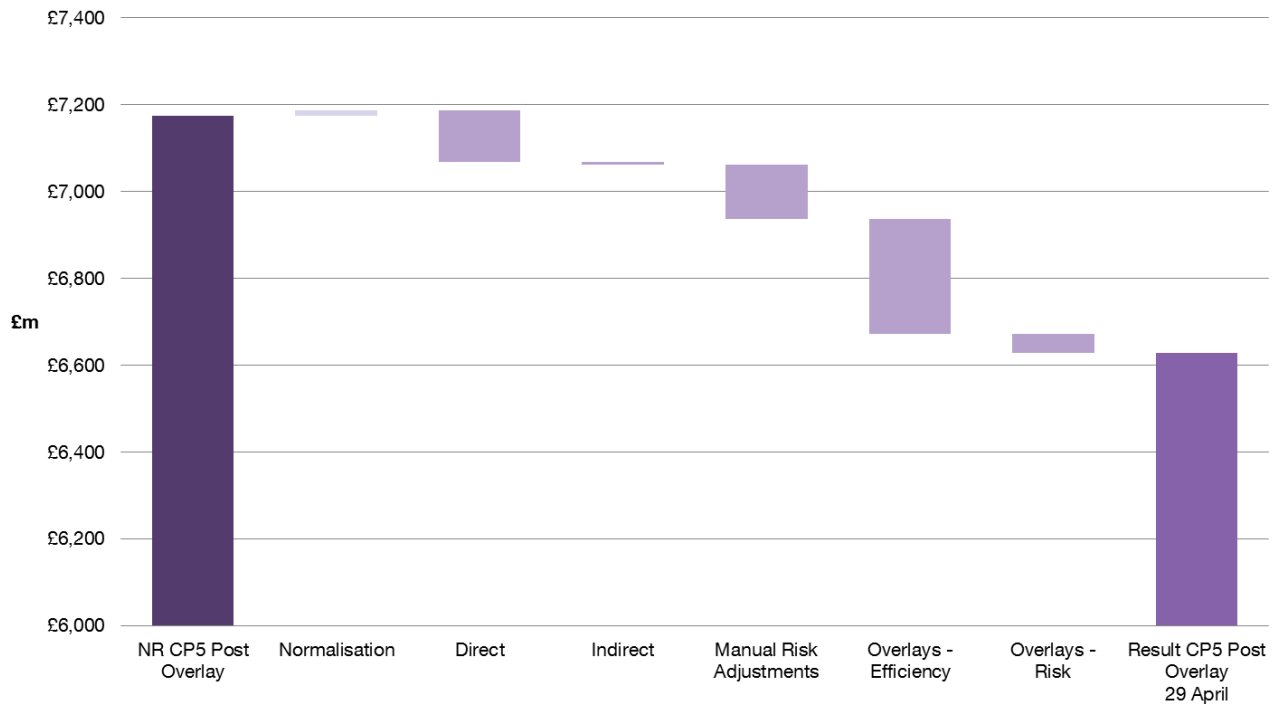


Figure 3: Waterfall summary of adjustments

These adjustments are described as follows:

Adjustment type	(£m)	Description
Normalisation	+14	Changes in figures required to align Electric Spine project costs with the DfT forecast, adjustments resulting from reconciliation issues between the Network Rail estimates provided and their SBP submission, and changes required to harmonise the cost base to 4Q12
Direct	-120	A net reduction resulting from proposed adjustments to direct costs including their commensurate indirect and risk uplifts
Indirect	-6	A small reduction resulting from proposed adjustments to indirect costs based on comparisons with Network Rail norms
Manual Risk Adjustment	-125	Proposed reductions to specific project risk and contingency provisions
Overlays – Efficiency	-265	A net reduction resulting from the proposed changes to Network Rail’s efficiency overlay, and to apply this to additional SBP projects
Overlays – Risk	-43	A reduction in relation to Network Rail’s portfolio risk overlay, including changes to both the rate applied and the projects impacted

A profile of enhancement costs in each year of CP5 has been put forward by Network Rail in its SBP submission. This is illustrated in Figure 4, incorporating all of the enhancements within the England & Wales and Scotland SBP, plus those projects that are outwith the scope of our review. This is compared to the equivalent SBP profile for CP4, and Network Rail's current forecast for CP4 outturn costs, which shows increasing costs in later years. We believe that the plan for CP5 represents an unrealistic profile for a portfolio that includes many schemes at an early stage of development. This may create deliverability, efficiency and financing issues that will need to be resolved.

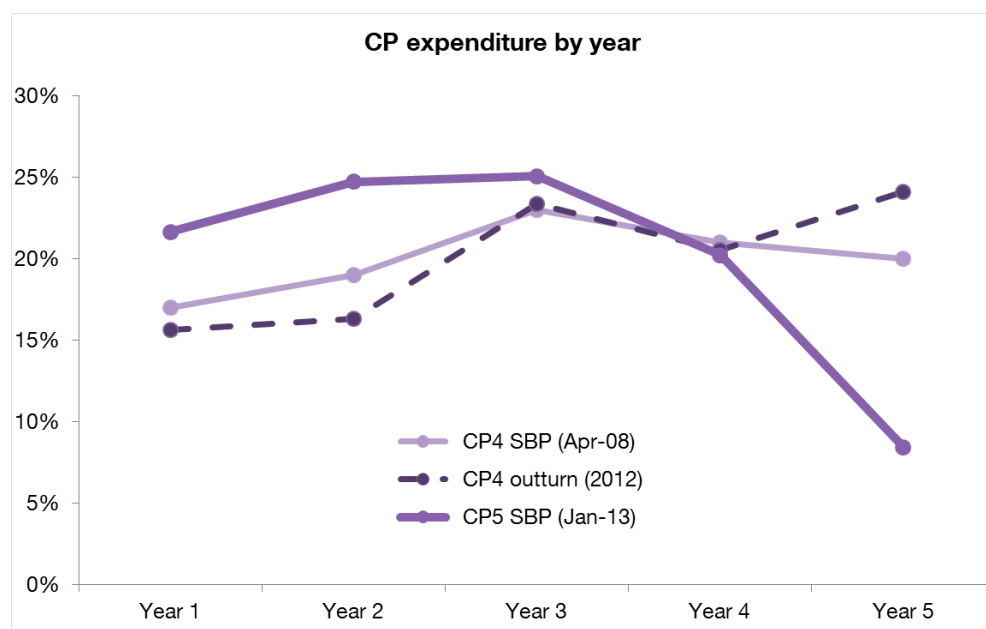


Figure 4: Cost split by year

Summary conclusions

In respect of Network Rail's submission for CP5 enhancements:

Is it robust? For the £1.9bn of Blue and Red projects it is not robust, given uncertain outputs, scope and costs

Is it efficient? For £5.3bn of Green and Amber projects we propose an efficient cost of £4.7bn.



Recommendations

We have identified three Key Recommendations to support the ORR's Draft Determination, and a further five Consequential Recommendations, which relate to suggested actions for Network Rail in the light of the findings from this report.

Key Recommendations:

- KR1: For the £5.3bn of Green and Amber projects, agree that £4.7bn represents the efficient cost for these CP5 enhancement projects, and adjust Network Rail's proposed funding requirement accordingly as part of the Draft Determination. This is based on the adjustments described in Section 5 of this report
- KR2: Agree that a further £1.9bn relates to Blue and Red projects with uncertain scope, outputs and costs that require separate treatment to define funding requirements for CP5, together with further development work by Network Rail and industry to ensure that robust plans are brought forward
- KR3: In the light of KR1 and KR2, agree that ORR and Network Rail will need to manage Blue and Red projects in a different way. Network Rail, together with industry partners as appropriate, will need to agree the action plan for dealing with schemes which are at an early stage of development. As projects mature, certainty on cost and delivery plans will improve. Further review, governance and change control will need to be applied once this development has been completed.

Consequential Recommendations:

- CR1: That Network Rail develops a clear plan setting out how it intends to achieve its efficiency savings; for those initiatives defined in its SBP and those summarised in this review that are focused on opportunities at early GRIP (Governance of Railway Investment Projects) Stages
- CR2: That Network Rail review the profile of costs, including the peak in mid CP5 and the low level of expenditure in the final year, to verify whether this is realistic, efficient and deliverable, and therefore that both Network Rail and its supply chain has sufficient resources to efficiently procure and deliver this and associated outputs
- CR3: That Network Rail considers strengthening its portfolio and programme management capability and plans given the complexity and scale of specific programmes within the CP5 enhancement portfolio and deliverability risks likely to be created. This can address opportunities for programme synergies and benefits that exist for common 'families' of schemes, notably electrification and power supply upgrades



- CR4: That Network Rail continues development of its cost estimating and benchmarking workstream, reinforced by a clear strategy for benchmarking initiatives to: derive common cost definitions to enable quantitative comparisons; improve consistency in cost data capture, standardised cost breakdown structures and facilitate improved use of the Unit Cost Model. Further analysis comparing estimates with outturn costs will also help define adjustments for residual factors and 'optimism bias' to justify uplifts at each GRIP Stage
- CR5: We would also advise that Network Rail considers addressing the issues apparent with its SBP submission data. This will help to clarify how its central function will collate and maintain information for all projects during CP5. This action may also help progress issues raised during the ORR's Determination process.



1. Introduction

Background

In July 2012 the Department for Transport (DfT) set out its High Level Output Specification (HLOS) defining the outputs the Secretary of State for Transport wished to be achieved by the railway industry in England & Wales in the five year Control Period 5 (CP5) that will run from April 2014 to March 2019. At the same time Scottish Ministers set out the HLOS for Scottish enhancements projects required in CP5. Government also set out the public funds that are or are likely to be available to secure delivery of these outputs; the Statement of Funds Available or SoFA. This was informed by the Initial Industry Plan (IIP) which was published in September 2011, which proposed enhancement investment of between £9.1bn and £9.4bn.

The HLOS and SoFA together enable Network Rail and the industry to further develop plans for CP5 and to support the Office of Rail Regulation (ORR) requirement to undertake its Periodic Review 2013 (PR13) Determination of the funding Network Rail require to deliver the required outputs.

To set out its plans and to inform the PR13 process, Network Rail published its Strategic Business Plan (SBP) for CP5 in January 2013, both for England and Wales and, separately, for Scotland. The SBP includes detailed proposals for 91 committed and new enhancement schemes with a total cost of £12.4bn.

Our review

In September 2012, anticipating issue of the SBP, the ORR requested that the Review Team undertake a detailed desktop review of Network Rail's infrastructure enhancement portfolio. The objective for the review was: 'to check whether Network Rail's SBP submission for CP5 enhancement projects is robust and represents an efficient cost'. The full remit for the review is at Annex A.

In reviewing whether a project's cost are efficient we have considered:

- The appropriateness of options selected and the outputs created, in relation to the requirements
- Reference to valid cost norms and market-tested rates



- Application of management and governance processes, in line with GRIP, to match those within industry practice and standards.

The review was undertaken by a consortium comprising The Nichols Group, URS and Turner & Townsend. Nichols led the team, bringing programme management and review expertise. URS provided strength in railway engineering and GRIP development experience. T&T are specialists in cost management and benchmarking, which completed the range of skills and services required for the review. The team comprised the following members:

- Paul Bishop, David Clarke, Jonathan Holland – Nichols
- Selwyn Dixon, Rob Lees, Mohan Balasubramanian – URS
- Lynne Anderson, Andrew Beadle – Turner & Townsend.

The main review phase commenced in early January 2013, and was required to be completed by the end of April 2013, to inform the ORR's Draft Determinations, which are expected to be published in June 2013. The review appraised over 1,000 documents submitted by Network Rail, the results of which are set out in this report. A glossary of key terms used is at Annex B.

Structure of the report

A summary of the enhancements portfolio within Network Rail's SBP and those defined within the scope of our review are set out in Section 2. The methodology adopted to review these projects is described in Section 3. Our key findings are set out in Section 4, and the cost adjustments that would apply for each project in the light of these summarised in Section 5. Our overall conclusions on efficient enhancement costs for ORR's determination are set out in Section 6. Finally, our proposed recommendations arising from this review are set out in Section 7.

Given the scale of the review work undertaken, a separate technical annex has been prepared, containing further detailed information that supports this report.



2. Summary of SBP enhancements

Network Rail's SBP has been directly developed based on the IIP and resultant HLOS. Proposed CP5 projects are designed to respond to one or more of the Government's strategic priorities which are, in addition to its committed enhancement programme, the creation of the Electric Spine, increased capacity and accelerate journey times between key cities, plans to facilitate growth in commuter travel in urban areas, and to improve railway links to major ports and airports. Responding to this challenge Network Rail's SBP has been developed as follows:

- Two separate SBP plans have been created; one for England and Wales, and one for Scotland. The SBP for England and Wales comprises 74 enhancement projects with at a total cost of c.£11bn. The SBP for Scotland contains 17 schemes with a total CP5 cost of c.£1.4bn
- Network Rail has defined costs for each project based on ongoing GRIP development work. For the most part these represent its view at or before mid 2012. These costs were profiled per annum within CP5 (and within CP4 and CP6 as appropriate)
- Finally, Network Rail applied a package of 'overlay' adjustments to project costs to correct these for inflation and to account for risk and efficiency savings expected during CP5.

Key building blocks within the resultant (combined E&W and Scotland) enhancement portfolio include:

- Approximately 25% of costs are for Crossrail and Thameslink combined, both committed England & Wales SBP programmes that have been in delivery since CP4
- A further 25% is for a major programme of electrification schemes across the network, in both England & Wales and Scotland
- 25% of costs relate to three key major capacity programmes, typically including specific SBP sub-projects. These are Northern Hub, East West Rail and the Electric Spine, all of which are at relatively early stages of development
- A large number of smaller capacity schemes across the network that add up to 15% of CP5 costs



- A package of ring fenced funds, six in England and Wales and five in Scotland, that sum to 10% of the value of CP5 costs.

Each SBP programme and project is managed and delivered through Network Rail’s ‘Governance of Railway Investment Projects’ (GRIP) process. This is a comprehensive eight stage framework characterised by increasing levels of scope and cost certainty as projects develop through their life-cycle, for example: defining outputs at GRIP1; option selection at GRIP3; detailed design at GRIP5; and construction, testing and commissioning at GRIP6.

This GRIP framework strongly influences the review process, as the requirements and focus are different for each stage, with documents, products and deliverables created to match these and decisions required to progress to the next stage. As shown in Figure 5, 52% of the England and Wales portfolio (expressed by CP5 cost) is at GRIP Stage 2 or less; rising to 60% of total costs including ring-fenced funds. The equivalent result is over 80% for the Scotland SBP, or 90% with funds; again expressed in relation to the total value. This represents a shift to a greater proportion of early stage schemes compared to CP4 which reported a lower figure of c.35%² for schemes at up to and including GRIP Stage 2. For Scotland this represents only a high level estimate of costs required.

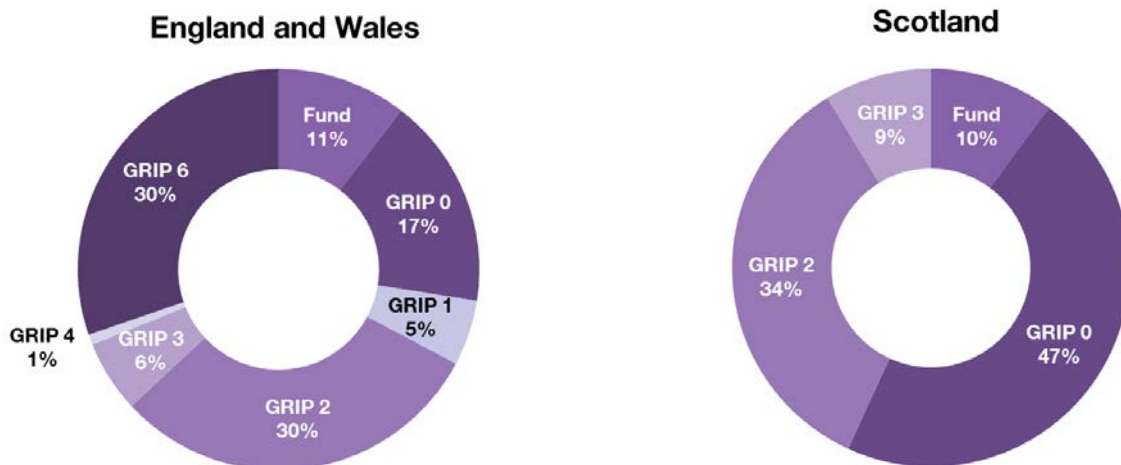


Figure 5: SBP divisible by GRIP Stage

² Strategic Business Plan Update: Control Period 4, April 2008.



Network Rail has apportioned its proposed costs within each year of CP5 as per Figure 6, with 20-25% of costs falling within each year with the exception of the final year of the Control Period which is at 8% of total CP5 cost. This contrasts the CP4 SBP position, which forecast a more uniform rate of expenditure through to the end of the Control Period. Furthermore, the outturn cost profile for CP4 forecast by Network Rail shows the additional movement of costs into later years, and contrasts markedly with the profile forecast for CP5.

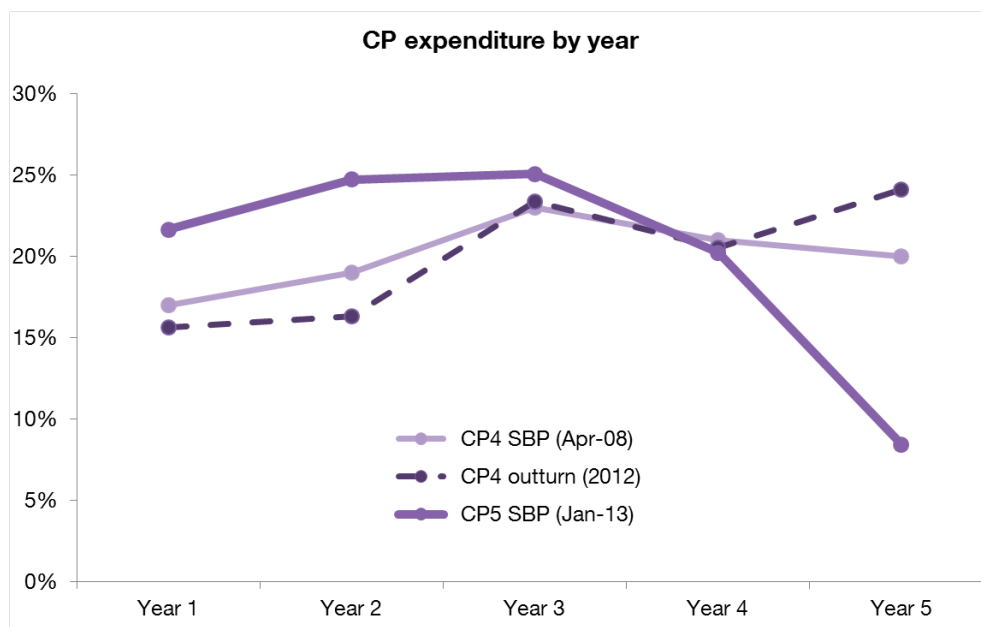


Figure 6: Cost split by year

A more detailed expenditure profile for the combined CP5 SBP portfolio, broken down by GRIP Stage, is shown in Figure 7. This shows that scheme costs peak in years two/three of the Control Period, irrespective of their stage of development. For Pre-GRIP ('GRIP0') projects this appears optimistic if, as per historic norms, it takes 2 to 3 years for a project to progress from GRIP0 to GRIP Stage 4.

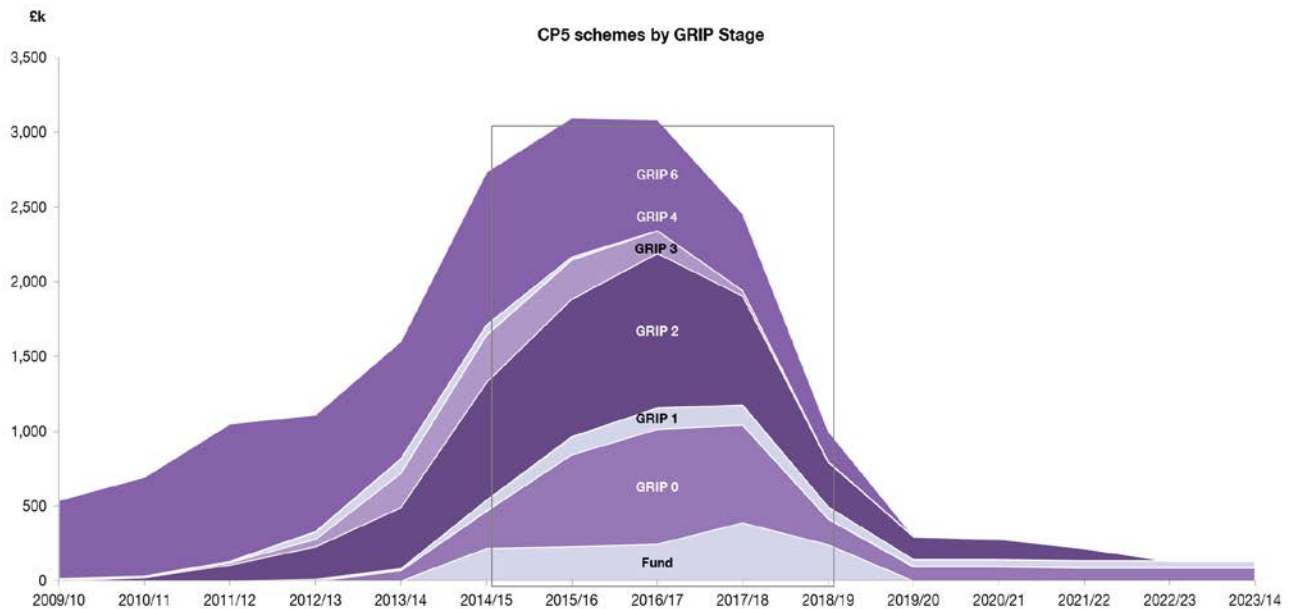


Figure 7: CP5 Cash flow profile divisible by GRIP Stage

Our review covered England & Wales and Scotland SBP schemes totaling £7.2bn of enhancement expenditure proposed by Network Rail in CP5. This represents circa 60% of the total CP5 enhancement costs, covering all scheme types, regions and stages of development. Schemes that were not included within the scope of the review were:

- Crossrail and Thameslink (£3.1bn)
- 'Roll-over' schemes from CP4 (less than £0.2bn)
- Funds for both England & Wales and Scotland (£1.3bn)
- Committed EGIP and Border Rail Project within the Scotland SBP (circa £1bn)

The full schedule of SBP schemes included within the scope of the review is set out in Section 5.

3. Review methodology

The review was structured and delivered via a seven step process as shown in Figure 8, which commenced immediately upon receipt of Network Rail's SBP and supporting documents.



Figure 8: Review process steps



This was a desk-top review of Network Rail’s SBP documentation, which was augmented by a number of very helpful clarification meetings with Network Rail on key topics and projects. The review was based upon documents provided formally as part of the SBP submission. The review steps are described as follows:

Step 1: Network Rail SBP Data

Network Rail SBP data was downloaded and a health check of the entire submission undertaken. This was required to catalogue all project documentation logged onto the datasite, including to identify any errors and gaps/omissions, as well as to help identify clarification questions for Network Rail to respond to.

Step 2: Assurance Reviews

A standard review product was applied to all enhancement projects to: review their remit, GRIP report and cost estimate; verify whether costs have been prepared in accordance with GRIP methodology, norms and guidance; identify good practice and any key issues or omissions and identify cost adjustments. The package of Assurance Reviews are contained in Annex C.

Step 3: Identify Key Themes

Key themes were identified from the initial assurance reviews to provide consistent analysis across the portfolio. In order to provide rigour, the constituent costs elements were systematically considered in turn, as illustrated in Figure 9.

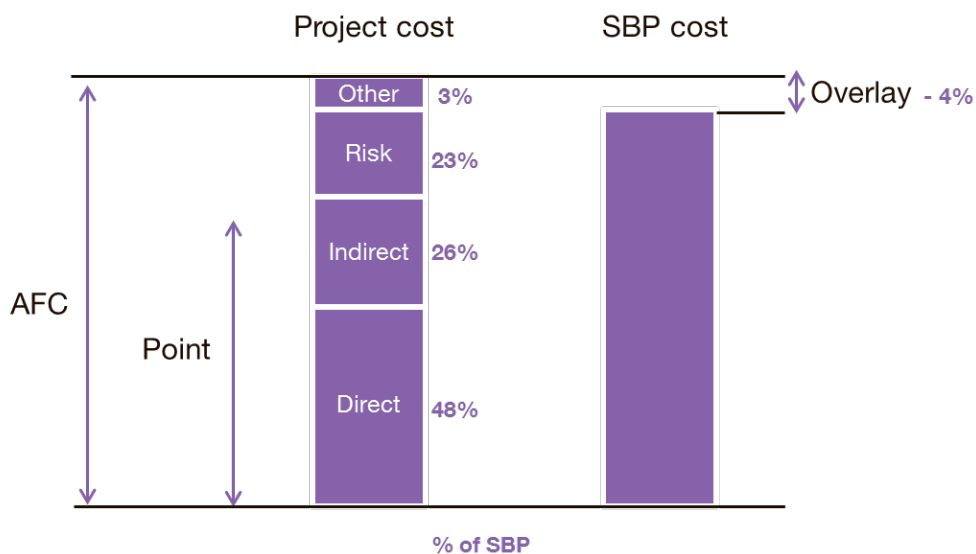


Figure 9: Summary of Network Rail project cost estimates



Key considerations included:

- Evidence of the relationship between scheme engineering and the cost estimate data provided
- Visibility of option selection supporting the choice of options taken and direct cost comparisons for comparable works where appropriate
- Indirect cost comparisons with industry benchmarks and Network Rail guidance
- The level of contingency provided relative to scheme maturity and uncertainty
- The efficiency improvement (overlay) assumptions for less mature schemes.

Step 4: Model the Cost Data

This step involved the extraction of detailed Network Rail estimate and business plan data into a single model with data formatted in a consistent format to enable cross-project comparison. Where incomplete data was provided, assumptions were made by extrapolating from those projects that provided detailed estimates ('normalisation'). This was done in order to allow consistent subsequent modelling of cost adjustments.

The baseline for our review is for prices set to 4Q12, as per Network Rail's post-overlay SBP costs. Note that consideration and treatment of inflation risk is excluded from the scope of our analysis.

Step 5: Detailed review

A detailed review of the portfolio was conducted against each of the key themes consisting of two different types of activity:

- Further high-level desktop review of those themes common across the portfolio, including efficiency and risk overlays, benchmarking of cost and quantities for electrification and power supply projects and platforms. Whilst the analysis primarily regards cost, deliverability and hence cost profiling considerations have also been made
- A review of each estimate against the key themes identified, and with reference to the Benchmarking Booklet (see Annex D), most notably for indirect costs and risk uplifts.



Step 6: Cost adjustment

Based on the findings from the review, a series of proposed adjustments are made to Network Rail's costs via the cost model. Adjustments proposed represent a balanced approach and adjust project costs both up and down. Adjustments have been incorporated into the cost model to enable clear traceability between the initial estimate and the final adjusted cost, highlighting which respective policies, cost elements and hence alterations give rise to the proposal.

Step 7: Validation

A final check was made to ensure that results are internally consistent and adjustments tied back to the Network Rail SBP submission, with full transparency on issues that influence results, including treatment of Network Rail numerical and reconciliation errors, price base effects, checks on double-counting and gaps in adjustment.



4. Review findings

Key Finding 1: Poor data quality

Network Rail submitted a significant package of SBP documentation on its datasite. Core documents were well presented and logically structured. In relation to enhancements, these included a summary description of all projects, together with standard estimating, efficiency and risk methodologies and a summary spreadsheet of all enhancements costs³.

Circa 1,000 supporting project documents were supplied, including sponsor/client remits, economic appraisals, GRIP reports and cost estimates. Whilst these contained many examples of documents of a good standard, there was a marked degree of inconsistency in the quality and completeness of the information supplied. Significant gaps were evident and in many instances it proved challenging to reconcile the Network Rail SBP with the intended underlying project documentation and estimates provided. This was immediately escalated and required urgent attention by Network Rail, in addition to the standard clarification process, though this remedial action has not always proved successful. Network Rail subsequently provided 1-page summaries for most of the SBP projects to help explain how its cost estimates linked to the SBP submission.

The ongoing clarification showed that detailed knowledge and GRIP documents available at project level were not always successfully translated into a robust SBP submission. Examples include Great Western electrification (DP001) and Stafford Area Improvement Scheme (WW001). There are also inconsistencies in the way costs are estimated across the SBP portfolio inhibiting comparisons between projects. Specific examples include:

- An inconsistency in approach and a lack of explanation of how estimates had been produced, notably for schemes in the early stages of development (Pre-GRIP and GRIP1)

³ SBPT3182.



- Not all estimates at a common GRIP Stage were consistent in the level of detail. There were also differences between IP regions – for example the HLOS Priority 2 power supply upgrade programme in England & Wales
- Cost coding and use of a standard estimating approach is inconsistently applied across the portfolio making cost comparison difficult, for example in relation to isolating direct versus indirect costs
- Application of a different cost base for the SBP estimates. There were also several instances of cost escalation added to estimates (i.e. costs to account for future inflation), whereas costs are required to be normalised at 4Q12 prices before inflation is applied, to avoid potential double-counting. Examples include Derby Station Area Remodeling (NE003) and Western Access to London Heathrow Airport (WW029)
- Inconsistent treatment of risk, residual factors and 'estimating tolerance', including instances of ignoring qualitative and quantitative risk analysis provided in favour of generic GRIP Stage uplifts. The Highland Main Line Journey Time Improvements project (SC011) is a notable example
- No explicit linkage between CP4 project outturn costs for the various types of scheme and the CP5 estimates – e.g. Reading Station Area Redevelopment (CR002). A similar boundary issue exists for schemes that span CP6, for example LNE Routes Traction Power Supply Upgrade (DP007).

There were two main updates to the Network Rail master cost spreadsheet during the review period, dated 29 January and 12 March 2013 to correct problems with project-specific costs and overlays. There were notable errors, including circa £90m of costs omitted from the Great Western electrification (DP001).

Overall, the large number of increased and reduced cost changes broadly net out. In total we found £14m is required to be added to the £7.2bn baseline cost of the portfolio in CP5 to correct for errors and omissions, and normalise the cost base to 4Q2012.

Network Rail identified the biggest driver for efficiency as 'the identification of the appropriate solution to an output requirement [and] Identifying the wrong solution or scope could result in significant amount of expenditure being inefficiently incurred'⁴. Whilst we would concur, we found a general lack of transparency on how options, scope and cost are tied back to requirements, with many examples of summary cost estimates submitted without this detail. This will make it difficult for Network Rail to monitor realisation of efficiency in this area.

We would expect some issues on a submission of this size and complexity and on what is a constantly changing programme of development work, and further we note that Network Rail took immediate action to

4 SBPT225.



resolve problems once identified. Notwithstanding this the number of problems and the variability in documentation appears to indicate quality assurance problems in the SBP submission, and also a potential disconnect between this corporate assurance process and costs reported by the projects.

Data quality issues for each SBP project are identified in Section 5 of this report, including a summary of examples of the data quality issues we encountered. For clarity, the version of the master spreadsheet that has been used as the baseline for our cost adjustment is 'GEN0070 SBPT3182 revised Feb 2013', received on 12 March 2013.

Key Finding 2: Low scheme maturity

Network Rail has reported that it has 'undertaken considerably deeper analysis than CP4 with plans that are more robust than ever before, including clear outcomes and initiatives'. Whilst this may indeed be the case across the SBP, the summary of the enhancements in Section 2 shows a significant proportion of the portfolio is at an early stage of development. This is the case for almost all Scotland schemes. There is therefore a correspondingly higher level of cost uncertainty, and arguably greater risk to delivery within CP5, which is an issue we will return to subsequently.

We acknowledge that a lower level of maturity does not mean that Network Rail has failed to carry out sufficient development work. There are several SBP schemes, most notably the Electric Spine, that have only recently been announced, and so it is unsurprising that Network Rail is not yet able to bring forward robust plans and costs. This represents a broader issue for the regulatory process, consideration of which is outwith the terms for this review. For our review we would expect highly uncertain schemes to require different treatment in order to determine efficient costs.

It is also important to note that the SBP data provided by Network Rail is dated from 2012 or earlier, and represents a 'snap-shot' of expected costs that is likely to have evolved during the review and Determination period, leading up to the start of CP5.

The low maturity of many schemes has made forensic cost analysis difficult, with many cost estimates of a summary nature. This is particularly the case for Pre-GRIP ('GRIP0') and GRIP1 projects where Network Rail acknowledges it has poor cost certainty and in many cases unclear scope and requirements. For these projects Network Rail has routinely added 60% uplift to its high-level cost estimates⁵. We believe that it is therefore inappropriate to determine an efficient cost for a number of such projects, as the more pressing issue is inevitably to determine what is required to be delivered and what treatment is required for projects with highly uncertain scope and hence cost. We do not, however, believe that this should be a 'blanket

5 Halcrow Optimism Bias Study for DfT (March 2009) reports 55% at GRIP0.



rule' applied to all early stage projects, depending on the cost certainty or availability of suitable benchmarks that exist.

Some SBP projects were new additions announced in the DfT's HLOS in July 2012, most notably the Electric Spine, which comprises a package of nine individual schemes, where seven are at Pre-GRIP Stage and two⁶ others (previously committed) are at GRIP Stage 2. We acknowledge that this represented a particular challenge to Network Rail in assembling its SBP several months later. In the case of the Electric Spine, Network Rail has created high level scheme estimates for the SBP and then overlaid these with a £635m reduction to (it states) align with the DfT view of cost. This effectively renders all project costs somewhat meaningless. We would therefore concur with Network Rail's view⁷ that these require separate treatment during CP5, with further development work required before plans and costs can be determined.

In order to respond to Key Finding 1 (data quality) and Key Finding 2 (low scheme maturity) we have assessed and categorised all SBP projects within the following framework:

- Green – there is sufficient information and of satisfactory quality, and thus adequate cost certainty to enable an efficient cost to be determined. This applies to most projects at GRIP Stage 2 and beyond
- Amber – poor or variable quality SBP data, with cost risks evident and thus assumptions required to enable an cost to be estimated
- Red – unable to determine efficient cost, because of high levels of scope or cost uncertainty. This applies to 11 projects including, for example Oxford Station Area Capacity (WW007) in England & Wales and Highland Mainline Journey Time Improvements (SC011) in Scotland. These schemes are candidates for different treatment within the ORR Determination process, with SBP funding determined in a different way from Green/Amber projects
- Blue – untreated projects with no determination possible and hence no adjustments made. This comprises the Electric Spine Pre-GRIP schemes and Waterloo. We have removed Network Rail's own overlay adjustments to these schemes. Whilst well intended and fully consistent with their overall approach, we consider that these adjustments are not appropriate for schemes with uncertain outputs, scope and costs. We expect these schemes to be subject to further development during the early part of CP5 to inform production of a robust cost estimate.

The assessed category of each SBP project is shown in Section 5. The split (by CP5 value) between each grouping is illustrated in Figure 10.

⁶ MML Electrification (DP005) and Derby Station Area Re-modelling (NE003).

⁷ SBPT244 – CP5 Regulatory Framework.

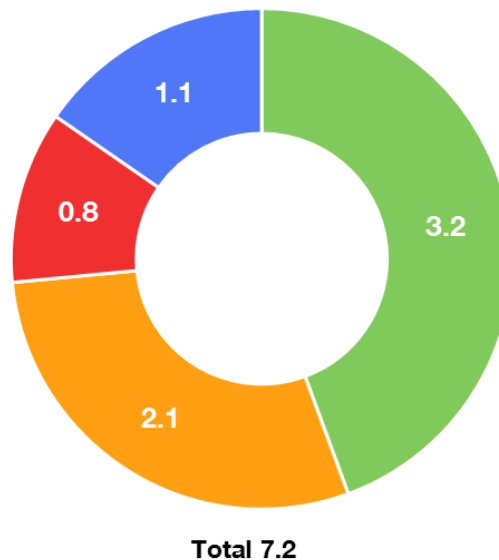


Figure 10: Breakdown of project costs by colour-coded review category (£bn)

Key Finding 3: Limited benchmarking of costs

The 'Enhancement Efficiency and Benchmarking Report' submitted with the SBP acknowledges the limited progress made by Network Rail on internal and external cost benchmarking before its SBP submission. We believe that inconsistent cost collection leading to non-standardisation of cost information and data integrity issues have not helped Network Rail in this regard. A more mature basis for cost comparisons will help Network Rail provide valuable information and a stronger platform for building robust estimates for CP5, and so improve confidence that an efficient cost was put forward.

A benchmarking booklet was produced by T&T to inform this review (See Annex D) to assess Network Rail enhancement costs, including notably direct and indirect costs, and risk uplifts, including non-rail comparators.

For the future, we would expect Network Rail to present asset category cost benchmarks, particularly for similar schemes, to check for consistency and potential outliers. Looking at asset types overall, not just estimate by estimate, will provide additional rigour and top-down comparisons to help in compiling the estimates, and provide robust internal assurance and peer review at portfolio level. The electrification portfolio represents a good example given its prominence in CP5 plans. We have conducted our own comparison of these schemes at Annex E1 and E2.

In addition, we would expect Network Rail to provide historical analysis of estimate of variances, comparing historical outturn costs compared with the cost estimates at each of the GRIP Stages along the way. Such



analysis would provide more meaningful adjustments for residual factors and 'optimism bias' rather than relying on apparently arbitrary uplifts dependent on GRIP Stage without consideration of comparable reference class project performance.

Network Rail has been building a Unit Cost Model (UCM) over the past 12-18 months, to create a tool to provide inputs to project estimating and support internal cost benchmarking. Our review has indicated that there has been limited use of the UCM in building the CP5 estimate, with little use in pricing schemes and relatively few projects that successfully used it – UCM reports were provided for only 11 projects. This appears to be a maturing system evidenced by a lack of a standard approach across the SBP portfolio, statements for some projects that the UCM has not been used because of the lack of data maturity. This has not been helped by the lack of maturity of the SBP portfolio. Whilst Network Rail expect the UCM has greater application at later GRIP phases it could have helped further in building the SBP estimate. We understand that this has not transpired due to limitations of the data sets available and issues with some data validity due, once again, to inconsistencies of cost capture at project level.

Key Finding 4: Opportunity for greater direct cost savings

Direct works combining contractor and Network Rail elements account for 48% of the £7.2bn scheme costs within our review. These are largely made up of track, civils and structures, electrification and plant, distribution, power supply, signaling, telecoms and property. We have made a limited number of cross-project (as opposed to project-specific) adjustments to applicable projects, as described below.

Electrification – we have undertaken a detailed review of direct costs for all electrification programmes, normalised for price base, as shown in E1 and E2. An adjustment is made for OLE costs for 'Series 2' schemes, applying a benchmark rate of █████ per single track kilometre (STK) for this common component of electrification schemes, which results in an adjustment up or down to seven schemes. STK quantities were also checked, and found to correlate very well with Network Rail's own estimates. No adjustments were made to the higher specification 'Series 1' OLE scheme costs due to insufficient data and higher development costs for this new specification, meaning that they are not comparable to Series 2. No other direct costs categories were adjusted, such as civils and power supply costs, as requirements vary considerably by project and location/context.

Power supply – we have also compared costs for bulk power supply across the SBP portfolio, for which several market-tested benchmarks exist. A summary of costs included within SBP cost estimates are included at Annex E3. As a result, we have made downwards adjustments to costs for two schemes (DP009 and DP021) where direct costs are higher than established rates. Other power supply components were examined but no clear rationale for adjustment could be made due to a lack of comparable information and notable project-specific differences.



It was not possible to identify further direct cost savings, in part because of a lack of data for 'amber' and 'red' projects defined previously. It is important to note, however, that we would expect further direct cost savings to feed through during the course of CP5 via the efficiency improvements described in Key Findings 6 and 7.

Key Finding 5: Opportunity for greater indirect cost savings

Indirect costs include contractor's preliminaries, overheads and profit; design; Network Rail management and sponsor costs and; provisions for TOC/FOC compensation. We have catalogued all indirect costs within the SBP and identified a number of themes that warrant adjustment. We have found that indirect costs account for 26% of the £7.2bn total scheme costs.

Overall we found levels of indirect cost are broadly in line with industry norms, as described in the Benchmarking Booklet (Annex D) and in Network Rail guidelines. However, when expressed as a percentage uplift on total direct costs, indirect costs vary considerably between projects. There are many examples of well-developed resource based estimates (such as Great Western electrification) and corresponding uplifts that give good assurance of efficiency. However, there are many other instances where high aggregate uplifts have been applied, for example Bristol Temple Meads passenger capacity (WW024).

For a number of schemes Network Rail has calculated direct costs via measured or unit rate based estimates, and then applied standard uplifts for indirect costs based on GRIP Stage norms. For example at GRIP Stage 2, this is typically 30% for contractor's indirect costs, and then 10% for design, 10% for management and 5% for access/compensation. Such uplifts create an indirect cost uplift equivalent to over 60%. i.e. for every £10m spend on direct costs, a further £6m is spent on indirect costs, before risk provisions are added. We have assessed the level of indirect and risk uplifts for all projects to identify 'outliers' which reveal high provisions compared to Network Rail norms and benchmarks (see Annex D). The projects that are candidates for indirect cost adjustment (up or down) are described in Section 5.

Key Finding 6: High risk provisions

Given the level of maturity of the SBP portfolio identified above, Network Rail's allowances for risk represent a significant percentage. The total risk budget within the £7.2bn is circa £1.7bn or 23% of the total (which represents 31% uplift on point costs).

We have assumed risk is and should be budgeted at the P80 level (i.e. an 80% probability that the project will be delivered within the risk adjusted price). Where evidence indicates the SBP estimate risk is at P50 we have proposed to increase Network Rail's risk provision accordingly. Similarly we have checked and challenged the appropriateness of risk provisions, notwithstanding whether they are at P80 levels.



Risk uplifts applied vary by project and by GRIP stage, for example 60% at Pre-GRIP and GRIP Stage 1, typically 30% at GRIP Stage 2 and 20-25% at GRIP Stage 3. We have made a number of adjustments to project risk provisions which are reported in Section 5. These can be summarised as follows:

- Individual project adjustment to risk uplifts where these are applied by Network Rail based on GRIP Stage norms, irrespective of project context and perceived level of cost certainty. This includes 21 projects which are reduced, and 4 projects where the risk provision is increased compared to Network Rail's SBP
- Network Rail has accounted for the effect of delivering a portfolio of enhancement projects and applied this as an overlay (reduction) to all schemes that were not committed prior to HLOS. This models the fact that the P80 risk-adjusted cost of a portfolio of independent projects is less than the sum of its individual constituent P80 project costs. As this statistical effect applies equally to any and all projects within the portfolio we have applied such 'portfolio risk' adjustment to all SBP projects for which an efficient price can be determined, and which are not at later stages of development. i.e. we consider that whether or not they featured in the HLOS is not relevant. In order to do this we modeled the approximate risk distribution across the portfolio of relevant projects using cautious and therefore robust assumptions (as described in Annex E6) to determine an independent estimate of the difference between the portfolio P80 and the sum of the project P80's. This data has been used to recalculate the overlay to be applied. The net impact has been to alter the overall reduction from Network Rail's 3.75% to a new result of 3.05% reflecting our conservative exclusion of the more uncertain (i.e. higher variance) Red and Blue projects, but noting also that this overlay is now applied to a greater proportion of the portfolio.

For the avoidance of doubt, no portfolio risk adjustments have been made to Red and Blue schemes. i.e. those schemes where there is insufficient clarity to enable meaningful adjustment of project risk. For these projects the most significant uncertainty is in relation to project outputs, scope and objectives rather than estimate accuracy. Where Network Rail had previously applied a portfolio risk adjustment, this has been removed, increasing the budgetary figure. There remains an important opportunity to manage these risks, but to make an adjustment at this stage could imply a spurious level of accuracy. For illustration purposes, if the portfolio risk overlay was applied to Red and Blue projects this would reduce Network Rail's costs by circa £24m.

Key Finding 7: Opportunity for greater efficiency savings

Network Rail's SBP included several documents setting out its efficiency proposals for CP5 enhancements⁸. This is consistent with the requirement set out by ORR as per its advice to Network Rail

⁸ SBPT3174 Enhancements Efficiency and Benchmarking Report Final, Benchmarking Report for NR Sweett UK Ltd.



summarised in Annex A. We have reviewed this analysis, which is comprehensive and constructive in defining efficiency targets for Network Rail. On the basis of this efficiency workstream Network Rail reports that it has applied a top-down efficiency overlay of 12% to all 'new' projects. We have, however, identified several issues with this work.

Firstly, there is a weak benchmark for the overlay. i.e. '*efficient compared to what?*'. Network Rail has not consistently created cost estimates based on benchmark rates and is often unable to do so for early stage or atypical schemes. The result is that the overlay is often effectively an assumed saving target on a cost estimate rather than a true efficiency. As noted in Key Finding 6 above, this is particularly so for early stage schemes with uplifts of up to 60% applied to them.

Network Rail has applied its overlay to 'new' projects that were not committed prior to the HLOS. We believe that whether or not a project appears in HLOS is not a valid reason for applying the overlay, and erroneously conflates two largely independent issues. In many cases SBP schemes are long running programmes that span the majority of CP5 (up to six years hence) and so are capable of deriving efficiency benefits during that time. To adjust for this we have applied the revised efficiency overlay to all SBP projects that are not at GRIP Stage 4 or beyond. This has resulted in application of efficiency overlay to nine additional projects. For those Red and Blue projects where Network Rail had applied the efficiency overlay, this has been removed, hence increasing the budgetary figure for the 10 projects affected. For illustration, if the efficiency overlay was applied to Red and Blue projects this would reduce Network Rail's costs by circa £24m.

We believe that this will require concerted effort and good engagement from Network Rail's centre throughout CP5 to ensure that the savings anticipated as a result of this efficiency challenge are realised.

We have found that Network Rail has mis-applied its efficiency overlay, reducing the effective impact – see Annex E6. The Network Rail analysis required application at in-year rates through CP5 of 4%, 8%, 11%, 16% and 19% to achieve a net 12% saving. Instead, the efficiency overlay has been applied at in-year rates of 1%, 2%, 4%, 7% and 12%. When applied to the sub set of 'new' projects, this has resulted in a net saving of 2% of the CP5 spend.

Network Rail's underlying analysis established three 'high-medium-low' efficiency scenarios of 9%, 12% and 19% respectively and their intention was to apply the medium case scenario of 12% average savings. We have found little evidence setting out how Network Rail plans to convert its efficiency into practical action for each specific project. The overlay has been developed centrally, and does not feature in any project documentation for specific SBP schemes. So whilst there is potential for improvement, this is at risk unless clear action plans are developed and cascaded to all projects, with results and learning shared and leadership and influence continuously applied through the Control Period. Consequently, we consider



it prudent to adopt the more cautious 9% average net impact scenario and have applied this in the cost adjustments described in Section 5.

Network Rail's efficiency reports states that the benefits anticipated are largely achieved in GRIP Stages 4 to 8 when Network Rail expects to estimate, procure and then assess post contract efficiency. Whilst we believe that this is robust and appropriate as targets for CP5, we also note that this overlooks further benefits that could be achieved at earlier stages, for example through:

- Optioneering, value engineering and value management
- Whole life cost analysis, which we acknowledge can increase as well as reduce costs
- Opportunity (as well as risk) management
- Innovation in development, contracting/procurement and in delivery
- Greater portfolio and programme management and procurement for complementary schemes.

We believe that these further efficiency opportunities for Network Rail's early stage projects mean that the 9% efficiency challenge to its projects is realistic and achievable.

This report proposes an alternative efficiency overlay profile, applied to a different sub set of projects, resulting in a net 6% saving of the CP5 spend.

Key Finding 8: Portfolio issues and opportunities

As part of our review we have looked strategically across Network Rail's enhancements portfolio and identified several important issues. Whilst these have not been used to propose specific adjustments to project costs, we suggest these issues are material and should be considered for the future. It is important to note, therefore, that this is an ambitious and challenging plan for CP5. Whilst the scale is not dissimilar to that for CP4, it represents a significant portfolio that is less mature than was the case at the same point in the previous Control Period.

Firstly, there does not appear to be a joined up, integrated specification and plan covering all infrastructure, rolling stock and depot changes included within the SBP submission (acknowledging this would not be expected for schemes in the early stages of development). This would give added assurance that scope and outputs are aligned and optimised. This is not helped by a lack of clarity and consistency in the way rolling stock and depot work and costs are treated across the portfolio – included for some schemes and not for others. Whilst there may be reasons for this, and acknowledging that this is for the industry not only Network Rail to address, there appears to be a risk that there are gaps in plans and costs required to



deliver CP5 outputs. A good example of this weak portfolio or route clarity is ECML which will be subject to a number of infrastructure, power, rolling stock, depot and enhancements in CP5 and beyond. For this route, there is no clear narrative on how these SBP programmes, and their outputs and costs, are aligned.

Secondly, there are notable concentrations in the scale of work being undertaken by Network Rail in CP5 that inevitably create deliverability risks, notwithstanding that there is good evidence that the challenge is understood in Network Rail's route plans. The most notable example is the Western route, which is responsible for delivery of 15 projects totalling over £3bn, including Reading, Crossrail, IEP, and several electrification schemes. This rises to c.£3.5bn (almost a third of the E&W SBP) if the Welsh Valley Lines and Western elements of the Electric Spine programme are included. Network Rail's Route Plan and our detailed review of DP001 provides evidence of the focus on and commitment to this major upgrade programme, but this undoubtedly represents a major challenge to efficient and timely delivery. Other notable examples are the LNE route (as noted above) and Midland route, both covering £2bn portfolios.

Thirdly, there is limited evidence of established portfolio and programme management activity to strengthen delivery plans for CP5. There are several opportunities for Network Rail in this regard. Most notably for the many electrification schemes. The scale of the programme represents a major challenge in CP5, for which Network Rail's delivery confidence is low⁹. We fully endorse its suggestion to develop and implement a national integrated plan and team, and believe that its establishment is an urgent priority. This plan will need to address whether delivering multiple programmes (most in parallel) is exacerbating deliverability risk or is a potential source of inefficiency. Optimising delivery plans across the portfolio may improve the picture, deal with interdependencies between schemes, make best use of resources (most notably the High Output Plant System which despite its high cost and value, is not proposed for use by any scheme other than Great Western), and finally ensure learning and practice from early schemes is systematically applied to those that follow. Other portfolio opportunities for eliciting cost efficiency appear to be:

- Power supply upgrade – this programme is generally at an early stage of development (as acknowledged by Network Rail), and has revealed inconsistencies in the quality of GRIP documentation and cost estimates. There is no clear explanation of requirements, which leaves doubts about the scope of work is needed. A top down view of this programme may help identify opportunities for cost savings
- Platform lengthening – whilst cost estimates are generally robust, and one of the few that exhibit good use of unit rates, there is insufficient evidence of Selective Door Opening (SDO) as a lower cost alternative to infrastructure solutions

9 Document ref. SBPT236.



- Leeds area – there a number SBP projects that contribute to the HLOS metric. There may be an opportunity to integrate and optimise this portfolio, possibly saving cost via reducing the overall infrastructure requirement.

Finally, the profile of Network Rail's CP5 expenditure illustrated in Section 2 shows costs falling significantly towards the end of the Control Period. This appears to be unrealistic for a portfolio that includes so many schemes that are at an early stage of development. There are several potential implications arising from this:

- Deliverability – if overly aggressive cost profiles reflect the same for scheme delivery plans then there is a high risk that project and programme timescales will slip, which could lead to increasing costs and wider implications for interdependent schemes and plans (including rolling stock) and delivery of HLOS outputs. A good example of this is Electric Spine and Waterloo (our 'Blue' projects), which are both at Pre-GRIP Stage and yet exhibit cost profiles befitting a scheme at a more mature stage of development
- Efficiency – a 'peaky' delivery plan is highly unlikely to represent the most efficient use of resources, both for Network Rail and its supply chain. This in turn may distort market supply and demand unnecessarily increasing cost of supply. We have not seen evidence that Network Rail and its supply chain has the resources to deliver this
- RAB finance charges required in CP5 may be over-stated reflecting the artificial early draw-down of finance.

We note that we do not believe that it automatically follows that Network Rail requires additional funding to manage deliverability risk. What is important in this regard is that Network Rail set out robust plans for efficient management and delivery, achievement of best value for money and dealing with delivery risk as part of its proposals for CP5.

We have concluded, via a high level sensitivity analysis on Network Rail's plans and cost profiles, that there is an opportunity for it to re-profile its CP5 enhancement expenditure. This is not simply a cashflow issue. Re-profiling may assist Network Rail in efficient delivery and help manage and mitigate delivery risk across its SBP portfolio associated with delivering all HLOS outputs by the end of the Control Period.



5. Cost adjustment summary

In this section of our report we define the proposed adjustments for each SBP project. These flow directly from the review process and activities described in Section 3, and the Key Findings and review themes identified in Section 4. The adjustments described in the pages that follow have been fed directly into our adjustment model. These are structured as follows:

- Data quality – to flag good practice as well as issues with the quality and completeness of SBP information that affect the review and may inform the treatment of these by the ORR in its Determination
- Omission/addition – adjustments to reconcile SBP figures with project estimates provided. i.e. to adjust costs both up and down
- Cost base – adjustment to ensure estimates correspond to the baseline price base or to remove escalation to future years embedded within the cost estimates. For the avoidance of doubt, we have assumed that the estimates provided should be in 4Q11 prices and that these correspond to the pre-overlay figures in the SBP. These figures are then uplifted to a 4Q12 cost base by the inflation component of Network Rail's overlay calculation, hence adding 3%. Consequently, where estimates have been provided in cost bases other than 4Q11 we have first adjusted to 4Q11 and then inflated to 4Q12 by adding 3%
- Direct cost – adjustment to contractor's costs, or Network Rail direct costs where applicable
- Indirect cost – adjustment to contractor's preliminaries, Schedule 4, etc.
- Risk – adjustment to calculated or assumed risk uplift levels and also application of the portfolio risk overlay
- Efficiency – application of the efficiency overlay. Note that this would be expected to derive savings in all cost categories



- Other – adjustment for project specific issues or opportunities that do not correspond to the general categories above, and that are considered important to flag to ORR.

We have structured the adjustment tables to replicate the project sequence as Network Rail set out in its SBP master cost spreadsheet. This begins with the England & Wales SBP, firstly Committed Projects, then Names Schemes, Priority 1 and Priority 2 HLOS Projects, and finally Third Party Funded projects. The adjustment tables for the Scottish SBP projects then follow. This sequence is shown overleaf, together with the colour-coded classification for each.

In addition to the description of the adjustments made for each project, we have summarised key project data and adjustment details as illustrated below.

SBP Details (4Q12)	£m	
GRIP stage	0(2)	← Network Rail reported GRIP Stage (apparent GRIP stage if different)
AFC		← Network Rail total enhancement cost, excluding renewals or other costs
CP5		← Network Rail CP5 post overlay costs (SBP submission)
CP5 adjusted		← Review Team’s proposed adjusted cost for CP5



SBP projects within the scope of the review

England and Wales

Ref.	Name	Page	Type
Committed projects			
DP001	GW Electrification (Paddington to Newbury, Oxford, Bristol, Cardiff)	36	Green
WW025	Bridgend to Swansea electrification	37	Green
NW002	East West Rail (committed scheme)	38	Green
DP003	Northern Hub (committed pre-HLOS)	39	Green
DP003	Northern Hub post-HLOS	40	Green
Various	IEP Programme (NE001, NE028, WW027)	41	Orange
DP022	North Trans Pennine electrification	42	Green
NE031	Micklefield - Selby electrification	43	Green
DP002	NW Electrification	44	Green, Orange
CR002	Reading station area redevelopment	45	Orange
WW001	Stafford area improvement scheme	46	Orange
WW002	West Coast Power Supply Upgrade	47	Green
Named schemes			
The Electric Spine			
DP005	MML electrification	48	Orange
NE032	MML Leicester Capacity (aka F2N Syston – Wigston)	50	Blue
NE003	Derby station area remodelling	49	Orange
WW005	Leamington to Coventry capacity	50	Blue
DP025	Oxford – Leamington – Coventry – Nuneaton electrification	50	Blue
SE025	Basingstoke to Southampton DC to AC conversion	50	Blue
NE029	MML Capacity (Bedford – Sharnbrook – Kettering – Corby) plus W12	50	Blue
DP026	Oxford – Bletchley – Bedford electrification	50	Blue
DP024	Basingstoke – Reading electrification	50	Blue
XXX	Overlay to bring electric spine forecast in line with DfT	50	Blue
Thames Valley			
NW013	Acton to Willesden electrification (WCML)	51	Green
NW012	Thames Valley Branches	52	Green
WW007	Oxford Station Area Capacity and Station Enlargement	53	Red



Ref.	Name	Page	Type
Midlands			
NW001	Walsall to Rugeley electrification	54	Green
Yorkshire			
NE021	Huddersfield station capacity improvement	55	Red
Airports & Ports			
WW029	Western access to London Heathrow Airport	56	Green
SE027	Service Improvements in the Ely Area	57	Orange
SE016	Redhill additional platform	58	Green
South East			
SE028	Waterloo	59	Blue
West			
WW009	Dr Days to Filton Abbey Wood capacity improvements	60	Green
WW024	Bristol Temple Meads passenger capacity (incl. Digby Wyatt Shed)	61	Green
Priority 1: Directly linked to delivery of HLOS capacity metric			
NE022	Micklefield turnback	62	Green
DP021	South London HV traction power upgrade	63	Orange
SE022	West Anglia main line capacity increase	64	Green
SE021	Bow Junction upgrade with Chelmsford & Wickford turnbacks	65	Orange
WW031	West of England DMU capability works	66	Green
NE026	South Yorkshire train lengthening	67	Orange
SE006	East Kent re-signalling phase 2	68	Green
NE004	Stevenage and Gordon Hill turnbacks	69	Orange
SE002	Reading, Ascot to London Waterloo train lengthening	70	Green
NE025	West Yorkshire train lengthening	71	Orange
SE011	Uckfield line train lengthening	72	Green
NE009	MML long distance high speed services train lengthening	73	Green/Red
NE030	East Leeds area	74	Red
WW032	Route gauge Clearance for different EMUs	75	Green
DP020	Bradford Mill Lane capacity	76	Orange
NE018	Leeds platform 0	77	Red
NE016	Leeds station capacity	77	Red
NE019	Leeds platform 17 lengthening	77	Red
NW006	Chiltern Main Line Train Lengthening	78	Orange



Ref.	Name	Page	Type
NE024	North West train lengthening	79	
SE026	New Cross Grid	80	
Priority 2: Linked to full delivery of HLOS capacity metric			
DP009	Anglia traction power supply upgrade	81	
DP008	Sussex traction power supply upgrade	82	
DP015	Wessex traction power supply upgrade	83	
SE018	London Victoria station capacity improvements	84	
DP011	Kent traction power supply upgrade	85	
DP007	LNE routes traction power supply upgrade	86	
Third party funded			
DP016	Welsh Valley Lines Electrification	87	

Scotland

Ref.	Name	Page	RAG
Other Scottish Projects			
SC002	Aberdeen to Inverness journey time improvements and other enhancements	89	
SC004	Rolling Programme of Electrification (Scotland)	90	
SC007	Carstairs journey time improvements	91	
SC011	Highland main line journey time improvements (phase 2)	92	
SC012	Motherwell area stabling	93	
SC013	Motherwell resignalling enhancements	94	
SC017	Edinburgh South Suburban Electrification	95	



England and Wales SBP



Great Western Electrification

The project is the 25kV AC electrification of the GWML from Maidenhead to Newbury and Oxford by December 2016, and to Bristol and Cardiff by December 2017. It is an integral part of the Great Western route upgrade, which includes Crossrail, Reading Station Area Redevelopment, signal renewals and the introduction of IEP trains and other EMU fleets on the newly electrified line. This scheme was reviewed at GRIP Stage 2, dated July 2012. GRIP Stage 3 was achieved April 2013.

Project	Description	SBP Details (4Q12)	£m
Name	Great Western Electrification	GRIP stage	2
Ref	DP001 (committed project, Western & Wales)	AFC	
Benefits/outputs	Train capacity uplift, frequency, journey time and carbon benefits, in combination with new electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Though the initial SBP submission was deficient, the project was subject to a detailed review of further high quality project documentation supplied by Network Rail (see Annex E4)		
Adjustment	Description		
Omission/addition	Network Rail confirmed it made an error in its submission. It added £17m scope but omitted £93m; compounding this with an erroneous amendment for WW025. This stemmed from a plan to allocate funds to CP6, which is at odds with the objective to deliver the scheme in CP5. This means that costs are significantly understated. To correct this we have added costs to CP5 and a provision assumed for CP6 for GRIP Stages 7-8 after CP5 outputs are delivered		
Cost base	Cost adjusted from 3Q12 to 4Q12 baseline. Network Rail's GRIP2 estimate included escalation, though this was correctly removed from its SBP estimate		
Direct cost	No adjustment to the comprehensive estimate, which includes the efficiency from the innovative High Output Plant (HOP) that delivers the OLE direct works		
Indirect cost	No adjustment		
Risk	A comprehensive register/QRA is in place, representing 23% of the AFC. The portfolio risk overlay was not applied within the SBP and has therefore been added, as per Key Finding 6		
Efficiency	Network Rail's efficiency overlay was not applied and has therefore been added, as described in Key Finding 7, and further via the detailed review of electrification in Annex E1		
Other	A check on route length 'STK' quantities revealed comparable results, though Network Rail may wish to check if some sections are slightly under-stated		
Other issue	Description		
Delivery	The project is part of a portfolio of related projects that comprise the GW upgrade, to be integrated and managed together. The full cost of the HOPS is allocated to DP001. This represents a clear efficiency opportunity for other electrification schemes – see Annex E1		



Bridgend to Swansea Electrification Project

The project is the 25kV AC electrification of the route from Bridgend to Swansea, which is anticipated to be completed by May 2018 to enable new electric trains to operate then. It is a more recently committed increment of the electrification of the GWML from London to Cardiff (DP001). The electrification of the 'infill' portion of the route between Cardiff and Bridgend is part of the Welsh Valley Lines Electrification, project DP016. This scheme was reviewed at a pre-GRIP stage of development.

Project	Description	SBP Details (4Q12)	£m
Name	Bridgend to Swansea Electrification	GRIP stage	0(2)
Ref	WW025 (committed project, Western & Wales)	AFC	
Benefits/outputs	Capacity uplift, frequency, journey time and carbon benefits, in combination with new electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Negligible information provided; limited to a high level summary estimate, notwithstanding that it has been contemplated for some time, as noted in the IIP. This renders review of the project difficult, most notably the direct costs assumed. Given development on DP001 being delivered with this project, there appears to be no reason why it cannot be considered as at GRIP2		
Adjustment	Description		
Omission/addition	Corrected the discrepancy in the SBP submission, by adding c.£3m to required costs		
Cost base	Cost adjusted from 2Q13 to 4Q12 baseline		
Direct cost	The assessment of costs per STK reveal that the high level estimate is not excessive, though includes several high-level provisions and 'pro-rata' costs – see Annex E1. This provides some assurance that the cost is appropriate notwithstanding the absence of quality cost data		
Indirect cost	No adjustment made. Costs per STK are low in comparison with other schemes, reflecting that is effectively part (Phase 10) of DP001		
Risk	The 32% uplift applied is adjusted to 25% to more closely align with DP001 of which it is part, and so effectively more mature than GRIP0. The portfolio risk overlay was not applied and has been added, as per Key Finding 6		
Efficiency	Network Rail's efficiency overlay was not applied and has therefore been added, as described in Key Finding 7, and further via the detailed review of electrification in Annex E1		
Other	Cost rates assumes conventional rather than high output ('HOPS') delivery, which is a further efficiency opportunity – see Annex E1		
Other issue	Description		
Delivery efficiency	The project is part of a portfolio of related projects (notably DP001) that comprise the GW upgrade, to be integrated and managed together		



East West Rail

This project provides additional network capacity by enhancing and reopening routes to provide direct connectivity between Oxford, Aylesbury, Milton Keynes and Bedford. This improved connectivity is designed to facilitate economic growth in the area through residential and commercial development along the line of route.

Project	Description	SBP Details (4Q12)	£m
Name	East West Rail	GRIP stage	0(4)
Ref	NW002 (committed project)	AFC	
Benefits/outputs	New journey opportunities through significantly improved connectivity, modal shift (road – rail) and economic growth	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Scheme is at GRIP Stage 4 level of development rather than the GRIP0 declared in the SBP. Good engineering and cost reports, though no schedule provided		
Adjustment	Description		
Omission/addition	Minor adjustment made to align SBP with Estimate Summary Report		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	Option 9 (a 1.5km loop on Aylesbury – P’Risborough) is included in the SBP. Information submitted does adequately justify selection rather than the more economical Option 10 (0.5km loop). As a result a negative adjustment of £16m has been made		
Indirect cost	Adjustment made to reflect costs from Option 9 to Option 10		
Risk	Manual risk adjustment made to reflect lower costs of Option 10. The portfolio risk overlay was not applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has not applied its efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



Northern Hub (Committed Pre-HLOS)

The Northern Hub project encompasses a series of interventions to improve the line capacity of lines between Sheffield, Manchester, Liverpool, Preston and Bradford. The pre-HLOS works include a new chord (link) to provide direct access between Manchester Piccadilly and Victoria, an additional line at Huyton, track doubling and other interventions to improve Journey times.

Project	Description	SBP Details (4Q12)	£m
Name	Northern Hub (committed pre-HLOS)	GRIP stage	2
Ref	DP003 (committed project)	AFC	
Benefits/outputs	New journey opportunities, passenger and freight capacity enhancement and journey time improvement, regional growth	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Significant un-collated data within the SBP. A meeting and correspondence with Network Rail helped unravel data. The GRIP2 reports are detailed and thorough, with recommended options for GRIP3 development. However there is inadequate justification for the selection of the 'most likely' options included in SBP costs, particularly as these are more expensive than the lowest cost options proposed for further evaluation at GRIP3. See Annex E5 for summary of costs		
Adjustment	Description		
Omission/addition	Significant cost transfer from Post to Pre-HLOS to reflect the classification shown in the estimate summary. Phase 1 land costs have been assumed to be a pre-HLOS element		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	Three of nine pre-HLOS schemes have achieved GRIP3. Lower cost options selected at Dore and Chinley, with the "most likely" option at Huyton Phase 1 unchanged. This questions the validity of the "most likely" scenario within SBP costs. An adjustment is made to reflect GRIP3 lower cost options at Dore and Chinley. In the absence of GRIP3 estimates for these schemes, this assumes GRIP2 estimates (with the risk allowance left at GRIP 2 levels)		
Indirect cost	No change made		
Risk	Applied risk is c.40%. There is inadequate information to justify this abnormally high risk allowance within the SBP submission. A manual risk adjustment has been applied to reduce risk to GRIP2 norm of 30%. The portfolio risk overlay was not applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has not applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



Northern Hub (post-HLOS)

The project includes additional capacity and connectivity improvements in the Manchester Area, notably capacity works in the Castleford Corridor, new platforms at Manchester Piccadilly and Manchester Airport, remodelling at Manchester Victoria and Oxford Road, and capacity improvements between Manchester, Liverpool, Rochdale and Chester.

Project	Description	SBP Details (4Q12)	£m
Name	Northern Hub post-HLOS	GRIP stage	2
Ref	DP003 (committed project)	AFC	
Benefits/outputs	Passenger and freight capacity enhancement and journey time improvements	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	As per the Pre-HLOS scheme, significant un-collated data requiring clarification with Network Rail. The GRIP2 reports are detailed and thorough, with recommended options for further development at GRIP3. However there is inadequate justification for the selection of the "most likely" options included in SBP costings, particularly as these are significantly more expensive than the lowest cost options proposed for further evaluation at GRIP3. See Annex E5 for summary of costs		
Adjustment	Description		
Omission/addition	Significant cost transfer from Post to Pre-HLOS to reflect the classification shown in the estimate summary. Phase 2 land costs, level crossings and provisional sums have been assumed to be post-HLOS elements		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	Emerging GRIP3 selection is confirming 'most likely' options assumed in SBP estimates. No adjustment made		
Indirect cost	No adjustment made		
Risk	Applied risk is c.40%. There is inadequate information to justify this high risk allowance.. A manual risk adjustment has been applied to reduce risk to GRIP2 norm of 30%. The portfolio risk overlay was not applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has not applied their efficiency overlay, which has been recalculated and applied as described in section Key Finding 7		
Other	None		
Other issue	Description		
Provisional Sum	Unable to determine adequacy of £14m provisional sum due to lack of detailed build up		



Intercity Express Programme (IEP)

The project comprises a package of gauge, track and platform enhancement on East Coast (NE001) and Great Western (W00027) routes, plus power supply improvements for East Coast (NE028) between London and Doncaster, to support deployment of IEP Super Express trains in CP5. IEP was nominally reviewed at GRIP Stage 2 though sub-projects are variously at GRIP Stages 1 to 5, as summarised in Annex E5.

Project	Description	SBP Details (4Q12)	£m
Name	Intercity Express Programme	GRIP stage	2+
Ref	NE001, NE028, WW027 (committed project)	AFC	
Benefits/outputs	Capacity, journey time, carbon and quality benefits via new trains and electrification	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Lack of transparency for a significant project with considerable development under its belt. Estimates with gaps in both GWML and ECML projects. See annex E5 for a summary of costs		
Adjustment	Description		
Omission/addition	£3m removed due to calculation error in NE001. This is reflected in the discrepancy in Network Rail's SBP spreadsheet. Note that WW028 was removed from the SBP submission by Network Rail as this was completed within CP4		
Cost base	Unchanged at 4Q12 baseline. Project NE028 estimate summary includes █████ of which █████ is estimated to be attributable to IEP and is therefore removed		
Direct cost	No adjustment made. NE028 contains a detailed estimate build-up for 90% of costs, with c.10% provisional sums. Partial estimate exist to support costs for NE001 and WW027		
Indirect cost	NE028 applies 32% uplift for contractor's preliminaries and a further 12% for Network Rail costs. These are conservative allowances and are dealt with via the efficiency overlay		
Risk	WW027s GRIP3 provision is a 21% uplift. Specific GRIP3 aspects of NE001 also at 20%. Uplifts for NE028 are not clear, with only a 5% programme risk visible, though historic GRIP3 estimates show uplifts of 22%. Overall, these appear reasonable and are therefore not adjusted. The portfolio risk overlay was not applied and has been added, as Key Finding 6		
Efficiency	Network Rail has not applied its efficiency overlay. This has been added as described in Key Finding 7 at one third of the nominal rate as key parts of the programme are at GRIP4+		
Other	Two 'third party' costs are: (1) the █████ contribution to NE028 by Thameslink and; (2) █████ allocated to WW027 for payment to BAA for use of OLE at Stockley		
Other issue	Description		
DP007	This project delivers ECML power supply improvements north of Doncaster		



North Transpennine Electrification

The project comprises the 25kV AC overhead electrification of the Manchester-Stalybridge-Leeds-York route ('Sections G1 to G5), delivering capacity and other benefits in combination with the introduction of new electric train services planned for the end of 2018. The Micklefield-Selby element of this programme is described in SBP project reference NE031. The project was reviewed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	North Transpennine electrification	GRIP stage	2
Ref	DP022 (committed project)	AFC	
Benefits/outputs	Capacity, journey time and carbon benefits, in combination with new electric rolling stock, plus lower whole life cost	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good, including a high VfM business case and robust option assessment backed up with a cost estimate		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	The project has a high unit cost (per STK) for OLE direct costs, which are therefore adjusted to the baseline of █████/STK, as described in Annex E1. This results in a decrease in costs allocated. No other direct costs are adjusted. Bulk power supply cost is comparable with risk adjusted benchmarks and so is not changed		
Indirect cost	No adjustment made – contractors prelims at 25% uplift, Network Rail at further c.9%		
Risk	The risk provision represents a 29% uplift, which is typical for GRIP2. The portfolio risk overlay was not applied and has been added, as per Key Finding 6		
Efficiency	Network Rail's efficiency overlay was not applied and has therefore been added, as described in Key Finding 7, and further via the detailed review of electrification in Annex E1		
Other	Cost rates are based on conventional not High Output Plant delivery. This represents a further potential efficiency opportunity – see Annex E1		
Other issue	Description		
Interfaces	There are notable interfaces with other projects plus also unexplained requirements for gauge/platform and depot works, for which no information is provided. i.e. there does not appear to be depot costs included within this estimate		



Micklefield – Selby Electrification

This project provides 25kV overhead electrification of the lines between Micklefield and Selby and, in conjunction with project DP022 supports the introduction of electric train operations for passenger and freight services between Leeds and York, and on ECML diversionary routes – all of which delivers capacity and other benefits for these routes.

Project	Description	SBP Details (4Q12)	£m
Name	Micklefield - Selby electrification	GRIP stage	0(2)
Ref	NE031 (committed project)	AFC	
Benefits/outputs	Capacity, journey time and carbon benefits, in combination with new electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Project is at GRIP 2 rather than the GRIP0 declared in SBP submission. Engineering and cost documentation is combined with DP022 with multiple option combinations making extraction of NE031 costs not straightforward. Various missing (blank) sections of GRIP2 report. However data provided was generally of a good quality		
Adjustment	Description		
Omission/addition	Minor reduction made to align the SBP with the estimate provided		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	The project has a high unit cost (per STK) for OLE direct costs, which are therefore adjusted to the baseline of █████/STK, as described in Annex E1. No other costs are adjusted		
Indirect cost	No adjustment made		
Risk	30% risk allowance is reasonable for a scheme at GRIP2 level of development and is unchanged. The portfolio risk overlay was not applied and has been recalculated and applied as per section Key Finding 6		
Efficiency	Network Rail's efficiency overlay was not applied and has therefore been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
Opportunity	Sections of this route have light passenger usage. There is an opportunity to undertake works in blockades or single line working to reduce costs which has not been explored		



North West Electrification

This project provides 25kV AC overhead electrification to routes in Manchester, Blackpool, Liverpool and Preston, delivering capacity and other benefits in combination with the introduction of electric train services.

Project	Description	SBP Details (4Q12)	£m
Name	North West Electrification	GRIP stage	3
Ref	DP002 (committed project)	AFC	
Benefits/outputs	Capacity, journey time and carbon benefits, in combination with new electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Significant differences between original project documentation/estimates and SBP submission, requiring reconciliation – summary included in Annex E5. No 1-page estimate summary produced by Network Rail		
Adjustment	Description		
Omission/addition	None		
Cost base	Uplifted to 4Q12 baseline		
Direct cost	Experience from Phase 1 and 2 works has been used to reduce costs. This project has a unit cost for OLE direct costs that is slightly lower than the baseline figure of █████/STK and is therefore adjusted as described in Annex E5. This results in an increase in the costs allocated for the Phase 4 main works. No other direct costs are adjusted		
Indirect cost	No adjustments made		
Risk	Phase 3 works have experienced risk reduction based on experience from Phases 1 & 2, whereas Phase 4 has not. Phase 4 tunnel work has a low risk allowance at 7.5% of point cost. Phase 4 OLE works have a high allowance at 36%. Both are adjusted to 20%, typical at GRIP 3, resulting in a reduction overall. No portfolio risk overlay was applied by Network Rail. This has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail did not apply the efficiency overlay to this project. This has now been added, as described in Key Finding 7		
Other	Cost rates are based upon conventional not High Output Plant delivery. This represents a further potential efficiency saving – see Annex E1		
Other issue	Description		
Provisional sums	There are large provisional sums for Blackpool sidings and a new feeder station. No detailed information has been provided on these elements and hence no adjustments made		

Notes

The programme is in four phases. Phases 1 & 2 and advance civils work for Phase 3 are the subject of separate ORR determination. This review comprises only Phase 3 main works and line speed enhancements, and Phase 4.



Reading Station Area Redevelopment

The project delivers significant improvements to capacity and performance at this major bottleneck on the Great Western Main Line, and so enabling the full benefits from IEP and electrification to be delivered. Major development work began in CP4, with several capacity outputs already successfully delivered. The project is at GRIP Stage 6, and scheduled to be completed in mid 2015. As a consequence, it is fully committed and has only 15% of costs that remain to be expended in CP5. Specific checks have been undertaken via ORR, to verify the cost of work done and forecast to the end of CP4, and the funds currently set aside for risk. This verified that the project's funding request for CP5 is appropriate, and in line with the project's progress, and current and forecast financial performance.

Project	Description	SBP Details (4Q12)	£m
Name	Reading Station Area Redevelopment	GRIP stage	6
Ref	CR002 (committed project, Western)	AFC	
Benefits/outputs	Capacity, availability and performance benefits for passenger and freight services, an enhanced station and new train depot (plus signalling and electrification works)	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Inadequate. SBP information was initially not supplied and, when addressed, this then contained no financial information to enable a review of scheme costs. The SBP spreadsheet also contains erroneous CP4 and AFC values		
Adjustment	Description		
Omission/addition	n/a – no information		
Cost base	n/a – no information		
Direct cost	n/a – no information		
Indirect cost	n/a – no information		
Risk	Risk within current cost analysis is reasonable at 10% of AFC for a project mid-way through GRIP6. The portfolio risk overlay has not been applied by Network Rail. This approach is supported given the late stage of development		
Efficiency	The efficiency overlay has not been applied by Network Rail. This approach is supported given the late stage of development		
Other	n/a		
Other issue	Description		
None	n/a		



Stafford Area Improvement Scheme

Infrastructure in the Stafford area has been identified as a capacity constraint on the West Coast Main Line, which limits the opportunity to fully exploit the capacity offered by the recent modernisation of the route and limits capacity to cater for future growth. The project delivers capacity improvements via a grade separated junction at Norton Bridge area, a 775m capable freight recess facility at Stafford Station and a series of line speed enhancements on the slow lines. The scheme was assessed at GRIP Stage 3.

Project	Description	SBP Details (4Q12)	£m
Name	Stafford area improvement scheme	GRIP stage	3
Ref	WW001 (committed project)	AFC	
Benefits/outputs	Capacity and journey time improvements	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	No engineering option data provided for LSI and re-signalling elements. The Final Option Selection report lists a series of intervention without sub-options or rationale for selection. Stage 4 estimates have been included, however the SBP is based on earlier Stage 3 estimates and there are significant unexplained changes. The absence of engineering data or evidence of requirements management means it is not possible to verify whether the requirements have been met		
Adjustment	Description		
Omission/addition	Adjustment made to align with the estimate provided at 1Q15		
Cost base	Adjusted from 1Q15 to 4Q12 baseline		
Direct cost	SBP is based on Stage 3 estimates. However later Stage 4 estimates are provided hence adjustments have been made to reflect these later estimates		
Indirect cost	Adjustments have been made to the indirect costs to reflect the later stage 4 estimates		
Risk	Risk has been adjusted to reflect the QRA figures provided with the later stage 4 estimates. Network Rail's portfolio risk overlay was not applied and has been recalculated and applied as per Key Finding 6		
Efficiency	Network Rail's efficiency overlay was not applied and has therefore been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



West Coast Power Supply Upgrade

This project will increase the capability of West Coast Main Line power supplies in support of the Stafford area improvements (WW001) and North West electrification (DP002). Phase 1 and 2 were completed in CP4. Phase 3 delivers an upgraded power supply across the balance of the route, and is to be completed in CP5. It will renew and upgrade the remainder of the 25kV equipment between North Wembley and Whitmore (Phase 3A) and between Whitmore and Great Strickland (Phase 3B) with an upgraded autotransformer power supply and distribution system. The project was reviewed at GRIP Stage 4.

Project	Description	SBP Details (4Q12)	£m
Name	West Coast Power Supply Upgrade	GRIP stage	4
Ref	WW002 (committed project)	AFC	
Benefits/outputs	Power to allow for increased electric services over WCML following Stafford and NW Electrification	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Adequate package of GRIP4 information provided, however information regarding value management, risks and assumptions were not included		
Adjustment	Description		
Omission/addition	Adjustment made to align with the estimate summary provided – c.£1m added		
Cost base	Estimate is at 2Q11, hence adjusted to align with 4Q12 baseline		
Direct cost	No adjustment made		
Indirect cost	No adjustment made		
Risk	Risk allowance is 8.5%, reflecting that costs and risks are well understood following completion of Phase 1 and 2. The portfolio risk overlay has not been applied by Network Rail – this approach is supported given the late stage of development		
Efficiency	The efficiency overlay has also not been applied. This approach is supported given the late stage of development for this project		
Other	None		
Other issue	Description		
Scope	It is reported that provision for growth in electric freight is no longer part of the scope defined by the DfT		



Midland Main Line Electrification

This Project is for the 25kV overhead electrification of the MML core routes including Bedford to Sheffield via Derby together with branches to Corby and Nottingham. This will allow electric train services to be introduced between London and major centres of population and economic activity in the East Midlands and South Yorkshire. The scheme was assessed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	MML electrification	GRIP stage	2
Ref	DP005 (Electric Spine)	AFC	
Benefits/outputs	Capacity, frequency, journey time and carbon benefits and economic growth, in combination with electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Interim Feasibility report provided without detailed back up, and signed off without apparently clarifying key issues. Business case is also of poor quality. Estimate summary methodology not adequately transparent. In particular there is no build-up of 556 STK quantity. Note that GRIP2 was not fully achieved as there are many residual scope issues. This is recognised via an interim GRIP 2X stage before GRIP3		
Adjustment	Description		
Omission/addition	Adjustment made to align with the estimate summary report		
Cost base	Adjusted from 3Q11 to the 4Q12 baseline		
Direct cost	No adjustment made		
Indirect cost	No adjustment made		
Risk	20% risk allowance is included, which appears low given the scheme is effectively at GRIP 1+ and 10% opportunities have already been assumed in figures. An adjustment has been made to increase the risk allowance to 25%. The portfolio risk overlay is applied, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	Note significant interfaces with other early stage projects risks omissions or double counting scope and costs		
Other issue	Description		
Business case	Costs appear to have escalated significantly. The business case needs reconfirming against an updated estimate which includes the current Client Requirements		
Scope	OLE quantities do not appear to account for Corby doubling and 4-tracking north of Bedford		



Derby Station Area Re-modelling

This project comprises track and signalling remodeling in the Derby station area in order to improve operational performance and flexibility by segregating services and removing the station bottleneck. It is regarded as a once-in-a-lifetime opportunity coincident with planned track and signalling renewals.

Project	Description	SBP Details (4Q12)	£m
Name	Derby Station area remodelling	GRIP stage	2
Ref	NE003 (Electric Spine)	AFC	
Benefits/outputs	Reduced journey time, improved performance and operational flexibility	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Information of mixed quality. Detailed estimate provided for option selected from value management review, but costs were not presented for options under consideration		
Adjustment	Description		
Omission/addition	None		
Cost base	Uplifted to 4Q12 baseline. Escalation to 3Q16 removed		
Direct cost	Reduction in structures cost to account for opportunity of lower cost option for Osmaston Road bridge. No other direct costs adjusted		
Indirect cost	Network Rail project management uplift at 13% exceeds norms and is adjusted to 10%		
Risk	30% risk provision included, which is typical for GRIP 2. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
Renewals dependency	The project is reliant upon planned track renewals in CP5 and advancing signalling renewals planned for CP6, but does not present the cost impact of these individual effects, instead only their overall contribution of [REDACTED]. No adjustments have been made in this area		



Electric Spine

The Electric Spine comprises the 25kV AC electrification of the corridor running from the south coast to Oxford, Bedford and, via the MML, to the East Midlands and Yorkshire, with a link from Oxford to the West Midlands and North-West. This will deliver significant capacity and other benefits to deal with growth in passenger and freight traffic. It was announced in the HLOS in July 2012, and is at an early stage of development. Seven projects are at Pre-GRIP; two others are at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	Electric Spine	GRIP stage	0
Ref	See projects listed in note below (named scheme)	AFC	
Benefits/outputs	Capacity, availability and journey time benefits, plus VfM and lower industry cost via deployment of electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Minimal information provided other than high-level cost estimates combined with a £635m overlay adjustment to bring the aggregate cost in line with DfT defined costs. i.e. there is significant uncertainty in costs for CP5. CP5 adjusted figure represents application of DfT CP5 figures in appropriate cost base – see Annex E6 for further detail		
Adjustment	Description		
Omission/addition	n/a		
Cost base	n/a		
Direct cost	n/a		
Indirect cost	n/a		
Risk	Network Rail has applied its portfolio risk overlay, though this adjustment has little meaning given the current status of the project and cost certainty. This is assessed as a 'Blue' project for which no adjustment is appropriate		
Efficiency	Network Rail has applied its overlay, though this 'efficiency' has little meaning given current status and uncertainty. This is assessed as a 'Blue' project with no adjustment is appropriate		
Other	Note that the review of DP005 and NE003 at GRIP2 are reviewed overleaf		
Other issue	Description		
Cost profile	Given the early stage of the project, deliverability in CP5 appears to be a significant risk		

Notes

NE032 – MML Leicester Capacity (F2N Syston-Wigston); WW005 – Leamington to Coventry capacity; DP025 – Oxford-Leamington-Coventry-Nuneaton electrification; SE025 – Basingstoke-Southampton DC to AC conversion; NE029 – MML Capacity (Bedford-Sharnbrook-Kettering-Corby) & W12; DP026-Oxford-Bletchley-Bedford electrification; DP024 – Basingstoke-Reading electrification, XXX – Overlay to bring electric spine forecast in line with the DfT



Acton to Willesden Electrification

The electrification of the Great Western Main Line (DP001) is such that 25kV overhead electrification of the infill between the GWML at Acton and the WCML at Willesden can provide additional flexibility for passenger and freight operators to run more efficient electric services via this link. The works also provide a connection to the West London Line at Willesden. Network Rail plan to complete this project by the end of CP5. It was assessed at GRIP Stage 2 though separately reported as Stage 0 by Network Rail.

Project	Description	SBP Details (4Q12)	£m
Name	Acton to Willesden electrification (WCML)	GRIP stage	0(2)
Ref	NW013 (named scheme, Thames Valley)	AFC	
Benefits/outputs	Operational flexibility for passenger and freight; also capacity and other benefits from electrification and new rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good GRIP2 cost estimate report provided, hence reviewed on the basis that this is at GRIP2 not as reported in above. Business case held by the DfT		
Adjustment	Description		
Omission/addition	None		
Cost base	Cost adjusted to 4Q12 baseline		
Direct cost	The project has the highest unit cost (AFC per STK) of any Series 2 scheme though, in part, this reflects the complexity of track layout and structures works. OLE direct costs are adjusted to the baseline of █████/STK, as described in Annex E1. This results in a decrease in costs allocated. No other adjustments are made		
Indirect cost	The 30% allowance for contractor's OHP is higher than the norm and particularly other electrification schemes. There is no evidence to justify this and so is adjusted to 25%		
Risk	The 30% uplift is consistent with those typically applied at GRIP2. This is adjusted to 25% reflecting the synergy/opportunity arising from the family of GW electrification schemes. Network Rail's portfolio risk overlay is already applied to the estimate as Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as Key Finding 7		
Other	Cost rates are based on conventional not HOPS delivery. This represents a further potential efficiency opportunity – see Annex E1		
Other issue	Description		
Delivery	The project is part of a portfolio of related projects (notably DP001) that comprise the GW upgrade, to be integrated and managed together, most notably with power and gauge works delivered via other projects		



Thames Valley Branches

The project will introduce 25kV overhead electric traction to the Thames Valley branch lines to Henley, Marlow and Windsor & Eton, with work on all three branches completed by the end of CP5. It represents a logical opportunity to deliver additional capacity and also operational flexibility on busy commuter routes, that is made possible by electrification of the Great Western Main Line (DP001) with which this project is closely related.

Project	Description	SBP Details (4Q12)	£m
Name	Thames Valley Branch (electrification)	GRIP stage	0
Ref	NW012 (named scheme, Thames Valley)	AFC	
Benefits/outputs	Capacity uplift, frequency, journey time and carbon benefits, in combination with new electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good GRIP2 cost estimate report provided for each branch line, hence reviewed on the basis that this is at GRIP2 not as reported in above. Business case held by the DfT		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	OLE direct costs are adjusted to the baseline of █████/STK for Series 2 works, as described in Annex E1. This results in an increase to costs allocated		
Indirect cost	The 30% allowance for contractor's OHP is higher than the norm and particularly other electrification schemes. There is no evidence to justify this and so is adjusted to 25%		
Risk	The 30% uplift is consistent with those typically applied by Network Rail at GRIP2. This is adjusted to 25% reflecting the synergy/opportunity arising from the family of GW electrification schemes. Network Rail's portfolio risk overlay is already applied to the estimate, adjusted as per Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as Key Finding 7		
Other	Cost rates are based on conventional not High Output Plant delivery. This represents a further efficiency opportunity – see Annex E1		
Other issue	Description		
Delivery	The project is part of a portfolio of related projects (notably DP001) that comprise the GW upgrade, to be integrated and managed together, most notably with power and gauge works delivered via other projects. No details have been supplied by Network Rail on rolling stock and depot delivery plans associated with the Thames Valley electrification		



Oxford Station Area Capacity and Station Enlargement

The scheme will improve capacity and capability on the Oxford Corridor via improvements to Oxford station platforms, bi-directional signalling between Didcot and Aynho Junction, signalling enhancement and line speed improvements. Costs also include for replacement of Botley Road Bridge which was instructed by DfT after development of the other interventions. The scheme was assessed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	Oxford Station Area Capacity and Station Enlargement	GRIP stage	2(0)
Ref	WW007 (named scheme)	AFC	
Benefits/outputs	Capacity and journey time improvements plus new station facilities and benefits for users	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	GRIP2 report lacks of clarity on conclusions and has an inadequate linkage to cost estimates. Not possible to reconcile scope against cost. Further to completion of GRIP2, [REDACTED] was added for Botley Road Bridge reconstruction "at DfT's request". This changes the options available and effectively resets this project to GRIP0. As a result it is not possible to determine an efficient cost and the project		
Adjustment	Description		
Omission/addition	Minor adjustment made to align with the Estimate Summary Report submitted		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustment made		
Indirect cost	No adjustment made		
Risk	The portfolio risk overlay was applied by Network Rail, and has been removed due to the status of the project as described in Key Finding 6 (this is a 'Red' project)		
Efficiency	Network Rail has applied their efficiency overlay, which has been removed due to the status of the project as described in Key Finding 7 (this is a 'Red' project)		
Other	None		
Other issue	Description		
Next steps	Given the issues described above this project requires re-evaluating by Network Rail and funders to clarify requirements scope and cost		



Walsall to Rugeley Electrification

Infill 25kV AC overhead electrification of the route between Walsall and Rugeley Trent Valley to facilitate conversion to electric train operation. This will provide the opportunity to reduce journey times and improve connectivity to the wider region, including longer distance destinations. Electrification also provides an electrified alternative/diversionary route to the Wolverhampton–Stafford route. The scheme was assessed at GRIP Stage 1.

Project	Description	SBP Details (4Q12)	£m
Name	Walsall to Rugeley electrification	GRIP stage	1
Ref	NW001 (named scheme)	AFC	
Benefits/outputs	Journey time and carbon benefits, in combination with new rolling stock. Alternative/diversionary electrified freight route	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good concise estimate and remit		
Adjustment	Description		
Omission/addition	£3m contractor's preliminaries costs were erroneously omitted and have been added to correct this		
Cost base	No adjustment made		
Direct cost	Civils costs amended to reflect the estimate back-up data. OLE direct costs are adjusted to the baseline of █████/STK for Series 2 works, as described in Annex E1, hence reduced costs allocated		
Indirect cost	Unchanged at 4Q12 baseline		
Risk	This is a relatively simple electrification scheme with well defined scope. The applied 60% uplift is considered excessive and has been reduced to 40% in line with similar provisions on other schemes. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
Opportunity	This route has light passenger usage. If freight issues can be overcome there is an opportunity to undertake works during blockades or single line working to reduce costs. This has not been explored in the documentation submitted		



Huddersfield Station Capacity Improvement

This scheme provides additional capacity at Huddersfield to maximise the value of TransPennine Electrification and allow longer trains to be used to meet the Leeds and Sheffield HLOS capacity metric. The scope of work includes potential extension of platforms and associated remodelling of the east end track layout. The scheme was assessed at GRIP Stage 1.

Project	Description	SBP Details (4Q12)	£m
Name	Huddersfield station capacity improvement	GRIP stage	1
Ref	NE021 (named scheme)	AFC	
Benefits/outputs	Increased capacity in combination with the deployment of longer trains	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Mixed quality. Sufficient documentation provided to clarify requirements at GRIP1 however the Sponsor's Instruction contains details of a different project all-together. The cost estimate summary report has no back-up to substantiate the figures provided. As a result it is not possible to determine an efficient cost and the project is classified as 'Red'		
Adjustment	Description		
Omission/addition	Minor adjustment made to align with the Estimate Summary Report		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustment made		
Indirect cost	No adjustment made		
Risk	This is a 'Red' project, so the Network Rail portfolio risk overlay has been removed, as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been removed as described in Key Finding 7, as this is classified as a 'Red' project		
Other	None		
Other issue	Description		
None	n/a		



Western Access to London Heathrow Airport

The scheme creates a new route from Heathrow Terminal 5, west from the airport to the Great Western Main Line. It has strong stakeholder support and is specified within the HLOS and Network Rail's RUS, as part of the long-term plans for the Greater Western route. Network Rail's SBP submission was assessed at GRIP Stage 2, dated February 2012. This anticipates development work and powers in CP5, with delivery completed in early CP6. The cost estimate within the SBP is based on Option 2B2 via the Langley Branch. This is one of the highest cost options, though is expected by Network Rail as likely to represent the best overall business case.

Project	Description	SBP Details (4Q12)	£m
Name	Western Access to London Heathrow Airport	GRIP stage	2
Ref	WW029 (named scheme, airports and ports)	AFC	
Benefits/outputs	Connectivity to/from the airport via a new rail link, providing capacity, frequency and journey time improvements, plus wider economic benefits	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	A good submission with a detailed GRIP2 report, cost estimate and business case		
Adjustment	Description		
Omission/addition	None		
Cost base	Escalation of 17.5% is included within the estimate and has been removed to ensure this is as per the required baseline price base excluding 'below the line' escalation		
Direct cost	None, noting good GRIP2 documentation and cost estimate		
Indirect cost	No adjustment		
Risk	Adjusted 40% uplift to the stated QRA value of 36%. This is still higher than Network Rail's GRIP2 norm of 30% but is considered appropriate given several technical and commercial risks faced. Network Rail's portfolio risk overlay is already applied to the estimate, re-calculated as per Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	None		
Other issue	Description		
Schedule	No rationale set out for the split between CP5 (40%) and CP6 (60%) expenditure. It is unclear what Network Rail expects to deliver by CP5 end, and whether its stated aim to complete the project in early CP6 is at risk		



Service Improvements in the Ely Area

This project comprises remodeling of Ely North junction and aim to achieve a doubling of train capacity on the following lines: Kings Cross / Cambridge – Kings Lynn; Cambridge – Norwich; Ipswich – Peterborough; Stansted – Birmingham.

Project	Description	SBP Details (4Q12)	£m
Name	Service Improvements in the Ely Area	GRIP stage	1
Ref	SE027 (named scheme, airports and ports)	AFC	
Benefits/outputs	Route capacity improvements by removing a track bottleneck affecting a number of routes and services	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Poor, with a low VfM business case, unclear option selection rationale and very high level cost estimate provided		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	Options 1 and 2 both of cost range █████ – but unclear whether viable stand-alone options. Option 3 cost range is █████ with mid-point of Option 3 figure of █████ used in SBP. Direct cost reduced by £1m to lower end of cost range, and opportunity saving of £1m included for solution nearer to combined option 1 and 2 costs		
Indirect cost	No estimate breakdown of direct v indirect costs provided. These will reduce 'pro-rata' , to the reduction in direct costs identified		
Risk	A 60% risk uplift has been applied by Network Rail, which is consistent with a GRIP 1 project norms. This is retained to cover current project uncertainty. The portfolio risk overlay was applied by Network Rail, and has been recalculated as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated as described in Key Finding 7		
Other	None		
Other issue	Description		
Business case	The project requirement includes achievement of a minimum benefit to cost ratio (BCR) of 2:1, but does not report this or explain how this will be achieved, although consideration of improved freight traffic is one factor		



Redhill Additional Platform

The project will deliver an additional 12-car platform at Redhill station by the end of CP5, as well as alternations to adjacent track and signaling infrastructure to compliment this. The scheme also facilitates the enhanced capability and resilience of operations on the main line needed to deliver full Thameslink KO2 services and outputs. The project was reviewed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	Redhill additional platform	GRIP stage	2
Ref	SE016 (named scheme, airports and ports)	AFC	
Benefits/outputs	Capacity for growth and performance at the station and on the main line from London to Redhill, Gatwick and Brighton	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Mixed. A good quality GRIP 2 report, though augmented by a GRIP3 cost estimate with different scope that undermines consistency and justification of incremental aspects		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	None		
Indirect cost	None		
Risk	Risk provision is appropriate at 23% of AFC within the GRIP3 estimate. Network Rail's portfolio risk overlay is already applied to the estimate, and is re-calculated as described in Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	Modest additional [REDACTED] costs for recovery of down-sidings are not adjusted/removed, though to note these are not part of or required for the enhancement scheme		
Other issue	Description		
Interface	The scheme is assumed within the Thameslink KO2 timetable planned for December 2018. This dependency will need to be managed to maintain alignment and efficient delivery		



Waterloo

A significant enhancement of Waterloo Station and its approaches is envisaged to deal with long-term growth at London's busiest rail terminus. This is expected to be a major programme of infrastructure work during CP5 and CP6. This scheme is at pre-GRIP Stage. The focus is on early development work and modelling of long-term strategic options, with highly uncertain scope, costs and outputs at this time. It is therefore not appropriate to determine an efficient price. The scheme is assumed to be treated differently for cost determination, with funding set at an amount needed to carry out development work, with further ORR scrutiny and (as necessary) governance and change control during CP5.

Project	Description	SBP Details (4Q12)	£m
Name	Waterloo	GRIP stage	0
Ref	SE028 (named scheme, south east)	AFC	
Benefits/outputs	Long-term capacity and capability for growth plus also integrated outputs with other major schemes	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	No information provided other than to confirm the CP5 provision was based on a DfT defined value. DfT documents confirmed this, and also scheme options ranging from █████ to █████. CP5 adjusted figure represents application of DfT CP5 figure in appropriate cost base – see Annex E6 for further detail		
Adjustment	Description		
Omission/addition	n/a		
Cost base	n/a		
Direct cost	n/a		
Indirect cost	n/a		
Risk	Network Rail has applied its portfolio risk overlay, though this has little meaning at current status and cost certainty. Assessed as a 'Blue' project for which no adjustment is appropriate		
Efficiency	Network Rail has applied its overlay, though this 'efficiency' has little meaning given current status and cost certainty. Assessed as a 'Blue' project for which no adjustment is appropriate		
Other	n/a		
Other issue	Description		
Cost profile	Network Rail's costs were uniformly spread over the Control Period. Given the early stage of the project, costs (once defined) would be more appropriately re-profiled with a greater proportion in latter stages of CP5, commensurate with what is realistically deliverable and needed to meet CP5 capacity output requirements		



Dr. Days Junction to Filton Abbey Wood Capacity

The 4-track enhancement of the Great Western at Filton Bank delivers significant capacity and other benefits, notably supporting delivery of full IEP outputs. It represents a unique opportunity schedule to integrate with and follow the re-signalling project upon which it depends, and still be completed before IEP deployment in 2017. This technically challenging, multi-disciplinary project was assessed at GRIP Stage 3.

Project	Description	SBP Details (4Q12)	£m
Name	Dr. Days Junction to Filton Abbey Wood	GRIP stage	3
Ref	WW009 (named scheme, western)	AFC	
Benefits/outputs	Capacity and journey time improvements, enabling additional train paths plus performance/availability (diversionary capability). A high VfM business case, held by the DfT	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Overall good, clear documentation, the one key exception being no detailed cost estimate, as would be expected for a scheme of this size and stage of development		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged as 4Q12 baseline		
Direct cost	None – this covers significant track, signalling, structures and station works. The GRIP3 narrative and costings during development give some assurance of estimating robustness in the absence of a detailed cost estimate		
Indirect cost	As a 39% uplift on direct cost, contractor's indirect costs are high and are adjusted to 30% (note that a further 17% Network Rail indirect costs are also added). This adjustment is made in combination with a higher risk provision and hence broadly balance out		
Risk	At 15% of the point estimate this appears low for a complex scheme with technical and schedule risks. This balances the very high indirect costs noted above, and hence is adjusted to 25%; noting also that the portfolio risk overlay is already applied as per Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is re-calculated and adjusted as per Key Finding 7		
Other	There is insufficient information to challenge the Schedule 4 cost. This is derived from a well-developed access plan though may be expected to piggy-back on some planned possessions		
Other issue	Description		
Delivery	The scheme is required to be delivered within a relatively narrow window to match timescales for Bristol area resignalling and IEP deployment. There was no evidence provided to confirm how this schedule/delivery risk is being managed		



Bristol Temple Meads Station Capacity (inc. Digby Wyatt Shed)

Passenger numbers at the station are forecast to increase significantly in CP5 and beyond, with the introduction of IEP (Super Express) services, and as a result of strong regional growth and a raft of other GW upgrade projects. The project improves passenger-handling capacity and also creates new capacity for additional IEP trains by acquiring and converting the Digby Wyatt shed into platform use. The project was assessed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	Bristol Temple Meads Station Capacity	GRIP stage	1(2)
Ref	WW024 (named scheme, western)	AFC	
Benefits/outputs	Capacity for new trains and passenger growth and enable delivery of full IEP benefits. Business case held by the DfT	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good quality, detailed GRIP2 submission for both passenger circulation (Elements 2, 4, 5, 6B, 6C, 7, 8) and new station/property elements (Option B4)		
Adjustment	Description		
Omission/addition	Network Rail centre has adjusted its costs to include █████ for Bristol south signal re-control. There is no explanation for this, though may be considered a provisional sum or contingency for works arising from the BASR renewals programme. It has not been removed		
Cost base	Escalation correctly removed from estimate by Network Rail. Minor adjustment made to property element of estimate (at 1Q12) to ensure as per 4Q12 baseline		
Direct cost	None		
Indirect cost	Contractor's indirect costs (as a % of point) are high at c.38% for the Wyatt Shed and 50% for station elements and hence adjusted to 30%		
Risk	The 30% uplift applied is as per other SBP schemes at GRIP2. This arbitrary application appears inappropriate. Proposed increase to 40% for the majority property/commercial element which is more at risk, and 20% for more certain and better developed passenger circulation works. Arguably the █████ sum referred to above is a contingency. Network Rail's portfolio risk overlay is already applied to the estimate, re-calculated as Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	None		
Other issue	Description		
Delivery	Notable schedule/delivery risk due to reliance on planning consents and land requirements, further compounded by significant interfaces to other GW schemes. It is not clear how this interdependency and risk is being managed		



Micklefield Turnback

Intervention is needed at Micklefield to allow the operation of a new peak hours shuttle service. The scope is for a new island station located to the west of the existing platforms, which would be then be closed. The new station would have two through-platforms with a central bay platform to allow turnback moves. The scheme was assessed at GRIP Stage 3.

Project	Description	SBP Details (4Q12)	£m
Name	Micklefield turnback	GRIP stage	3
Ref	NE022 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity to achieve the HLOS capacity metric into Leeds	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	A good quality submission containing a remit, Option Selection Report and GRIP 3 Estimate. No evidence of specific Value management being undertaken		
Adjustment	Description		
Omission/addition	Adjustment made to align with the Estimate Summary Report		
Cost base	Unchanged at baseline 4Q12		
Direct cost	No adjustments made		
Indirect cost	No adjustments made		
Risk	The risk provision of 10% appears to be too low for a new station at GRIP 3. This has been adjusted to 20% to align with GRIP 3 norms. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied as described in section Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



South London HV Traction Power Upgrade

Together with New Cross (SE026) the Wimbledon Grid point is approaching the limit of its capacity, having previously been the subject of renewals work in CP3. The CP5 project requires a new bulk supply point (via National Grid) plus upgrades to feeder connections associated with this and to deliver a resilient link to the enhanced New Cross grid point. This supports train lengthening and service enhancements across South London, and is part of a programme of power supply enhancements. It reviewed at GRIP Stage 1.

Project	Description	SBP Details (4Q12)	£m
Name	South London HV traction power upgrade	GRIP stage	1
Ref	DP021 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity and resilience for more trains to meet HLOS requirements on Southern, Wessex, Kent and Thameslink	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	A good strategy/remit. Otherwise high level information only, comprising a bulk supply point and feeder cables, to which a 60% uplift is applied		
Adjustment	Description		
Omission/addition	None		
Cost base	Adjusted to 4Q12 baseline		
Direct cost	█████ for a grid connection (plus a 60% uplift) at a total cost of █████ is very high in comparison with benchmarks, and is adjusted to █████. See Annex E3		
Indirect cost	Included within the direct cost – so adjustment for both is pro-rata to ensure £5m adjustment to point		
Risk	A 60% uplift is considered excessive where lower benchmark costs exist (see Annex E3) and is therefore amended to 40%. This lower figure is still higher than the 30% assumed by Network Rail in its former IIP estimate, and so is considered reasonable. Note that an adjusted bulk supply point cost would thus become █████. Network Rail's portfolio risk overlay is already applied to the estimate, adjusted as per Key Finding 7		
Efficiency	Network Rail's overlay is already applied to the estimate. This is re-calculated and applied as per Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



West Anglia Main Line Capacity Increase

The project delivers additional capacity to deal with forecast growth on the Lower Lea Valley portion of the WAML. This is achieved via a three/four tracking scheme, plus associated infrastructure works, that enables train services to be increased from 2tph to 4tph all day by 2017. The project was reviewed at GRIP Stage 1 having previously been at GRIP Stage 2 for a scheme option that could not be progressed.

Project	Description	SBP Details (4Q12)	£m
Name	West Anglia Main Line Capacity	GRIP stage	1
Ref	SE022 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity, frequency and journey time benefits, acceptable PPM levels. A high VfM business case is reported	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Poor submission, augmented via a separate SBP submission folder, though little quality consistent information provided, and a lack of clarity on scope and cost. It is not clear what measured scope Network Rail is seeking to deliver. Seemingly good business case though now superseded		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	None		
Indirect cost	These are high at 39% for contractor's OHP and a further 11% for Network Rail though are not adjusted in lieu of the risk adjustment described below		
Risk	Network Rail progressed its lower cost option (C2a) with the best business case to GRIP2, but found this created unacceptable performance issues. In reverting to the higher cost option (C2b) at GRIP1 Network Rail applied 60% rather than 40% uplift (AFC 2.5 times direct cost). This is considered conservative for an incremental option, and is re-adjusted to 40%. Network Rail's portfolio risk overlay is already applied to the estimate, adjusted as per Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	None		
Other issue	Description		
Interfaces	Power supply is via project ref. DP009. This CP5 enhancement is the first part of a longer term capacity scheme for the WAML route		



Bow Junction Upgrade with Chelmsford & Wickford Turnbacks

Overcrowding on the Chelmsford and Southend Victoria routes is reduced by optimising capacity released on the Electric Lines into Liverpool Street following diversion of most peak suburban services through the Crossrail tunnel from 2019. The project comprises performance improvements, upgrade of Bow Junction and provision of turnbacks in the Chelmsford and Wickford areas.

Project	Description	SBP Details (4Q12)	£m
Name	Bow Junction upgrade with Chelmsford & Wickford turnbacks	GRIP stage	0
Ref	SE021 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity improvements, provision of train stabling in Stratford / Temple Mills / Lea Bridge corridor	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Mixed quality. High VfM business case presented, although figures do not align with SBP submission which may affect this position. High-level estimate summary that does not give detailed build-up for individual cost components		
Adjustment	Description		
Omission/addition	None		
Cost base	Uplifted to 4Q12 baseline		
Direct cost	No adjustments made, with only high level data provided		
Indirect cost	No adjustments made		
Risk	A 60% risk uplift has been applied by Network Rail, which is consistent with Pre-GRIP project norms. The portfolio risk overlay was applied by Network Rail, and has been recalculated as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated as described in Key Finding 7		
Other	None		
Other issue	Description		
Assumption	The inclusion of a substantial cost element, circa █████, for High Meads sidings is not explained in the supporting documentation, but appears to relate to the train stabling requirement, and has been retained in the adjusted figure		



West of England DMU Capability Works

The electrification of the GWML and associated deployment of electric rolling stock will enable existing diesel (DMUs) to cascade to other parts of the Great Western route that will remain non-electrified in CP5. A programme of gauge and platform enhancements is required to facilitate this change. These are required to be delivered by 2016/17, in line with plans for the re-deployment of the fleet. This project was assessed at GRIP Stage 2 though reported by Network Rail as Stage 1.

Project	Description	SBP Details (4Q12)	£m
Name	West of England DMU capability works	GRIP stage	1(2)
Ref	WW031 (Priority 1 HLOS, Western & Wales)	AFC	
Benefits/outputs	Cost effective capacity via cascaded rolling stock and in combination with electrification/EMU deployment	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Adequate, comprising a GRIP2 (i.e. not GRIP1 report) and gauge analysis. The cost estimate is based on a clear scope though with high-level unit rates		
Adjustment	Description		
Omission/addition	Network Rail's SBP estimate correctly removes 'industry fee funds' included in the project cost estimate		
Cost base	Correctly inflated from 3Q09 to 4Q11 by Network Rail, and then to SBP 4Q12 baseline		
Direct cost	None – though see 'other' below		
Indirect cost	None – though see 'other' below		
Risk	A 60% uplift has been applied. The GRIP2 report states that 35% is appropriate given the level of development and cost certainty, hence an adjustment is made to 40%. Network Rail's portfolio risk overlay is already applied, once re-calculated and applied as per Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	Network Rail has not sought SBP funding for full project costs, with £4.5m omitted with no reason given. This is added back into the estimate (as a direct and indirect cost). This is not considered generous as it will provide for the apparent uncertainty in scope at some stations, and balances the adjustment made to risk uplift, hence no net change in the final amount		
Other issue	Description		
Schedule	Whilst the project is modest in cost and scale, there are no detailed delivery dates or evidence that franchise DMU fleet and depot changes are integrated to deliver the planned outputs		



South Yorkshire Train Lengthening

This project helps deliver the capacity metric on routes into Sheffield by extending platforms on eight stations to accommodate the subsequent introduction of longer trains operating on the route. It was reviewed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	South Yorkshire train lengthening	GRIP stage	2
Ref	NE026 (priority 1 HLOS)	AFC	
Benefits/outputs	Increased capacity in combination with longer trains	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Documentation covering the scope of work is poorly referenced, variously covering different lists of stations, making it unclear which are included. Individual engineering reports provided for only one station with no engineering backup for any others		
Adjustment	Description		
Omission/addition	Adjustment made to align costs to the P80 total from the QRA		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustment made		
Indirect cost	No adjustment made		
Risk	The 32% risk allowance is comparable to GRIP2 norms and hence no adjustment is made. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
Opportunity	Opportunities for SDO have not been assessed with no reason given		



East Kent Resignalling Phase 2

The enhancement project is being delivered as part of a larger re-signalling renewals scheme with a combined AFC of over [REDACTED]. It comprises a package of enhancements, including platform extensions, signaling headway improvements, a new turnback facility and a completely new station at Rochester. These are all planned to be delivered by the end of 2016, ahead of the Thameslink KO2 service changes. The project was reviewed at GRIP Stage 3.

Project	Description	SBP Details (4Q12)	£m
Name	East Kent Resignalling Phase 2	GRIP stage	3
Ref	SE006 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity enhancement, journey time improvement and capability plus reduced operational cost	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Adequate summary of costs, comprise the sum of 10 separate estimates, though gaps in detailed estimate for some items and an out of date, albeit very high VfM business case		
Adjustment	Description		
Omission/addition	None		
Cost base	Assumed to be at 1Q12 and hence adjusted to 4Q12 baseline. Escalation within Rochester Station costs removed		
Direct cost	None		
Indirect cost	None		
Risk	The total risk provision is equivalent to a 13% uplift. This is relatively low, but is not adjusted as this forms part of a wider programme with obvious synergy and opportunity to manage delivery efficiently. Network Rail's portfolio risk overlay is already applied to the estimate, re-calculated as Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	No evidence to substantiate the CP4 (20%) v CP5 cost split (80%)		
Other issue	Description		
None	n/a		



Stevenage and Gordon Hill Turnbacks

To provide increased capacity on the Moorgate – Stevenage routes, it is proposed to run trains at increased frequency. To minimise the number of additional trainsets required to achieve this (eight reduced to four), a new turnback facility is proposed at Stevenage and at Gordon Hill on the Hertford Loop. The Stevenage works may require a further intervention at Langley Junction. The scheme was assessed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	Stevenage and Gordon Hill turnbacks	GRIP stage	2
Ref	NE004 (Priority 1 HLOS)	AFC	
Benefits/outputs	Increased capacity and train frequency, and to reduce the number and cost of additional train-sets required	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	The appraisal summaries are very thorough analyses of the business cases for the two schemes. There is, however, no engineering design provided with which to validate the cost estimates		
Adjustment	Description		
Omission/addition	Minor adjustment to align with the Estimate Summary Report		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustment made		
Indirect cost	No adjustment made		
Risk	The 40% risk uplift is higher than GRIP2 norms and is not adequately justified. This is reduced to 30% in line with similar schemes at this level of development. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



Reading, Ascot to Waterloo Train Lengthening

The provision of longer platforms at 11 stations on the Reading to Waterloo line by 2019 will enable longer trains to operate, increasing this from 8-car to 10-car capability. The project was previously removed from the scope of the SBP for CP4. The project was reviewed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	Reading, Ascot to Waterloo Train Lengthening	GRIP stage	2
Ref	SE002 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity via the introduction of 10-car trains, linked to HLOS metric	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	A good GRIP2 report, estimate and UCM though no business case provided		
Adjustment	Description		
Omission/addition	Noted that an additional (high cost) station has been added since IIP		
Cost base	Correctly inflated from 1Q11 to the 4Q12 baseline by Network Rail		
Direct cost	A review of direct platform costs shows these are higher than Network Rail's estimating methodology benchmark though not significantly so, hence no adjustment is made		
Indirect cost	These are set at conservative levels, equivalent to 75% uplift on base construction cost, one of the highest levels within the SBP. Adjusted to 60% as per SE011		
Risk	A 51% uplift has been applied by Network Rail. This is significantly higher than GRIP2 norms and not justified for a well defined platform scheme. This is adjusted to 30% (QRA most likely value). Network Rail's portfolio risk overlay is applied to the estimate, as per Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	None		
Other issue	Description		
Options	Opportunities for SDO have not been assessed with no reason given. There would appear to be a business case for this as a lower cost solution for some stations that will lighter passenger loading		



West Yorkshire Train Lengthening

This project helps deliver the HLOS capacity metric on routes into Leeds by extending platforms on approximately 30 stations by the end of CP5 to accommodate the introduction of longer trains. It was assessed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	West Yorkshire train lengthening	GRIP stage	2
Ref	NE025 (Priority 1 HLOS)	AFC	
Benefits/outputs	Increased capacity in combination with longer trains	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Documentation covering the scope of work is poorly referenced, variously covering different lists of stations, making it unclear which are included. Individual engineering reports are provided for only 10 out of the 36 stations. These are civils based with poor quality statements on signalling which should have been more thoroughly dealt with at GRIP2		
Adjustment	Description		
Omission/addition	Adjustment made to align costs to the P80 risk figure submitted by Network Rail		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	The cost estimate includes costs for all 36 stations but Option 1 requires work at 33 and Options 2 and 3 require 29 stations to be modified. Costs have been adjusted on the basis of Option 1 scope of work		
Indirect cost	No adjustment made		
Risk	The 32% risk allowance is comparable to GRIP2 norms and hence no adjustment is made. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
Opportunity	Opportunities for SDO have not been assessed with no reason given		



Uckfield Line Train Lengthening

The project comprises the lengthening of platforms and associated signaling changes at eight stations on the Uckfield branch. This will enable 10-car services to operate into London by the end of CP5 as part of the post Thameslink KO2 timetable. The scheme was reviewed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	Uckfield Line Train Lengthening	GRIP stage	2
Ref	SE011 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity for the introduction of 10-car DMUs, plus passive provision for possible future electrification	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good GRIP2 report, UCM and high VfM business case		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged as 4Q12 baseline		
Direct cost	A review of costs shows these to be very similar to Network Rail's estimating methodology benchmark for platform lengthening, which shows a good UCM correlation, hence no adjustment is made		
Indirect cost	None. These are set at reasonable levels		
Risk	The risk uplift applied is low at 17% of the point cost. This is not adjusted upwards as this was submitted as a GRIP3 cost, is technically straightforward and as SDO opportunities remain. Network Rail's portfolio risk overlay is already applied to the estimate, re-calculated as per Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



MML Long Distance High Speed Services Train Lengthening

Longer trains are proposed on MML to accommodate forecast levels of passenger growth and reduce crowding on long distance 'high speed' services between London St. Pancras and Nottingham, Derby and Sheffield. This project provides the necessary infrastructure modifications to accommodate the longer trains, including platform extensions, new footbridges, operation control measures and minor signalling changes. This project, which will be completed by the end of CP5, was assessed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	MML long distance high speed services train lengthening	GRIP stage	2(0-2)
Ref	NE009 (Priority 1 HLOS)	AFC	
Benefits/outputs	Increased capacity in combination with the deployment of longer trains	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good GRIP 2 level engineering and cost documentation for station works. However depot works have not been defined, and are effectively at GRIP 0		
Adjustment	Description		
Omission/addition	Adjustment made to align SBP with the Estimate Summary Report		
Cost base	Adjustment made from 3Q11 to the baseline at 4Q12		
Direct cost	No adjustments made		
Indirect cost	No adjustments made		
Risk	The 45% risk provision is has not been adequately justified and is considered excessive for platform and associated structural works at GRIP2. This is reduced to 30% GRIP2 norms for the platform works and retained at 45% for the depot works. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
Depots	█ direct cost for depots (approximately █ after uplifts) is a high-level provision with no back-up. Further work is required to substantiate this		
Opportunity	Further use of SDO at higher cost stations should be explored		



East Leeds Area

The scheme contributes to the delivery of the HLOS capacity metric into Leeds through enhanced capacity interventions on the eastern corridor. The feasibility study will determine the exact scope of works, with options to be considered that may include improved access to/from Neville Hill and layout improvements at Micklefield Junction. The scheme was assessed at Pre-GRIP Stage and is assumed to be completed by the end of CP5.

Project	Description	SBP Details (4Q12)	£m
Name	East Leeds area	GRIP stage	0
Ref	NE030 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity in Leeds and approaches to deliver the CP5 HLOS metric	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Only documentation is a one-page description. A high level estimate is provided based on NE022 Micklefield turnback. However this is not appropriate as the scope is different (e.g. no new station involved). As a result it is not possible to determine an efficient cost and the project is classified as 'Red'		
Adjustment	Description		
Omission/addition	n/a		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	n/a		
Indirect cost	n/a		
Risk	Network Rail has applied its portfolio risk overlay, though this adjustment has little meaning given the current status of the project and cost certainty, and is therefore deleted – this is a 'Red' project		
Efficiency	Network Rail has applied its overlay, though this 'efficiency' has little meaning given the current status of the project and cost certainty, and is therefore deleted as this is a 'Red' project		
Other	None		
Other issue	Description		
Next steps	Given the issues described above this project requires re-evaluating by Network Rail and funders to clarify requirements scope and cost		



Route gauge clearance for different EMUs

The project comprises a programme of platform extensions to provide for up to 12-car train operations. It is integral with the electrification of the Great Western Main Line and Thames Valley branches, which will see new and longer electric rolling stock cascaded on the route to deal with forecast growth. It is part of wider programme of platform works that will see similar works undertaken elsewhere on the route by Crossrail and IEP. The project was assessed at Pre-GRIP Stage, though appears as GRIP Stage 1.

Project	Description	SBP Details (4Q12)	£m
Name	Route gauge Clearance for different EMUs	GRIP stage	0(1)
Ref	WW032 (Priority 1 HLOS, Western & Wales)	AFC	
Benefits/outputs	Capacity uplift delivered in combination with the introduction of new electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Adequate. A thorough GRIP1 report and station by station platform lengthening summary, together with unexplained gauge related documents that do not feature in costs at all, rendering this an unclear submission		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged as 4Q12 baseline		
Direct cost	The estimate is based on a unit cost for platform extensions that compare favourably with Network Rail's enhancements estimating methodology. It states clearly, however, that it includes work and costs that are delivered and funded by Crossrail and IEP. On this basis costs are over-stated by one third and are adjusted as such		
Indirect cost	None – this is part of the unit cost applied to direct costs above		
Risk	A 60% uplift has been applied in line with Network Rail's approach for GRIP1 projects. This is not adjusted as the overall unit rate inclusive of this uplift is reasonable when compared to other projects and considering that signalling, telecomms and depot interface works may also be required. Network Rail's portfolio risk overlay is already applied to the estimate, though is re-calculated as per Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7. The estimate is based on the maximum 12-car working and acknowledges opportunities for efficiencies via SDO and integrating work into other GW programmes		
Other	None		
Other issue	Description		
Scope	Refer to GRIP1 report plus DP001, WW027, NW012 and CR001 for stations affected		



Bradford Mill Lane Capacity

To achieve the HLOS capacity metric into Leeds an additional hourly service is proposed to operate from Halifax to Leeds. This project, to be completed by the end of CP5, remodels the approaches to Bradford Interchange to allow parallel moves from Leeds and Halifax. The scheme was assessed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	Bradford Mill Lane capacity	GRIP stage	2
Ref	DP020 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity and frequency uplift for passenger services to achieve HLOS metric	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good quality submission		
Adjustment	Description		
Omission/addition	Adjustment made to align costs with the Estimate Summary Report		
Cost base	Adjustment made to inflate figures from 2Q11 to baseline of 4Q12		
Direct cost	No adjustment made		
Indirect cost	No adjustment made		
Risk	QRA provides a 52% risk allowance. Although this is high for a GRIP2 scheme it makes some provision for additional costs to resolve the freight issue noted below. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
Scope	Proposed solution is non-compliant with the remit as it does not accommodate existing freight services (FOC compensation or additional cost to re-locate turnback moves)		
Business case	The business case developed in the RUS (BCR 2:1) is unlikely to be still valid due to significant increase in AFC from [REDACTED] to [REDACTED]		



Leeds Station Capacity

To help deliver the HLOS capacity metric into Leeds, additional platform capacity is required at Leeds Station. Options being developed by Network Rail include: increasing capacity in low-numbered platforms 1-5; increasing the operational length of platform 17 and; creation of an additional through-platform by joining platforms 13 and 14. The scheme was assessed at Pre-GRIP Stage.

Project	Description	SBP Details (4Q12)	£m
Name	Leeds Station Capacity	GRIP stage	0
Ref	NE016, NE18, NE19 (priority 1 HLOS)	AFC	
Benefits/outputs	Capacity and facilities for users at Leeds Station to deliver the CP5 HLOS metric	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Option selection reports provided in 2009 do not align with the 2011 Client Remit, which itself does not align with the SBP. The one page summary notes that the total value of these three schemes should be approximately █████ rather than the █████ in the SBP. It is unclear what the current scope of work now. As a result it is not possible to determine an efficient cost and the project is classified as 'Red'		
Adjustment	Description		
Omission/addition	SBP figures amended to reduce to █████ for all three schemes in line with Network Rail's one page summary		
Cost base	No adjustment made		
Direct cost	No adjustment made		
Indirect cost	No adjustment made		
Risk	Network Rail has applied its portfolio risk overlay, though this adjustment has little meaning given the current status of the project and cost certainty, and is therefore deleted – this is a 'Red' project		
Efficiency	Network Rail has applied its overlay, though this 'efficiency' has little meaning given the current status of the project and cost certainty, and is therefore deleted as this is a 'Red' project		
Other	None		
Other issue	Description		
Next steps	Given the issues described above this project requires re-evaluating by Network Rail to clarify requirements scope and cost		



Chiltern Main Line Train Lengthening

This project comprises platform extensions on the Chiltern Main Line to facilitate 9-car train lengthening for delivery of increased capacity into London Marylebone. Platform extensions are expected at Beaconsfield, Bicester North, Haddenham and Thame Parkway, High Wycombe, and Princes Risborough.

Project	Description	SBP Details (4Q12)	£m
Name	Chiltern Main Line train lengthening	GRIP stage	0
Ref	NW006 (Priority 1 HLOS)	AFC	
Benefits/outputs	Increased capacity in conjunction with additional rolling stock to be provided outside of this project	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Some detailed scope documentation, although this does not align with high level scope and estimate summaries. Estimates provided have been based upon 'average scope from previous works on the same line' and are at a very high level only		
Adjustment	Description		
Omission/addition	None		
Cost base	Adjusted to 4Q12 baseline		
Direct cost	Costs for Gerrards Cross removed as not in scope, resulting in a reduction of £0.5m. Costs for Bicester North and Haddenham and Thame Parkway are high compared with other stations, without justification. These are altered in line with estimates for Beaconsfield, Princes Risborough and Network Rail expected platform extension lengths, with a reduction of £1.3m		
Indirect cost	Reduced on a pro-rata basis as a consequence of alteration to direct costs identified		
Risk	A 60% risk uplift has been applied by Network Rail, which is consistent with Pre-GRIP 0 project norms, and is appropriate given uncertainty over SDO solutions. The portfolio risk overlay was applied by Network Rail, and has been recalculated as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated as described in Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



North West Train Lengthening

Longer trains are proposed on routes into Liverpool and Manchester to accommodate forecast levels of passenger growth and to reduce crowding. This project provides the necessary infrastructure modifications to accommodate the longer trains, including platform extensions, new footbridges, operation control measures and minor signalling changes. This project was assessed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	North West train lengthening	GRIP stage	2
Ref	NE024 (Priority 1 HLOS)	AFC	
Benefits/outputs	Increased capacity in combination with the introduction of longer trains	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	GRIP 1-3 report referred to in the Sponsor's Instruction, and PRS are not provided. The scope is inconsistent between documents (the list of stations covered in the GRIP 2 report differs from those on the cost estimate). The list of stations in the estimate are assumed to be correct		
Adjustment	Description		
Omission/addition	Adjustment made to align with the Estimate Summary Report		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustments made		
Indirect cost	No adjustments made		
Risk	The 60% risk allowance has not been adequately justified and is considered excessive for platform and associated structural works at GRIP2. This is reduced to 30% in line with GRIP2 norms for platform works. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied as described in Key Finding 7		
Other	None		
Other issue	Description		
Scope	The scope is inconsistent between the documents (the list of stations covered in the GRIP2 report differs from those on the cost estimate). No allowance made for Hadfield - Dinting – Glossop – Manchester rail capacity improvements – SBP states “scope to be identified”. Opportunities for SDO have not been assessed in the documentation with no reason given		



New Cross Grid

The project is to replace and increase the capacity of the New Cross Grid from 66kV to 275kV. It forms part of a wider programme of power supply enhancements across south London, required to deal with long term growth in services. The scheme commenced in CP3 and is scheduled to be completed and commissioned in early CP5. It was reviewed at GRIP Stage 4.

Project	Description	SBP Details (4Q12)	£m
Name	New Cross Grid	GRIP stage	4
Ref	SE026 (Priority 1 HLOS)	AFC	
Benefits/outputs	Capacity and resilience for more trains to meet HLOS requirements on Southern, Wessex, Kent and Thameslink	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Poor. A rationale for the project and a summary estimate is provided, though no detail and backup for the CP5 funding requirement. There is some assurance as the request for funding is for a minority (c.20%) component of the combined renewals/enhancement scope		
Adjustment	Description		
Omission/addition	Minor increase to remove █████ of renewals costs from gross cost whereas Network deducted fractionally less than this (all costs above are for enhancements only)		
Cost base	Network Rail reportedly deflated the estimate from 2Q14 to 4Q11, whereas we believe they were already at 1Q12 prices, hence small increased adjustment		
Direct cost	None		
Indirect cost	No adjustment – these are typical at c.25% of construction (National Grid works as direct cost)		
Risk	The risk uplift applied is appropriate at c.13%. The portfolio risk overlay has not been applied by Network Rail – this approach is supported given the late stage of development		
Efficiency	The efficiency overlay has also not been applied. This approach is supported given the late stage of development for this project		
Other	Noted that the SBP for CP4 refers to this scheme, the cost and timescales for which appear to have grown since its conception in 2008		
Other issue	Description		
Renewals	To note that of █████ AFC, █████ is for enhancements and █████ renewals		



Anglia Traction Power Supply Upgrade

The proposed scope is for two new 400kV bulk supply points and upgrades to a further two existing grid points. This additional power supply is required to support enhanced electric train services to deal with passenger growth on the Great Eastern and West Anglia Main Lines during CP5. The project was assessed at pre-GRIP (Stage 0).

Project	Description	SBP Details (4Q12)	£m
Name	Anglia Traction Power Supply Upgrade	GRIP stage	0
Ref	DP009 (Priority 2 HLOS)	AFC	
Benefits/outputs	Capacity to meet HLOS requirements for more train services on Great Eastern and WAML, and as a result of Thameslink	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good clarity on requirements and evidence of refining (reducing) options/scope. High level estimate summary only, for 2 new bulk supply points at Springfield and Brimsdown and two upgrades at Ugley and Milton		
Adjustment	Description		
Omission/addition	Network Rail has added £4m to offset the efficiency overlay noted below, as one supply point is carried out by the Thameslink Programme in 2017-18. This adjustment is removed as spurious – it should not cost £4m more if delivery is by another project (if so then why do it?)		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	■■■■ for a bulk supply connection (plus a 60% uplift) at a total cost of ■■■■ is very high in comparison with benchmarks, and is adjusted to ■■■■ – see Annex E3. Costs for upgraded connections are not adjusted		
Indirect cost	Included within the direct cost – so adjustment for both is pro-rata to ensure £5m adjustment to point per supply point		
Risk	A 60% uplift is considered excessive where lower benchmark costs exist (see Annex E3) and is therefore amended to 40%. Note that the adjusted cost for a risk adjusted bulk-supply would thus become ■■■■ Network Rail's portfolio risk overlay is already applied to the estimate, which is re-calculated as per Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	None		
Other issue	Description		
Portfolio	The Anglia PSU is part of a portfolio of power supply enhancements by Thameslink, Crossrail and LNE routes – there appears to be opportunity to manage and deliver these in an integrated and efficient manner		



Sussex Traction Power Supply Upgrade

The project delivers a programme of enhancements to DC power supply equipment associated with the provision of longer trains and the implementation of the post Thameslink KO2 timetable improvements at the end of 2018. This includes work in five areas; Gatwick-Brighton, West Coastway, Sutton corridor, the Purley area and main line suburban routes that are proposed to be completed by the end of CP5. The project was reviewed at GRIP Stage 1.

Project	Description	SBP Details (4Q12)	£m
Name	Sussex Traction Power Supply Upgrade	GRIP stage	1
Ref	DP008 (Priority 2 HLOS)	AFC	
Benefits/outputs	Capacity to meet HLOS requirements for longer train services on Sussex and as a result of Thameslink	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good remit and underpinning (high VfM) business case for the train lengthening/power programme, based on the same scope and costs as per the SBP submission. High level point, indirect, uplift, civils and power costs for each of five geographic project elements		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline (reported as 2011/12 prices)		
Direct cost	No adjustment is made		
Indirect cost	These are high in comparison with SBP norms when assessed via benchmarking analysis though the treatment of this is wrapped up in the risk adjustment below		
Risk	A 60% uplift is applied – contrasting the low 8% value in the estimate breakdown. Given also high indirect costs this results in an AFC that is 2.5 times the direct costs, which is considered excessive. The risk uplift is therefore adjusted to 40%. Network Rail's portfolio risk overlay is already applied to the estimate, and is re-calculated as Key Finding 6		
Efficiency	Network Rail's overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



Wessex Traction Power Supply Upgrade

The project delivers the additional DC power supply capacity associated with 10-car lengthening of trains from Reading to London Waterloo (SBP project SE002). It is anticipated to be completed by the end of CP5. The project was reviewed at GRIP Stage 1. This entailed assessment of several cost documents that are not consistent or of a quality needed to permit a robust assessment of efficient cost.

Project	Description	SBP Details (4Q12)	£m
Name	Wessex Traction Power Supply Upgrade	GRIP stage	1
Ref	DP015 (Priority 2 HLOS)	AFC	
Benefits/outputs	Capacity in association with the introduction of longer trains via project SE002	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Poor – a muddled and internally inconsistent set of documents that creates uncertainty on costs. Notable also that there is not a good business case for the project, with a BCR<1		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline (reported as 2011/12 prices)		
Direct cost	No adjustment. Three components for Reading line power upgrade, Isleworth/Bentfont power and HV feeders at Aldershot.		
Indirect cost	No adjustment. It is not possible to determine from the cost data provided whether indirect costs are included in the sums defined above for direct costs		
Risk	A 60% uplift is applied. In the absence of adequate cost information this is adjusted to 40% as per other PSU schemes, notably DP021. Network Rail's portfolio risk overlay is already applied to the estimate, adjusted and applied as per Key Finding 6		
Efficiency	Network Rail's portfolio risk overlay is already applied to the estimate, and is re-calculated and applied as per Key Finding 7		
Other	None		
Other issue	Description		
Business case	The sizeable cost of [REDACTED] is reported to provide power needed for the Reading-Waterloo train lengthening project, for which there is reported to be a poor business case. This raises questions on the justification for this scheme as a whole		



London Victoria Station Capacity

This represents a series of interventions that together support delivery of the relevant HLOS capacity metric and alleviate current congestion. Improvements are for a small programme of station access, concourse, retail, gateline and platform areas works. This project was reviewed at GRIP Stage 3 dated April to June 2012. It is set reach construction stage in 2015 and be substantially completed in 2016.

Project	Description	SBP Details (4Q12)	£m
Name	London Victoria Station Capacity Improvements	GRIP stage	3
Ref	SE018 (Priority 2, HLOS metric)	AFC	
Benefits/outputs	Station passenger handling capacity, congestion relief – linked to HLOS metrics	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Generally good submission with GRIP3 report and effective option assessment used to derive a lower cost and better value package		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	None. Noted that Network Rail has successfully applied good option selection principles to optimise the cost and value this scheme		
Indirect cost	High overall level of indirect (prelims) associated with a package of small interventions. No adjustment as the risk provision is low		
Risk	20% uplift applied by Network Rail. Network Rail's portfolio risk overlay is already applied to the estimate. This is adjusted as per Key Finding 6		
Efficiency	Network Rail's efficiency overlay is already applied to the estimate. This is adjusted as per Key Finding 7		
Other	None		
Other issue	Description		
Delivery	As a modest package of works this would appear to be a good candidate for delivery completed earlier than 2016/17 if this fits wider station upgrade plans		



Kent Traction Power Supply Upgrade

The project delivers the additional DC power supply capacity associated with the Thameslink KO2 December 2018 service specification, which includes the introduction of new and cascaded 12-car trains on Kent suburban routes. The project was reviewed at GRIP Stage 1.

Project	Description	SBP Details (4Q12)	£m
Name	Kent Traction Power Supply Upgrade	GRIP stage	1
Ref	DP011 (Priority 2 HLOS)	AFC	
Benefits/outputs	Capacity in association with the introduction of longer 12-car trains post Thameslink KO2	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good package of documents, including a clear remit and cost estimate that is underpinned by unit rates based build-up from other projects/frameworks. This is commensurate with the level of detail found in GRIP2 projects elsewhere within the SBP portfolio		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline (reported as 2011/12 prices)		
Direct cost	No adjustment. Three components for Tunbridge Wells 12-car / Grove Hill substation, Gravesend-Gillingham 12-car and Canterbury-Thamet resilience.		
Indirect cost	Included with the direct costs above		
Risk	A 60% uplift is applied. This is adjusted to 40% as per other PSU schemes, and befitting the good quality cost estimate provided. Network Rail's portfolio risk overlay is already applied, and is re-calculated and applied as per Key Finding 6		
Efficiency	Network Rail's portfolio risk overlay is already applied to the estimate, and is adjusted as per Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



LNE Routes Traction Power Supply Upgrade

The project delivers enhanced traction power supply on the East Coast Main Line between Doncaster and Edinburgh, and on the diversionary Hertford Loop. The enhancement of ECML south of Doncaster is delivered by IEP (NE028) together with the Thameslink Programme (TL001). Delivery of the LNE programme is planned to commence in the latter stages of CP5 and be completed in CP6. The project was reviewed at GRIP Stage 1.

Project	Description	SBP Details (4Q12)	£m
Name	LNE Routes Traction Power Supply Upgrade	GRIP stage	1
Ref	DP007 (Priority 2 HLOS)	AFC	
Benefits/outputs	Traction power capacity to facilitate long-term growth in association with enhanced train services	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Initially inadequate data, subsequently augmented to provide an adequate basis for review, including cost estimate with reasonable detailed back-up		
Adjustment	Description		
Omission/addition	None		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustment made for the total of █████ largely made up of power/autotransformer feeding and civils, plus █████ for National Grid bulk supply points		
Indirect cost	32% add for contractor's prelims plus a further 8% for Network Rail. These are generous allowances but are not adjusted to balance the lower risk provision noted below		
Risk	A 15% uplift has been applied, contrasting the 60% typically proposed to be added to PSU schemes at GRIP1. Grid connection costs have risk uplifts already built-in. No adjustment is therefore made. Network Rail's portfolio risk overlay is already applied though is applied as per Key Finding 6		
Efficiency	Network Rail's portfolio risk overlay is already applied to the estimate. This is re-calculated and applied as described in Key Finding 7		
Other	The recommendation not to adjust CP5 spend is not a reflection on the efficiency or otherwise of the substantial majority CP6 spend, which will need to be addressed as part of the CP6 settlement process		
Other issue	Description		
Schedule	No rationale set out for the split between CP5 (20%) and CP6 (80%) expenditure. It is unclear what Network Rail expects to deliver by the end of CP5		



Welsh Valley Lines Electrification

The project comprises the 25kV AC overhead electrification of the branch lines radiating north of Cardiff (see note) as well as connections to Bridgend, Cardiff Bay and Cardiff Airport. This will provide capacity, carbon and other benefits in combination with the deployment of new 6-car electric rolling stock anticipated around the end of CP5. This is a third party funded project, which was reviewed at GRIP Stage 2.

Project	Description	SBP Details (4Q12)	£m
Name	Welsh Valley Lines Electrification	GRIP stage	2
Ref	DP016 (Third Party Funded)	AFC	
Benefits/outputs	Capacity, carbon and operational cost efficiency in combination with the introduction of new rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good GRIP2 report, albeit missing several GRIP products. Detailed cost estimate provided. Note that Network Rail's cost SBP cost spreadsheet contains some erroneous numbers		
Adjustment	Description		
Omission/addition	Network Rail's SBP spreadsheet was in error, with incorrect pre-overlay though correct post-overlay cost. The correct input costs and overlays are modelled though these largely net off		
Cost base	Cost adjusted to 4Q12 baseline		
Direct cost	OLE direct costs are adjusted to the Series 2 baseline of [REDACTED]/STK, as described in Annex E1. As these are relatively low within the estimate, this results in an increase in allocated costs		
Indirect cost	The 30% allowance for contractor's OHP is slightly higher than the norm and for other electrification schemes		
Risk	A 30% uplift has been applied. Whilst this appears conservative, there are notable risks faced and hence this is not adjusted. The portfolio risk overlay was applied, though note that numbers presented by Network Rail were in error (i.e. incorrect pre-overlay and efficiency calculation but the right output numbers)		
Efficiency	The efficiency overlay was applied, though note that numbers presented by Network Rail were in error (i.e. incorrect pre-overlay and efficiency calculation but right output numbers). This overlay was adjusted as Key Finding 7		
Other	Note that the project assumes power supply is provided via GWML (DP001)		
Other issue	Description		
Delivery	The GRIP2 report assumed that HOPS delivery is not applicable yet also acknowledges that it offers benefits that represent a cost saving opportunity for this project		

Notes

Valley Lines to Treherbert, Aberdare, Merthyr Tydfil, Coryton, Rhymney and Newport/Ebbw Vale.



Scotland SBP



Aberdeen to Inverness Journey Time Improvements Phase 1

This project aims to improve commuter services at either end of the line, reduce journey times and increase service frequency on the Aberdeen to Inverness route, through a series of line speed improvements, level crossing and signalling upgrades. New stations are to be provided at Dalcross and Kintore, plus extended loop provision along the route.

Project	Description	SBP Details (4Q12)	£m
Name	Aberdeen to Inverness journey time improvements phase 1	GRIP stage	0
Ref	SC002	AFC	
Benefits/outputs	Capacity and journey time improvements for passengers plus new stations for communities at Dalcross and Kintore	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Based on previous study taken up to draft GRIP 3 which is now out-of-date due to revised HLOS requirements. Current project phasing, scope and costs have still to be agreed to meet the required outputs, consequently, it is not possible to determine an efficient cost for the scheme		
Adjustment	Description		
Omission/addition	None		
Cost base	Uplifted to 4Q12 baseline, giving an increase of c.£4m		
Direct cost	No adjustments made, noting the fundamental scope uncertainty		
Indirect cost	No adjustments made due to fundamental scope uncertainty		
Risk	20% contingency included in GRIP 3 estimate for the previously assumed project scope. This has not been adjusted due to the uncertain status of and scope/requirements for the project. The portfolio risk overlay was applied by Network Rail, and has been removed (as of no relevance or meaning) due to the status of the project as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been removed due to the status of the project as described in Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



Rolling Programme of Electrification (Scotland)

A rolling programme of electrification works is proposed in CP5 and CP6, at a rate of circa 100 single track kilometres per annum). The programme includes: Rutherglen – Coatsbridge; Holytown Jn – Shotts – Midcalder Jn (the ‘Shotts Line’), as well as Cumbernauld – Polmont and Camuirs – Dunblane/Alloa.

Project	Description	SBP Details (4Q12)	£m
Name	Rolling Programme of Electrification (Scotland)	GRIP stage	3(0-3)
Ref	SC004	AFC	
Benefits/outputs	Reduced journey times, operating costs and carbon benefits in combination with new electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Good GRIP3 reports and costs estimates for R&C and Shotts lines. No reports and a complex and confusing estimate for Cumbernauld – Polmont and Camuirs – Dunblane/Alloa		
Adjustment	Description		
Omission/addition	Adjusted to remove CP6 schemes in line with ORR instruction – a [REDACTED] AFC adjustment		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustment is made, noting the poor quality underpinning cost data		
Indirect cost	No adjustment is made		
Risk	20% risk provision for R&C and Shotts lines is reasonable for GRIP3 level of development. The portfolio risk overlay was applied by Network Rail, and has been recalculated and applied albeit to 50% of costs as described in Key Finding 6 – reflecting that circa half of the scheme is well defined and the other not at all (for the latter efficiency overlay is not meaningful)		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated and applied to 50% of costs as described in Key Finding 7 – and as per the risk overlay note above		
Other	None		
Other issue	Description		
None	n/a		



Carstairs Journey Time Improvements

This project introduces journey time improvements through remodeling of Carstairs junctions along with layout simplification to reduce the amount of equipment being maintained. The project is dependent upon major track and signalling renewals occurring at Carstairs within CP5.

Project	Description	SBP Details (4Q12)	£m
Name	Carstairs journey time improvements	GRIP stage	0
Ref	SC007 (not included in Scottish HLOS)	AFC	
Benefits/outputs	Journey time improvements, reduced maintenance costs.	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Early stage development information provided, with little supporting information and no justification for estimates. When challenged, Network Rail stated that the estimate presented was a modification of costs from a previous GRIP 2 study – but no further explanation or substantiation was given: as such, an efficient cost determination is not possible		
Adjustment	Description		
Omission/addition	Minor reduction to align SBP with estimate provided		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustments made, noting lack of substantiated estimate		
Indirect cost	No adjustments made due to lack of substantiated estimate		
Risk	54% contingency has been included within Pre-GRIP estimate, although narrative states 60% contingency. As this is comparable with norms at this early stage of development it is unadjusted. The portfolio risk overlay was applied by Network Rail, and has been removed due to the status of the project as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been removed due to the status of the project as described in Key Finding 7		
Other	None		
Other issue	Description		
Renewals dependency	Project is reliant upon major planned track and signalling renewals in CP5, but does not describe the cost impact of these individual components within the estimates, merely the overall contribution of [REDACTED]. Hence no adjustments have been made in this area		



Highland Main Line Journey Time Improvements (Phase 2)

This project comprises track, signalling, and extensive structural strengthening works in order to provide improved journey times and capacity on the Highland main line between Perth and Inverness. Timetable studies are also included to determine where double-track sections will be required.

Project	Description	SBP Details (4Q12)	£m
Name	Highland Main Line journey time improvements (phase 2)	GRIP stage	0
Ref	SC011	AFC	
Benefits/outputs	Capacity and journey time improvements	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	An inconsistent set of documents was provided, with detailed feasibility reports in draft and a patchwork of estimate elements that do not clearly substantiate costs within the SBP submission. Project requirements have not been finalised, are dependent upon changed outputs requirements from EGIP, and are acknowledged not to meet the changed HLOS requirements. For these reasons, an efficient cost determination is not possible		
Adjustment	Description		
Omission/addition	Reduction to align SBP with estimate provided		
Cost base	Adjusted to 4Q12 baseline, giving a reduction of £4m		
Direct cost	No adjustments made due to fundamental scope uncertainty		
Indirect cost	No adjustments made due to fundamental scope uncertainty		
Risk	20% contingency included in estimate which is lower than the 60% uplift expected at Pre-GRIP stage, however this has not been adjusted due to the project status. The portfolio risk overlay was applied by Network Rail, and has been removed due to the status of the project as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been removed due to the status of the project as described in Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



Motherwell Area Stabling

Train stabling and cleaning facilities in the Motherwell area are proposed to be consolidated in order to reduce the number of moves between Yoker and Motherwell, and to provide additional stabling for train operator (ScotRail) services. This will comprise track layout alterations, electrification, provision of new cleaning facilities and related access arrangements.

Project	Description	SBP Details (4Q12)	£m
Name	Motherwell area stabling	GRIP stage	0
Ref	SC012	AFC	
Benefits/outputs	Increased train stabling in the Motherwell area, provision of new traincare facilities	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Poor quality submission reflecting recent changes in project direction by Transport Scotland, and a specification which is yet to be agreed. Many redundant documents provided, and no clearly detailed estimate to substantiate costs or verify alignment with remit. For these reasons, an efficient cost determination is not possible		
Adjustment	Description		
Omission/addition	Reduction to align SBP with estimate provided		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustments made due to fundamental scope uncertainty		
Indirect cost	No adjustments made due to fundamental scope uncertainty		
Risk	No risk provision has been included in the estimate, whereas 60% uplift would be expected at Pre-GRIP stage, however this has not been adjusted due to the project status and cost uncertainty. The portfolio risk overlay was applied by Network Rail, and has been removed due to the status of the project as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been removed due to the status of the project as described in Key Finding 7		
Other	None		
Other issue	Description		
Depot	Large provisional sum included for a traincare depot, with no build-up to explain how cost has been arrived at		



Motherwell Re-Signalling Enhancements

This project provides increased capacity between Carfin and Holytown junction, and a degree of bi-directional signalling from Carstairs to Law junction and Shieldmuir South junction. The project is associated with core signalling renewals in the Motherwell area.

Project	Description	SBP Details (4Q12)	£m
Name	Motherwell re-signalling enhancements	GRIP stage	0
Ref	SC013	AFC	
Benefits/outputs	Increased capacity and operational flexibility	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Very poor, with virtually no project information provided and no supporting estimate. When challenged, Network Rail provided a very high level summary of costs, but no further project information. For these reasons, an efficient cost determination is not possible		
Adjustment	Description		
Omission/addition	Increase to align SBP with cost summary provided		
Cost base	Unchanged at 4Q12 baseline		
Direct cost	No adjustments made noting a lack of substantiated estimate		
Indirect cost	No adjustments made due to lack of substantiated estimate		
Risk	A 27% risk provision has been included in the cost summary, whereas 60% uplift would be expected at Pre-GRIP stage, however this has not been adjusted due to the project status and cost uncertainty. The portfolio risk overlay was applied by Network Rail, and has been removed due to the status of the project as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been removed due to the status of the project as described in Key Finding 7		
Other	None		
Other issue	Description		
Add by exception	n/a		



Edinburgh South Suburban Electrification

This project comprises the 25kV AC overhead electrification of the Edinburgh South suburban line and associated connecting routes. It includes associated engineering works required to achieve structural clearances and installation of overhead line equipment.

Project	Description	SBP Details (4Q12)	£m
Name	Edinburgh South suburban electrification	GRIP stage	0
Ref	SC017 (not included in Scottish HLOS)	AFC	
Benefits/outputs	Capacity, journey time and carbon benefits in associated with the introduction new electric rolling stock	CP5	
		CP5 adjusted	
SBP submission	Description		
Data quality	Very high level scope and cost summary based upon £/STK rate		
Adjustment	Description		
Omission/addition	Increase to align SBP with cost summary provided		
Cost base	Adjusted to 4Q12 baseline, giving a reduction of circa £1m		
Direct cost	Unit rate (£/STK) found to be broadly comparable with other Type 2 OLE schemes, and a quantity check was in close agreement with 28 STK for the scheme. Therefore no direct adjustments have been made in either area		
Indirect cost	No adjustments made		
Risk	20% risk provision has been included in the cost summary, whereas 60% uplift would be expected at Pre-GRIP, however this has not been adjusted as the £/STK rate used is based upon the out-turn AFC. The portfolio risk overlay was applied by Network Rail, and has been recalculated as described in Key Finding 6		
Efficiency	Network Rail has applied their efficiency overlay, which has been recalculated as described in Key Finding 7		
Other	None		
Other issue	Description		
None	n/a		



6. Conclusions

Adjustment summary

We have reviewed Network Rail's plans for 67 enhancement projects totalling £7.2bn of expenditure in CP5 and confirm the following:

- £1.1bn are Blue projects, for which the adjustments made represent baseline changes advised by ORR
- £0.8bn represent Red projects, where we cannot determine an efficient cost
- £5.3bn is a combination of Green and Amber projects for which we have identified an adjusted efficient cost of £4.7bn.

This is illustrated in Figure 11.

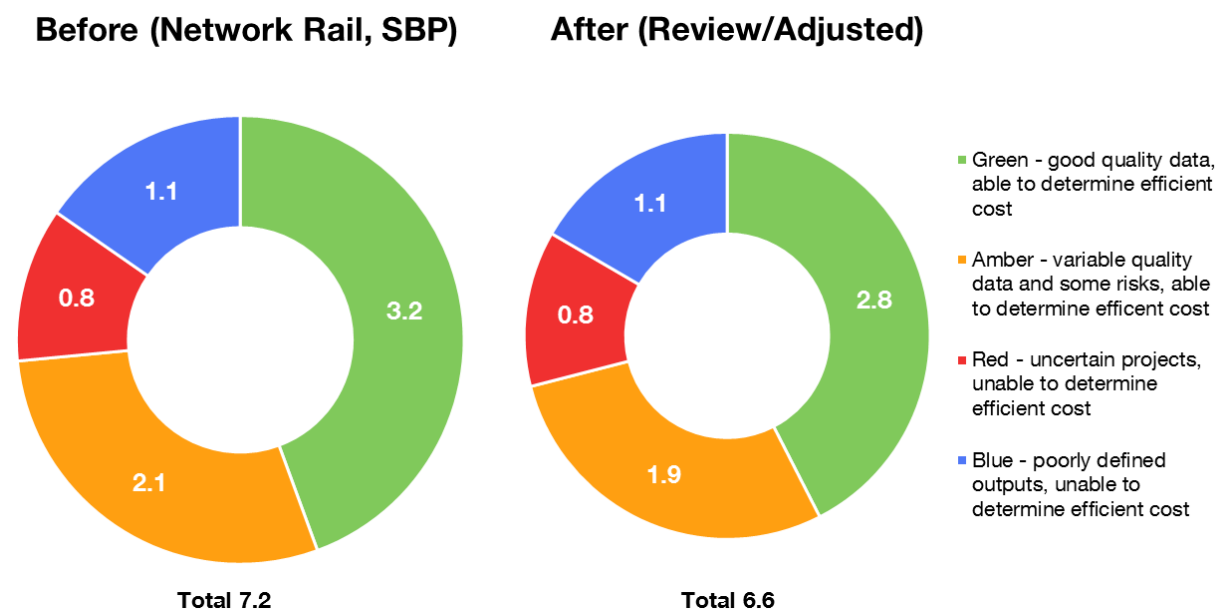


Figure 11: Project split by review finding (£bn)

A 'waterfall' summary explaining the proposed adjustments, by category of cost, to move from the £7.2bn start point to the £6.6bn figure proposed by this review is described in Figure 12.

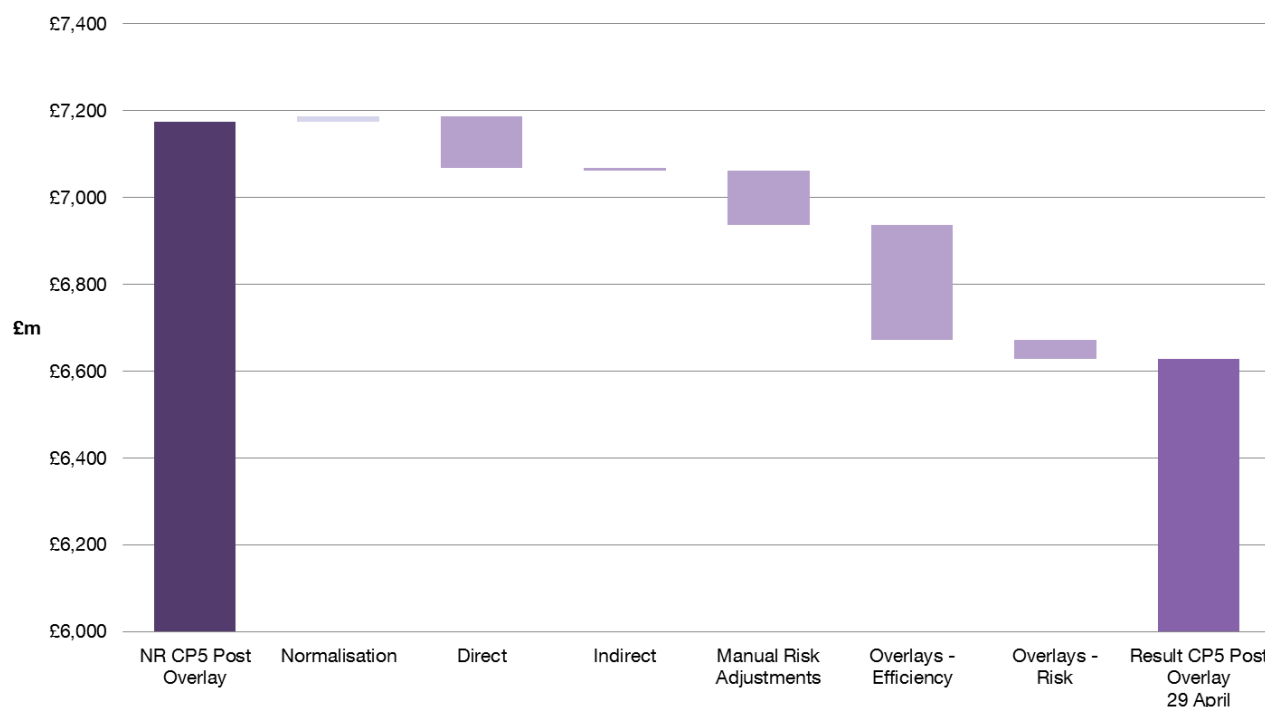


Figure 12: Waterfall summary of adjustments

These adjustments are described as follows:

Adjustment type	(£m)	Description
Normalisation	+14	Changes in figures required to align Electric Spine project costs with the DfT forecast, adjustments resulting from reconciliation issues between the Network Rail estimates provided and their SBP submission, and changes required to harmonise the cost base to 4Q12
Direct	-120	A net reduction resulting from proposed adjustments to direct costs including their commensurate indirect and risk uplifts
Indirect	-6	A small reduction resulting from proposed adjustments to indirect costs based on comparisons with Network Rail norms
Manual Risk Adjustment	-125	Proposed reductions to specific project risk and contingency provisions
Overlays – Efficiency	-265	A net reduction resulting from the proposed changes to Network Rail's efficiency overlay, and to apply this to additional SBP projects
Overlays – Risk	-43	A reduction in relation to Network Rail's portfolio risk overlay, including changes to both the rate applied and the projects impacted



Project adjustments

Adjustments for all England & Wales and Scottish projects are set out in detail in Annex G. To summarise which of Network Rail's projects have experienced the greatest adjustment, the top 15 schemes ranked by adjusted (reduced) cost are summarised below. These represent any scheme where the adjustment is in excess of £10m. The aggregate of these adjustments represents a reduction in Network Rail's costs of circa £480m. Key adjustments are highlighted only. i.e. relatively small changes of less than £1m in component cost categories are not highlighted.

Project (ranked by adjustment)	Omission addition	Cost base	Direct cost	Indirect cost	Risk uplift / overlay	Efficiency overlay	Change (£m)
Northern Hub Post HLOS	✓				✓	✓	-115
East West Rail			✓		✓	✓	-54
Great Western electrification	✓				✓	✓	-44
Anglia traction power supply			✓		✓		-40
Intercity Express Programme	✓				✓	✓	-38
Western Access to Heathrow		✓			✓		-35
Trans Pennine electrification			✓		✓	✓	-31
Stafford area improvement	✓	✓	✓	✓	✓	✓	-24
Derby area remodelling		✓		✓		✓	-20
Sussex traction power supply				✓	✓		-17
South London traction power			✓		✓		-16
Walsall-Rugeley electrification	✓		✓		✓	✓	-13
Bristol Temple Meads				✓	✓		-13
North West Electrification			✓		✓	✓	-11
Valley Lines Electrification						✓	-11

Cost profile

The breakdown of enhancement costs in each year of CP5 has been put forward by Network Rail in its SBP submission. This is illustrated in Figure 13, incorporating the entire enhancements portfolio. i.e. including both England and Wales and Scotland, and those projects that are outwith the scope of our review. We believe that this represents an unrealistic profile for a portfolio that includes so many schemes that are at an early stage of development. This is likely to create deliverability, efficiency and financing issues that will need to be resolved.

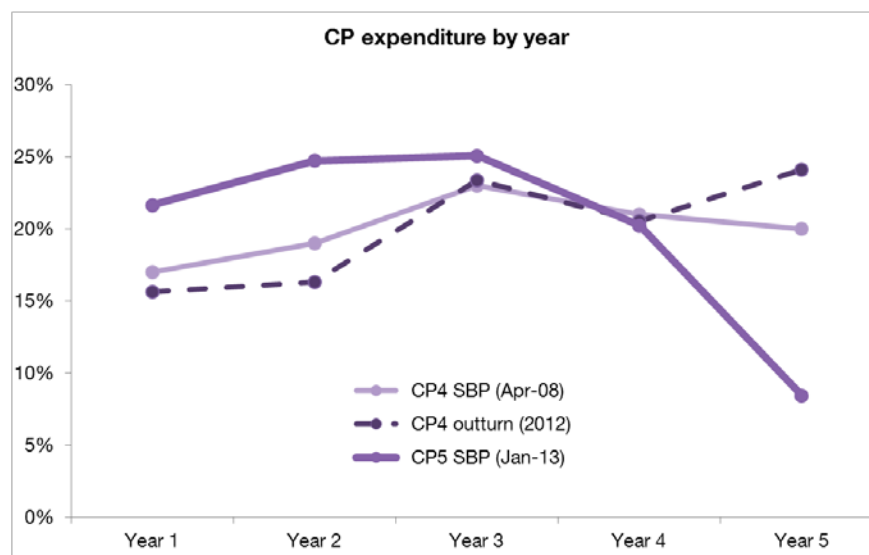


Figure 13: Cost split by year (post overlay)

Wider funding implications

Our review covers SBP enhancement projects only, and hence only enhancement costs have been reported here. We note, however, that several schemes include renewals work and funding, or other costs that are outwith the scope of our review. For clarity, and to assist ORR's assessment of the efficiency of Network Rail overall CP5 plans, plans we have listed the affected projects in Annex F.

There are several projects where Network Rail has made provision for depot or stabling/sidings costs within its enhancement cost estimate. By contrast, there are others where costs are excluded, because these are assumed to be budgeted for and funded separately (by the DfT or franchisees) and/or delivered by rolling stock providers (e.g. IEP)¹⁰. To provide clarity on how such work has been costed into SBP schemes we have summarised this in Annex F.

¹⁰ SPBT101 refers.



Summary conclusions

In respect of Network Rail's submission for CP5 enhancements we have addressed two key questions:

1. Is it robust? For the £1.9bn of Blue and Red projects within our review it is not robust, given uncertain outputs, scope and costs
2. Is it efficient? For £5.3bn of Green and Amber projects we propose an efficient cost of £4.7bn.

We believe a saving of £0.6bn on an SBP baseline of £5.3bn is achievable:

- A proportion of this is not a saving as such, and requires little or no action by Network Rail. For example to achieve a correct baseline scope and cost dataset, normalise the price base for the portfolio and achieve a P80 risk provision with the portfolio risk overlay more widely applied
- Further adjustment requires the consistent application of existing Network Rail benchmark costs and rates for direct and indirect costs, and changes to risk uplifts to reflect norms or QRA values and consequential savings from uplifts on other adjustments.

The majority of the adjustment is genuinely targeted at achieving greater efficiency and so does require that Network Rail respond and do things differently. This, we believe, is achievable as Network Rail's own analysis suggests it can achieve an efficiency saving of between 9% and 19% in CP5, targeting a range of initiatives that are largely achieved in GRIP Stages 4 to 8. We support these measures and their application, and have correctly applied it at the 9% rate. We also believe efficiencies are possible for almost all of the SBP portfolio, and without exception to any scheme where delivery spans the majority of CP5, irrespective of whether or not it was new within the HLOS. Finally, we believe there are further opportunities and initiatives that are not well documented or consistently applied in the SBP that could underpin greater levels of efficiency savings. These include:

- Greater value management and value engineering solutions for scheme options, and more widespread consideration of lowest whole life costs
- Portfolio and programme management to achieve greater synergy and standardisation between related projects and procurements
- Further alliancing with operators and the supply chain, targeting optimum whole industry cost and value, including in relation to engineering access plans



- Greater focus on innovation in delivery, and getting better value from Network Rail's High Output Plant with benefits costed into more than one electrification scheme
- Opportunity, as distinct from risk, management – and embedding and valuing the benefits of opportunities deeper and earlier within project plans and costs.

Whilst we believe that this saving is achievable, it will require Network Rail to set out robust plans to implement and achieve this, and ensure these are successfully embedded within plans for individual SBP projects.



7. Recommendations

We have identified three Key Recommendations to support the ORR's Draft Determination, and a further five Consequential Recommendations, which relate to suggested actions for Network Rail in the light of the findings from this report.

Key Recommendations:

- KR1: For the £5.3bn of Green and Amber projects, agree that £4.7bn represents the efficient cost for these CP5 enhancement projects, and adjust Network Rail's proposed funding requirement accordingly as part of the Draft Determination. This is based on the adjustments described in Section 5 of this report
- KR2: Agree that a further £1.9bn relates to Blue and Red projects with uncertain scope, outputs and costs that require separate treatment to define funding requirements for CP5, together with further development work by Network Rail and industry to ensure that robust plans are brought forward
- KR3: In the light of KR1 and KR2, agree that ORR and Network Rail will need to manage Blue and Red projects in a different way. Network Rail, together with industry partners as appropriate, will need to agree the action plan for dealing with schemes that are at an early stage of development. As projects mature, certainty on cost and delivery plans will improve. Further review, governance and change control will need to be applied once this development has been completed.

Consequential Recommendations:

- CR1: That Network Rail develops a clear plan setting out how it intends to achieve its efficiency savings; for those initiatives defined in its SBP and those summarised in this review that are focused on opportunities at early GRIP Stages



- CR2: That Network Rail review the profile of costs, including the peak in mid CP5 and the low level of expenditure in the final year, to verify whether this is realistic, efficient and deliverable, and therefore that both Network Rail and its supply chain has sufficient resources to efficiently procure and deliver this and associated outputs
- CR3: That Network Rail considers strengthening its portfolio and programme management capability and plans given the complexity and scale of specific programmes within the CP5 enhancement portfolio and deliverability risks likely to be created. This can address opportunities for programme synergies and benefits that exist for common 'families' of schemes, notably electrification and power supply upgrades
- CR4: That Network Rail continues development of its cost estimating and benchmarking workstream, reinforced by a clear strategy for benchmarking initiatives to: derive common cost definitions to enable quantitative comparisons; improve consistency in cost data capture, standardised cost breakdown structures and facilitate improved use of the Unit Cost Model. Further analysis comparing estimates with outturn costs will also help define adjustments for residual factors and 'optimism bias' to justify uplifts at each GRIP Stage
- CR5: We would also advise that Network Rail considers addressing the issues apparent with its SBP submission data. This will help to clarify how its central function will collate and maintain information for all projects during CP5. This action may also help progress issues raised during the ORR's Determination process.



Annex

- A** ORR review remit
- B** Glossary
- C** Project Assurance Reviews
- D** Benchmarking booklet
- E** Supporting detailed analysis
 - E1 Electrification scheme costs and rates
 - E2 Electrification STK quantities
 - E3 Bulk power supply costs and rates
 - E4 Great Western electrification (DP001) review
 - E5 Cost breakdown for major SBP programmes¹¹
 - E6 Risk and efficiency overlay analysis
- F** Summary of wider funding implications
- G** Model results tables

¹¹ Northern Hub, IEP, North West Electrification, DfT provided costs (Electric Spine and Waterloo).



Annex A ORR Review Remit

The full remit is shown below. The projects within the scope of the review and (for clarity) those projects excluded from the scope are also scheduled. In both cases these represent the final adjusted scope of the review, which was adjusted following issue of the SBP by Network Rail.

Background to the project

The Periodic Review 2013 (PR13) will establish access charges, outputs and the associated regulatory framework for Network Rail for Control Period 5 (CP5, April 2014 to March 2019). The assessment of Network Rail's planned infrastructure enhancements and determination of efficient costs is an important input to the assessment of access charges.

As part of PR13, the industry published the Initial Industry Plan in September 2011 which proposed between £9.1 and £9.4bn of infrastructure enhancement investment. Using this information the government published its High Level Specification in July 2012 setting out what outputs it wanted to buy, and giving a set of illustrative options showing what infrastructure enhancements it expected to be required to achieve those outputs. In response to the HLOS, Network Rail is currently developing its Strategic Business Plan due to be published on the 7 January 2013 which will propose its efficient cost for delivering the outputs and specified projects in the government's HLOS.

As part of PR13, the Office of Rail Regulation (ORR) will be reviewing Network Rail's Strategic Business Plan and wishes to commission a consultant to review the proposed enhancement projects and the supporting information that Network Rail will provide for each project.

This mandate sets out the terms of reference for a detailed examination of a large number of enhancement projects. The review will be largely desk-top based and will require the review of project specific documentation such as option selection reports, cost estimates and sponsor's remits.

The final report will need to give ORR a clear view of whether the consultant considers Network Rail's submission to be robust, adequately justified and represent efficient costs. The report shall highlight any



shortcomings, particularly the areas of costs, outputs, schedule and key risks and quantify any further potential efficiencies that can be made.

The consultant's report will be a key piece of evidence in ORR's determination of efficient costs for CP5 and as such will be published on our website. The report therefore needs to be based on high quality and robust analysis and present clear conclusions supported by evidence and professional judgement where necessary.

Project Objectives & Scope

Objectives

We want to check whether Network Rail's SBP submission for CP5 enhancement projects is robust and represents an efficient cost.

Scope

There is expected to be around £9.5bn worth of enhancement projects in Network Rail's SBP for CP5. Some of these are being assessed separately and are not included in this remit. The projects included in this review are listed in Annex A.

The projects are at various stages of development, with around half at GRIP 2¹² (pre-feasibility complete) and a quarter at GRIP 3 (single option selection) with the remainder mixed between GRIP 1, 4 and 5.

The scope comprises two principal components, specifically a project and portfolio review and a benchmarking workstream.

Project and Portfolio Review

For the defined set of projects, the consultant shall review the Network Rail supporting documentation and check that:

- the selected option in the project estimate has been tested against alternative solutions and there is clear and appropriate criteria for selecting it.
- Project cost estimates are sufficient for the stage of development, including elements as follows
 - Quantities

12 See Network Rail website for definitions of GRIP stages (Governance of Rail Investment Projects).



- Unit costs
- Design and development costs
- Uplifts e.g. project management, professional services, schedule 8 compensation, working in possessions, estimating uncertainty and any project risks/contingency
- Provisional sums, land, property
- Risk methodology is appropriate and how it has been applied at project, and portfolio level
- Efficiency overlay, how applied and whether it addresses all reasonable opportunities to reduce costs in CP5
- Any 'portfolio' uplifts for central overheads / programme management function etc.

The consultant shall give a view on whether there is sufficient justification of costs, for example by internal or external benchmarking. To give ORR further assurance in this area the consultant shall undertake some additional benchmarking of Network Rail's key cost categories (see Part 2).

Using all this evidence the consultant shall give a view on the efficient cost of the portfolio of projects. In considering efficient cost the consultant shall take into account:

- Whether the estimates have taken into account interactions with other projects and asset renewals
- The criteria for selection is aligned with the principles in Network Rail's asset policies to achieve a sustainable output, for example there is evidence of whole life cost being considered in selecting preferred options
- Whether stakeholders have been involved in the proposed option (if the project is directly taken from the published Route Utilisation Strategy then this is sufficient evidence of stakeholder involvement)
- Whether Network Rail has made sufficient use of its internal unit cost information captured during the CP4 (e.g. its unit cost model) and whether these costs have been appropriately used.
- Whether the forecast cost split between CP4 and CP5 is clear, particularly for committed schemes
- Assumptions and interdependencies are clear, for example where an enhancement requires a change to rolling stock provision, or where the output of one project is dependent on another



In addition to the above review of costs, the consultant shall specifically comment on:

- Any implications for operating, maintenance and renewals expenditure
- Whether the schedule looks realistic, i.e. for each operating route, does the high level programme schedule look logical and achievable with regard to development, design and implementation phases.

In reviewing the evidence, the consultant should take account of the stage of project development, i.e. some are much earlier in development than others, and therefore difference approaches may be necessary for different development stages.

Benchmarking

In Network Rail's SBP submission there will be some level of justification for Network Rail's proposed costs, usually by benchmarking or other means. Network Rail has had difficulty to collect any external cost benchmarking for enhancement projects, mainly due to the bespoke nature of infrastructure enhancements. We want the consultant to propose a method of categorising the significant cost elements across the portfolio and give a quantified view of how well justified each cost element is and where the major cost uncertainties / opportunities lie. Using this as a basis we want the consultant to undertake some further benchmarking using non-rail sectors and any rail companies external to Network Rail. This benchmarking should draw on a range of information sources such as:

- Non-rail companies that the consultant has connections with and that can share examples of efficient cost norms / benchmarks for enhancement projects
- Documented norms for cost elements such as project management costs, based on published material or the consultants own cost database
- Case studies of achieved efficiency improvements for major project delivery from public and private sector projects

The consultant shall use this benchmarking information to inform its methodology and its challenge of project/portfolio costs.

There may be a requirement for follow-up work after receipt of the final report on 29 April 2013 to address Network Rail responses or any further evidence the ORR considers might be necessary. This will be treated as a variation to this contract and is not included in these requirements.



Scope Exclusions

The following are excluded from scope as these are the subject of separate ORR commissions.

- whether the projects will deliver the route outputs in terms of passenger capacity metrics in the HLOS;
- an assessment of “frontier shift” efficiency
- the projects listed in Annex A under the excluded heading
- a review of the Network Rail asset policies

Methodology

The consultant will:

- Develop and agree its proposal with ORR, using this statement of requirements, supplemented with meetings with ORR to help understanding
- Review a number of Network Rail's project supporting documents e.g. GRIP reports in October to assist the consultant to develop an appropriate methodology
- Attend regular meetings with ORR to ensure a common understanding of the agreed approach, schedule and scope of the work
- Undertake a literature review, including past reports such as those produced by the independent reporter and other consultants.
- Develop an approach to assess projects in a consistent and effective manner
- Develop an approach to undertake the additional benchmarking and engage as necessary with industry contacts
- After receiving the SBP, attend Network Rail briefing sessions to understand its overall approach
- Undertake a desk-top assessment of the SBP and the supporting information from Network Rail. For each project the consultant shall review a set of project specific documents (mostly Network Rail GRIP products) together with some generic information from Network Rail describing its overall approach to risk, estimating and efficiency overlays. This is likely to include:
 - project specific documents such as client remits, project management remits, option selection reports, feasibility reports, value management reports and project appraisals



- generic documents will include estimating methodology, risk methodology, approach to efficiency overlay
- Determine, on a quantitative basis, the size of any potential gap between Network Rail's proposed costs and what a best practice organisation might deliver in CP5. This needs to consider project level costs and portfolio costs
- Provide a two weekly report on progress and current issues
- Provide an interim presentation of draft findings to ORR, including emerging conclusions on efficient cost
- Produce a draft report
- Produce a final report which incorporates comments and amendments from ORR

Outputs, Pricing Model and Intellectual Property Rights

Outputs/Outcomes

In order to meet the project requirements outlined above, ORR requires the following three phases of deliverables:

1. A Methodology and Benchmarking presentation, setting out how the consultant will undertake the intensive project review between January and April 2013, and how it will use benchmarking information (or other information) to justify its findings (by 1 December 2012).
2. Interim presentation of emerging findings, including cost tables showing the initial assessed costs of projects and portfolio overlays (by 11 March 2013).
3. Draft report (by 18 April) for comment, detailing findings and conclusions, followed by final report (by 29 April) suitable for publication.
4. The consultant should also allow for a presentation to ORR team for full de-brief including detailed explanation of analysis, and handover of key working documents and spread-sheets, and also a presentation of the final report to ORR Efficiency Expenditure Programme Board.



Pricing Model

There shall be a two stage approach to pricing.

1. Firstly, a costed proposal by 4th October 2012 to include:
 - a. Fixed price lump sum for phase 1 deliverables, split by methodology development and benchmarking, under option A pricing mechanism
 - b. Provisional costed proposal for phase 2, under Option E pricing
 - c. Provisional costed proposal for phase 3, under option E pricing
2. Secondly, a fixed cost lump sum by December 15th 2012 for phase 2 and phase 3.

The contract will be awarded on a fixed sum basis in the two stages shown, but any changes to the requirements agreed between the parties will adjust the price up or down.

The ORR will own the Intellectual Property Rights to any report produced under this contract.

The report will be published on ORR website and therefore there may be the need for any commercial sensitive information to be redacted in a separate version.

Project Timescales

The provisional project timetable is as follows:

- Start-up meetings October 2012
- Briefings / background research / benchmarking: from November 2012
- Receipt of Network Rail's SBP and supporting information: 7 January 2013
- Interim findings by 11 March 2013
- Draft report by 18 April 2013
- Final report by 29 April 2013



Requirements for Network Rail's January 2013 Strategic Business Plan

Issued by ORR, 15 March 2012

Extract [Enhancements]

1.34. We have been discussing your project development work which has been funded by the CP5 development fund. We expect this to provide a good basis for part of the SBP submissions. We have also been discussing your cost analysis and we are not convinced that you are making fast enough progress, specifically in being able adequately to justify project cost elements (e.g. project management costs or risk provision) through modelling or benchmarking.

1.35. The SBP must cover the portfolio of enhancements in a way which:

- sets out the planned outputs and costs, demonstrating how HLOS requirements will be delivered at an efficient cost.

1.36. You should provide supporting information on individual schemes consistent with their stage in GRIP and make sure it:

- shows costs disaggregated by: development costs, construction costs, management costs, risk allowance for quantified risks, contingency allowance for unidentified risk, efficiency overlay, and other costs such as Schedule 4 or Schedule 8 costs, land purchase or legal fees;
- includes the latest version of the project business case (including whole-life costed options, scope, outputs, risk allocation, and benefit cost analysis) and the latest end of GRIP stage reports;
- clearly distinguishes between forecast CP4 and CP5 costs, particularly for committed schemes;
- is complete, taking account of all relevant stakeholder input;
- is consistent between types of schemes and across routes;
- is clear on rolling stock and depot assumptions;
- takes account of interactions between schemes and with asset renewals; and
- is clear on its process and programme to develop schemes through the GRIP process.

1.37. In addition to scheme level cost information the SBP should show aggregated portfolio costs, with portfolio efficiencies clearly quantified and supported.



1.38. The SBP should demonstrate that Network Rail has selected the most cost-effective combination of projects that deliver the HLOS outputs, for example taking into account different combinations of infrastructure, rolling stock and timetabling solutions.

1.39. Wherever possible, cost elements should be substantiated either by benchmarks from the internal enhancement cost database or benchmarks from international comparisons and other (rail and non-railway) industry comparisons.

1.40. Work by the reporter in 2010 concluded that Network Rail has a process in place to capture and use cost data but this was at an early stage and further work was needed to make sure it could be used in PR13. Last year we instructed the same reporters to revisit this and check progress. They concluded that you will be able to use this database for some of the proposed schemes but coverage is not sufficient for cost estimates for all proposed schemes. We have therefore brought forward the next audit, originally planned for later in 2012, and have instructed the reporters to review immediately Network Rail's process for costing its projects. This needs resolving quickly so that you can make a robust submission to us.



SBP schemes not in scope

England & Wales

Ref.	Name
Committed projects	
CR001	Crossrail programme (including WRARP)
TL001	Thameslink
	Funds
	East Coast Connectivity
	Station Improvement
	Development
	Level Crossing Safety
	Passenger Journey Improvement
	The Strategic Rail Freight Network
CP4 Rollovers	
ROV01	Birmingham New St Gateway
ROV02	Bromsgrove Electrification - Midlands Improvements Programme
ROV03	Redditch Branch Enhancement
ROV04	Kent power supply upgrade (CP4)
ROV06	Barry – Cardiff Queen Street corridor



Scotland

Ref.	Name
Committed projects	
SC001a	EGIP: Electrification of Springburn to Cumbernauld
SC001b	EGIP: Edinburgh to Glasgow Electrification
SC001c	EGIP: Edinburgh Gateway Station
SC001d	EGIP: Infrastructure Projects
SC015	Border Railway Project
Funds	
	Scottish Stations Fund
	Scottish Strategic Rail Freight Investment Fund
	Scottish Network Improvement Fund
	Future Network Development Fund
	Level Crossings Fund



Annex B Glossary

Glossary of terms

Term	Definition or meaning	Term	Definition or meaning
BAA	British Airports Authority	IEP	Intercity Express Programme
BCR	Benefits to Cost Ratio (business case)	IIP	Key Output 2 (Thameslink Programme)
CP4	Control Period 4 (April 2009 to March 2014)	KO2	Key Output 2 (Thameslink Programme)
CP5	Control Period 5 (April 2014 to March 2019)	LNE	London North East (route)
CP6	Control Period 6 (April 2019 to March 2024)	LNW	London North West (Route)
DC	Direct Current (3- rail power supply)	LSI	Linespeed Improvement
DfT	Department for Transport	OLE	Overhead Line Electrification
DMU	Diesel Multiple Unit	ORR	Office of Rail Regulation
E&W	England and Wales	PR13	Period Review 2013
ECML	East Coast Main Line	PSU	Power Supply Upgrade
EMU	Electric Multiple Unit	RAB	Regulatory Asset Base
ESR	Estimate Summary Report	SBP	Strategic Business Plan
GRIP	Governance of Railway Investment Projects	SDO	Selective Door Opening
GRIP0	Pre-GRIP Stage of development	SoFA	Statement of Funds Available
GWML	Great Western Main Line	STK	Single Track Kilometre
HLOS	High Level Output Specification	UCM	Unit Cost Model
HOPS	High Output Plant System	VfM	Value for Money



Annex D

Benchmarking booklet



CP5 Enhancements

Benchmarking Booklet – Summary Version

*(Final, 30th January 2013, including narrative
only amendments 25th April 2013)*



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1 General Comments about the Benchmarking Booklet

This booklet contains a summary of the benchmarking data produced by Turner & Townsend.

- This booklet has been produced in order to provide cost benchmarking for both non-rail and rail companies external to Network Rail. The focus of the benchmarking is the categorisation of the significant cost elements across projects in order to document norms for key indirect cost categories (such as project management and design). The benchmark data shows cost norms for projects at a snapshot in time (December 2012 – January 2013).
- Benchmarking data has been sourced to reflect projects at various stages in the project lifecycle (inception through to completion) in order to provide a range of comparators. Benchmark project cost data status ranges from inception, options stage to detailed design and through to actual outturn costs. It must be noted that the Network Rail Control Period 5, Strategic Business Plan projects and associated cost estimates range from Pre-GRIP to GRIP 3 stages. Therefore caution should be applied when undertaking comparisons and deriving conclusions and Turner & Townsend advice should be sought.
- Cost head terminology and cost capture and data coding varies between benchmark projects and Network Rail estimating structure. A template has been produced to enable alignment and direct comparison.
- The booklet provides a high level split of direct and indirect costs by the Anticipated Final Cost (section 3), followed by a further split of direct and indirect costs by Point Value (see section 4). See section 2 for definitions).
- Section 5 provides a more detailed analysis of the indirect costs against the Point Value (Note 1).
- Section 6 focuses on benchmarking costs that are not contained within the Point Value (Note 2).
- Section 7 includes overhead and profit benchmarks per sector and commercial ratio (£ in the Ground and Point vs Anticipated Final Cost).
- Section 8 – Benchmarks – Key Contextual Information: Benchmark data contained in the above sections must be considered in light of the individual project key contextual information in section 8, in particular the life-cycle stage and the project specific attributes.
- **Note 1:** The 'Point Value' referred to in this document reflects all costs exclusive of risk and contingency, sponsor costs, escalation and estimating tolerance. Anticipated Final Cost includes all costs.
- **Note 2:** Direct cost is defined as Construction (Principal/Main Contractor costs inclusive of any subcontracted works) plus client direct costs. Preliminary costs are captured as indirect costs.



2 Cost Head Mapping

Mapping from Network Rail Cost Data Collection Sheet to Benchmarking Booklet

Note: The Point Value contains all costs exclusive of risk and contingency, sponsor costs, escalation and estimating tolerance. Anticipated Final Cost includes all costs.

Cost Head – Network Rail Cost Data Collection Sheet	Map to Benchmarking Booklet	Definition	Note
COSTS CLASSIFIED AS DIRECT COSTS			
Direct Construction (contractor and Network Rail)	Direct Construction (contractor and client)	Permanent works, Direct Cost, Measured Works	
Test & Commission	Included in direct construction costs	Not applicable	Item generally considered a direct cost. Majority of clients do not itemise this separately
COSTS CLASSIFIED AS INDIRECT COSTS WITHIN THE POINT VALUE			
Preliminaries	Preliminaries	Non-permanent, Plant, Equipment, Site Accommodation	
Design	Design	Architectural, Engineering, Services design team	
Network Rail Project Management	Project Management and Professional Fees	Delivery partner, alliance, project team, legal, finance, assurance, audit	Project Management costs include: Core project management functions (incl. PM, Controls, Planning, Commercial) Professional fees include: assurance, finance, audit
Compensation Charges, TWA Charges, Land/ Property Costs and compensation	Planning & approvals, site acquisition and 3 rd party compensation costs	Compensation Charge (e.g. to an operator), Transport & Works Act costs, Land/Property costs and compensation	Grouped together as specific charges and compensation are project, sector and country specific



Cost Head – Network Rail Cost Data Collection Sheet	Map to Benchmarking Booklet	Definition	Note
COSTS CLASSIFIED AS INDIRECT COSTS WITHIN THE POINT VALUE			
Risk & Contingency	Risk	Quantitative Risk Assessment	Majority of clients hold contingency outside of the project level budget. For construction stage and completion (outturn cost) stage benchmarks the allowance will be commensurately lower or zero
Sponsor Costs	Sponsor Cost	Business case, benefits realisation	
Escalation	Escalation, Indexation, Inflation		For construction stage and completion (outturn cost) stage benchmarks the allowance will be commensurately lower or zero
Adjustment for residual factors	Estimating tolerance	Adjustment to reflect the estimator's assessment of the confidence level around the estimate	For construction stage and completion (outturn cost) stage benchmarks the allowance will be commensurately lower or zero



3 Direct vs Indirect Cost Split – By Anticipated Final Cost

Definitions:

- Direct cost is defined as Construction (Principal/Main Contractor costs inclusive of any subcontracted works) plus client direct costs. Testing and commissioning is captured as a direct cost.
- Indirect cost captures all project level costs not captured within direct cost. Preliminary type costs have been captured as an indirect, which aligns with Network Rail cost estimate format.
- Two indirect cost columns are shown in the table below. The first shows the indirect cost percentage exclusive of risk and contingency, escalation, estimating tolerances and sponsor costs. The second column shows the data inclusive of these cost heads. This approach enables direct comparison to Network Rail point estimates and anticipated final costs.
- Section 8 – Benchmarks – Key Contextual Information: Benchmark data contained in the above sections must be considered in light of the individual project key contextual information in section 8, in particular the life-cycle stage and the project specific attributes.

3.1 Rail

Sector	Location	% Direct	% Indirect (excl items not contained in NR Point Estimate)	% Indirects (risk & contingency, escalation, estimating tolerance, sponsor)	Overall AFC Value
Rail - Asset enhancement and New Build	Australia	34%	27%	39%	Aus \$22.8bn
Rail - New build	Middle East	50%	27%	23%	£22.5bn
Rail - New build	UK	48%	33%	19%	£2.8bn
Rail - New build	Europe	62%	12%	26%	Euro 11.75bn

3.2 Water

Sector	Location	% Direct	% Indirect (excl items not contained in NR Point Estimate)	% Indirects (risk & contingency, escalation, estimating tolerance, sponsor)	Overall AFC Value
Water - Asset enhancement	South East UK	66%	27%	7%	£272m
Water - Asset enhancement	UK North	64%	35%	2%	£1.2bn



Comments

Note:

- *Water (UK North) 2% represents sponsors costs. 0% recorded for risk & contingency, escalation, estimating tolerance and sponsor costs - project benchmark data reflects the outturn cost.
- *Water (UK – North): Risk allowances - A standard methodology is applied to establish project target prices at the early conception stages. This standard applies 5% to construction costs and indirect costs, with a further 1.5% for design based risk. In addition, a further 5% for client project risk is applied to the point value.
- Relatively low (7%) for South East UK – primarily driven by cost data compilation from outturn cost database for previously completed projects. The 7% recorded represents sponsor costs.
- Relatively lower indirect costs in the water sector reflects the standardised design of key assets and components and repeat delivery of similar works.

3.3 Aviation

Sector	Location	% Direct	% Indirect (excl items not contained in NR Point Estimate)	% Indirects (risk & contingency, escalation, estimating tolerance, sponsor)	Overall AFC Value
Aviation – terminals, piers, specialist systems	UK	56%	42%	2%	£802m
Aviation - car parks, pavements, minor works	UK	60%	38%	2%	£402m

Comments

Note:

- Relatively low percentage of indirect costs associated with risk and contingency, estimating tolerance, escalation and sponsor costs reflect the outturn cost nature of the benchmark data received.
- Significantly higher indirect costs for pavement, piers and satellites reflects the airside working nature of these works. The associated working restrictions and safety considerations drives higher indirect costs.



4 Direct vs Indirect Cost Split – By Point Value

4.1 Rail

Sector	Location	% Direct	% Indirect (excl items not contained in NR Point Estimate)	Overall Point Value
Rail - Asset enhancement and New Build	Australia	56%	44%	Aus \$22.8bn
Rail - New build	Middle East	65%	35%	£22.5bn
Rail - New build	UK	58%	42%	£2.8bn
Rail - New build	Europe	83%	17%	Euro 11.75bn

4.2 Water

Sector	Location	% Direct	% Indirect (excl items not contained in NR Point Estimate)	Overall Point Value
Water - Asset enhancement	South East UK	71%	29%	£272m
Water - Asset enhancement	UK North	64%	36%	£1.2bn

4.3 Aviation

Sector	Location	% Direct	% Indirect (excl items not contained in NR Point Estimate)	Overall Point Value
Aviation – terminals, piers, specialist systems	UK	57%	43%	£802m
Aviation - car parks, pavements, minor works	UK	61%	39%	£402m



5 Indirect Costs

5.1 Preliminaries

Preliminaries Benchmarks			
	% Point Estimate		
	Lower Range	Upper Range	Mean %
All Sectors	3%	43%	16%

Comments

- Aviation preliminary cost drivers: Live operational environments result in restricted site operations, methodologies and sequencing amended to reflect security factors, both airside and landside.
- International rail: scale and value of projects enable preliminary cost efficiencies. A number of benchmarks are valued above £250m and a small proportion above £1bn. In addition, Middle Eastern benchmarks are predominantly Greenfield site locations.
- Water: regulator cost efficiency challenge to all UK water companies drives organisations (and tier 1 suppliers) to isolate, analyse and challenge all non-direct construction costs.

5.2 Design

Design Benchmarks			
	% Point Estimate		
	Lower Range	Upper Range	Mean %
All Sectors	2%	13%	7%

Comments

- Water: Mature value management processes drive continual review and rationalisation of design standards. Carbon reduction focus has challenged traditional design solutions and standards.
- Aviation: Metrics collected cover a wide range of assets from minor works through to new build terminals. The type of asset and associated complexity represent the main driver of design cost variations.



5.3 Test & Commission

Comment & Next Steps

- Testing and commission cost data is classified as a direct cost by all benchmark project sources within this booklet.

5.4 Project Management

Project Management Benchmarks			
	% Point Estimate		
	Lower Range	Upper Range	Mean %
All Sectors	1%	17%	8%

Comments

- International rail: High project values enable scale economies and relatively lower project management costs.
- Water sector: Programme organisation structures and variance in the approach to the procurement of the project management function (such as alliances, delivery partners) drives the variances.
- Aviation: Lowest percentages were recorded against minor works projects.

5.5 Client Professional Services

Professional Services Benchmarks			
	% Point Estimate		
	Lower Range	Upper Range	Mean %
Rail	1%	10%	2%
Water	2%	6%	3%
Aviation	1%	17%	4%
All Sectors	1%	17%	3%



5.6 Land & Property Costs

Land & Property: Other Benchmarks			
	% Point Estimate		
	Lower Range	Upper Range	Mean %
All Sectors	1%	23%	3.5%

Comments

- The 23% upper range against rail sector is due to a particular project location in the centre of a major city. The project involved expanding the capacity and footprint of the station and this is driving high land and property costs.

5.7 Train Operating Company / Freight Operating Company Compensation (TOC/FOC) Costs and Possessions Management Costs

Operator compensation costs and possessions management costs: Benchmarks

Benchmark data sourced from international rail projects demonstrate a lower range of 1%, upper range of 5% and a mean of 2%.



6 Other Indirect Costs not Included within Point Value

6.1 Sponsor

Sponsor: Other Benchmarks			
	% of Anticipated Final Cost		
	Lower Range	Upper Range	Mean %
All Sectors	0.3%	22%	4%

6.2 Risk & Uncertainty

Risk (including escalation): Other Benchmarks			
	% Anticipated Final Cost		
	Lower Range	Upper Range	Mean %
All Sectors	1%	21%	8%

Comments

- Benchmark data from projects within construction and close out phase will typically have lower risk percentages than earlier stages of lifecycle. Any comparison with early asset lifecycle cost estimates should be undertaken with caution.
- ^{*1}Lower range international rail benchmarks – some client retained risks (including escalation) are held in a separate budget by the client and it has not been possible to access this data.
- ^{*1}A number of international rail projects are greenfield site based with commensurately lower risk relating to site access constraints, utilities, existing asset and protection and ground conditions.
- Water sector – Mature cost bases and repeatability of work enables reduced risk percentages
- ^{*2} Further to the benchmarking booklet original issue in January 2013, two further aviation (UK South) benchmarks have been sourced for design stage projects. The risk provisions within the cost data show 9% lower range (AFC £21.5m) and 15% upper range (AFC £12m), with the former currently at option selection stage and the latter at detailed design stage. A further four construction stage aviation benchmarks have been sourced showing a risk range between 4% - 8% with AFC values ranging



6.3 Estimating Tolerance Level

Estimating Tolerance: Other Examples				
Association of Cost Engineers UK	Class IV	Class III	Class II	Class I
	Order of Magnitude -30/+30	Study Estimate -20/+20	Budget Estimate -10/+10	Definitive Estimate -5/+5
Mining Sector	Concept Study	Pre-Feasibility	Feasibility	Execution
	Order of Magnitude ±30/±35 Definition: 0-2%	Preliminary ±20/±25 Definition: 1-15%	Control Budget ±10/±15 Definition: 10-40%	Definitive Estimate ±5/±10 Definition: 30-70%
Oil & Gas	Project Initiation	Concept Development	Definition	Implementation
	-30/+50 Definition: 1-15%	-20/+30 Definition: 10-40%	-15/+20 Definition: 30-70%	-10/+15 Definition: 50-100%
Developer	Concept Design	Preliminary Design	Detailed Development	Pre-Tender
	-10/+35 Definition: 1-5%	-5/+20 Definition: 10-30%	-5/+10 Definition: 30-70%	-5/+5 Definition: 70-100%
Rail (International)	Order of Magnitude	Feasibility	Detailed Estimate	Pre-Tender
	+/- 40%	+/- 30%	+/- 10%	+/- 5%

Comments

- Estimating tolerance application must consider and reflect scope complexity and quantity visibility.
- A number of clients include estimating tolerance within risk and contingency assessment.
- Client's attitude to risks will determine level of estimating tolerance required.
- Effective benchmarking of procured and outturn costs enables reduced estimating tolerance, particularly for repeat work items.



7 Useful Ratios

Overhead & Profit %, £ in the Ground, 'Point' Estimate vs Anticipated Final Cost

a) Overhead & Profit percentage range:

Sector	Overhead & Profit percentage
International rail	5-14%
UK Water	7-8.5%
UK Rail	6-9%
Europe Rail	8-15%
Aviation	3-16%

b) £ in Ground (total direct cost excl preliminaries) as % of Anticipated Final Cost.

Project Lifecycle Stage	Low Performance	High Performance	Range excl upper & lower outlier
Inception Stage	25%	53%	34% - 47%
Option Development Stage	32%	77%	34% - 66%
Construction Stage (including completed projects)	36%	71%	45% - 70%
Turner & Townsend Commercial Performance Study 2012/13	44%	80%	Mean of 69%

c) Point Cost (excl risk, tolerances, indexation) vs Anticipated Final Cost

Project Lifecycle Stage	Low Performance	High Performance	Range excl upper & lower outlier
Inception Stage	53%	84%	59% - 70%
Option Development Stage	68%	93%	71% - 80%
Construction Stage (including completed projects)	43%	95%	61% - 90%



d) Ratio of design cost to direct construction cost (sourced from Turner & Townsend Commercial Performance Study 2012/13)

Metric	Low Performance	High Performance	Mean Performance
Ratio of design cost to direct construction cost	30%	7%	17%

Note: Depends on asset type and complexity of the project.



8 Benchmarks – Key Contextual Information

8.1 Rail

Sector	Location	Base Date	Stage in Lifecycle	Notable Project Specific Attributes
Rail - Asset enhancement	Australia	Q2 2010	Option selection	<p>Works: Track, systems and services renewal, in addition to station and tunnel construction.</p> <p>Abnormals: Mix of brownfield and Greenfield sites</p>
Rail - New build	Australia	Q1 2011	Single Option Development	<p>Works: New build heavy rail track and systems.</p> <p>Abnormals: Scope includes upgrade of rail system to existing underground railway.</p>
Rail - New build	Australia	Q1 2011	Option Selection	<p>Works: 12km of new build heavy rail track and systems</p> <p>Abnormals: Involves element of tunnelling and renewal of 4 existing stations, plus flood mitigations.</p>
Rail - New build	Australia	Q1 2012	Option Selection	<p>Works: New light rail system, 12km in length.</p> <p>Abnormals: Brownfield site, extensive below ground utilities diversions required. Involves section of tunnelling.</p>
Rail - New build	Middle East	Q3 2011	Concept / feasibility	<p>Works: New build light rail system, approx 250km length.</p> <p>Abnormals: Mix of at grade, below and elevated new build stations.</p>
Rail - New build	Middle East	Q3 2012	Concept / feasibility	<p>Works: New build heavy rail track and systems.</p> <p>Abnormals: Mix of at grade, below and elevated new build stations and includes element of tunnelling.</p>
Rail - Metro extension	South East UK	Q1 2008	Option Selection	<p>Works: The construction of new heavy rail link to connect an existing rail line to a disused line, including construction of two new stations.</p> <p>Abnormals: Includes construction of a viaduct.</p>



Sector	Location	Base Date	Stage in Lifecycle	Notable Project Specific Attributes
Rail - Metro upgrade	South East UK	Q2 2011	Construction	Works: Signalling Upgrade Abnormals: Brownfield environment, multiple interfaces with existing operational lines.
Rail - Sub-surface new build	South East UK	Q1 2008	Single Option Development	Works: Platform extension and refurbishment, extended ticket hall Abnormals: Project site is located adjacent to two operational rail lines and located within a heavily trafficked area.
Rail - Sub-surface new build	South East UK	Q3 2008	Detailed Design	Works: Below ground station enhancement Abnormals: Extensive utilities diversions and protection
Rail - Sub-surface new build	South East UK	Q3 2009	Construction	Works: Station modification Abnormals: Significant volume of possessions
Rail - Sub-surface new build	South East UK	Q3 2012	Construction	Works: Platform extension and refurbishment, extended ticket hall Abnormals: Project site is located adjacent to two operational rail lines and located within a heavily trafficked area.
Rail - New build	Germany	Q3 2012	Detailed Design	Works: New build heavy rail Abnormals: None stated
Rail - New build	Austria	Q2 2010	Construction	Works: 40km new build heavy rail. Abnormals: 80% Tunnel (difficult soil conditions) 3 connections with existing tunnels.
Rail - New build	Austria	Q1 2010	Construction	Works: 50km new build heavy rail. Abnormals: One 13km tunnel, 5 short tunnel (~1km) (difficult soil conditions)
Rail - New build	Austria	Q1 2009	Construction	Works: 130km new build heavy rail. Abnormals: 35% Tunnel, longest Tunnel 33km, (difficult soil conditions).



8.2 Water

Sector	Location	Base Date	Stage in Lifecycle	Notable Project Specific Attributes
Water - Asset enhancement	South East UK	Q3 2011	Construction	Works: Water Infrastructure
Water - Asset enhancement	South East UK	Q3 2011	Construction	Works: Water Non-Infrastructure
Water - Asset enhancement	South East UK	Q3 2012	Construction	Works: Waste Infrastructure
Water - Asset enhancement	South East UK	Q3 2012	Construction	Works: Waste Non-Infrastructure
Water - Asset enhancement	UK - North	Q2 2012	Construction	Works: Water Infrastructure
Water - Asset enhancement	UK - North	Q2 2012	Construction	Works: Water Non-Infrastructure
Water - Asset enhancement	UK - North	Q2 2012	Construction	Works: Waste Infrastructure
Water - Asset enhancement	UK - North	Q2 2012	Construction	Works: Waste Non-Infrastructure



8.3 Aviation

Sector	Location	Base Date	Stage in Lifecycle	Notable Project Specific Attributes
Aviation - minor works	UK	Q4 2008	Construction	Works: Small scale minor works, modifications and renewals Abnormals: Repeat core scope, with significant local site specific variables.
Aviation - car parks	UK	Q4 2008	Construction	Works: Car parks, including all security systems Abnormals: Landside working.
Aviation - other facilities	UK	Q4 2008	Construction	Works: Various aviation facilities Abnormals: Airside working. Operational environment
Aviation - pavement	UK	Q4 2008	Construction	Works: Aircraft taxiway and apron ramps Abnormals: Airside working. Operational environment
Aviation - piers & satellites	UK	Q4 2008	Construction	Works: New build and extended airport piers and satellites Abnormals: Airside working. Operational environment
Aviation - specialist systems	UK	Q4 2008	Construction	Works: Installation of specialist data, communication, baggage and security systems Abnormals: Landside and airside working. Operational environment
Aviation - terminals	UK	Q4 2008	Construction	Works: New build and extended airport terminal Abnormals: Airside working. Operational environment
Aviation - terminal	UK	Q4 2008	Construction	Works: New build airport terminal Abnormals: Airside working. Operational environment

