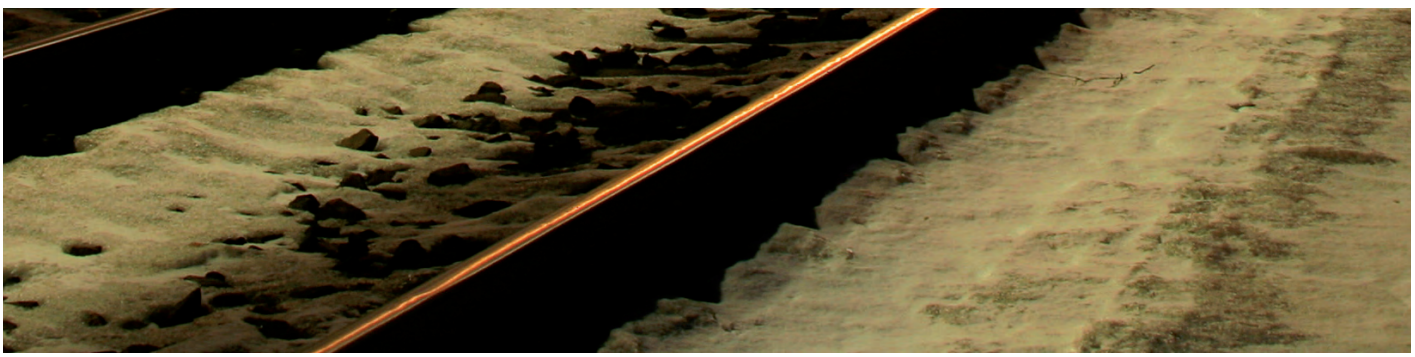
Office of Rail Regulation

PART A INDEPENDENT REPORTER MANDATE

Audit of the Robustness of the Network Rail Unit Cost Framework

FINAL REPORT

ARUP



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May 2010

This report takes into account the particular instructions and requirements of our client.
It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

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Contents

Glossary

ANG	Anglia
AR2009	Annual Return 2009
BAA	BAA plc
BSM	Business Support Manager
CEM	Cost Efficiency Measure
CAF	Cost Allocation Framework
CP	Control Period
DfT	Department for Transport
DIGS	Deliver and Implement Great Solutions
EID	Efficient Infrastructure Delivery [Programme]
EW&S	England Wales and Scotland
FEI	Financial Efficiency Index
FOC	Freight Operating Company
FVA	Financial Value Added
IMDM	Infrastructure Maintenance Delivery Manager
IRG	Investment Review Group
KPI	Key Performance Indicator
KNT	Kent
L-TIP	Long Term Incentive Plan
LNE	London North East
LNN	London Northern
LNS	London Southern
M&C	Midlands and Continental
MDU	Maintenance Delivery Units
MUC	Maintenance Unit Cost
MNT	Maintenance activity code
MST	Maintenance Scheduled Tasks
ORR	Office of Rail Regulation
OTL	Oracle Time and Labour
PR08	Periodic Review 2008
PR13	Periodic Review 2013
P'way	Permanent Way
RAB	Regulatory Asset Base
RACI	Responsible, Accountable, Consulted and Informed
RCM	Reliability Centred Maintenance
RIBA	Royal Institute of British Architects
RWI	Repeatable Work Items

S&C	Switch and Crossing
S&T	Signal and Telecoms
SBP	Strategic Business Plan
Schedule 4	Compensation for possessions paid to TOCs
Schedule 8	Performance related revenue received or paid by Network Rail to TOCS and/or FOCs
SCT	Scotland
SSM	Systems Support Manager
SSX	Sussex
TOC	Train Operating Company
TS	Transport Scotland
UCF	Unit Cost Framework
UCM	Unit Cost Model
WAIF	Work Arising Form
WES	Western
WI	Work Instruction
WSX	Wessex

1 Executive Summary

Introduction

1.1 During Control Period 3 (CP3) (April 2004 to March 2009) Network Rail developed a range of maintenance and renewals unit costs which the Office of Rail Regulation (ORR) used to assist it with its monitoring of Network Rail's efficiency. For Control Period 4 (CP4) (April 2009 to March 2014), Network Rail is committed to improving its unit cost framework. It agreed with ORR that its new unit cost framework would be audited by the Independent Reporter (IR) Arup. This report presents the findings from that audit process.

1.2 The ORR asked the Independent Reporter to opine as to whether: Network Rail's Unit Cost Framework (UCF) is robust and fit for purpose for CP5; whether the new Cost Efficiency Measure (CEM) and Financial Value Added (FVA) measure are both robust and fit for purpose; and what is realistically achievable in CP4 (in terms of further improvements).

1.3 Network Rail has told us that it does not endorse all the findings of this report and it will provide further detail setting out its concerns as soon as possible.

Maintenance Unit Costs (MUCs)

1.4 Network Rail has implemented a robust reporting and governance process for MUCs, which includes clear reporting specifications and management attention to deal with problems on a frequent basis. There has been intensive focus on activities designed to improve MUC measures over the past twelve months. These are very positive developments. However, data quality is still poor, arising from shortcomings in time recording and cost allocation at a local level within the business and a lack of systems integration that could otherwise resolve some of the problems we have identified. Furthermore, the MUC reporting process relies on intensive management control to ensure that data quality is maintained. Taking these factors into account, we do not believe that the MUC framework is currently fit for purpose.

1.5 There have been notable changes in Network Rail's approach to MUCs compared to CP3. This is as a result of senior management attention and engagement with maintenance staff at Route and MDU level. These changes appear to have had a positive effect on the attention given to improving data quality/reliability throughout the organisation. This work is still considered as "work in progress" by Network Rail.

1.6 In our opinion, a further 2-3 years of reliable reporting will be required before we can have confidence in the long-term consistency of MUC data, and a reliable time-series of unit costs can be obtained.

1.7 Based on our experience, there are very few other infrastructure enterprises/sectors where maintenance unit costs are collected to the same level of detail found in Network Rail. It is more common for enterprises to focus their cost analysis activities on renewal and capital projects. However, as many maintenance tasks within Network Rail are repeated on a regular basis, recording maintenance unit costs within a clearly defined process has the potential to provide meaningful and useful information to better understand the organisation's maintenance costs.

1.8 We consider the main risk in the MUC data process is in relation to manual time and cost allocation processes. These rely on the diligence of maintenance workers to accurately allocate their time. Whilst this process appears to be improving (as a result of increased management attention over the past 12 months), it will require ongoing attention to ensure that data quality is maintained and improved.

1.9 Within CP4, it should be possible for Network Rail to continue to improve data quality to a level where reported MUCs can be used for developing Network Rail's business plan for CP5 and by ORR to inform the PR13 determination process.

1.10 With further work on the framework, increased coverage should also be possible. However, this is likely to make year-on-year comparisons difficult, unless a process of re-stating prior years' unit costs is introduced.

1.11 Our recommendations and observations are summarised as follows:

- Currently individual MUCs vary widely during the year because of cost and activity recording problems. Network Rail attempts to resolve problems as part of a "week three" review process. We understand a formal internal audit of MUCs only takes place at year end. Network Rail should consider a number of interim close-outs during the year, so that a more reliable view of actual MUCs can be provided on an on-going basis.
- Current initiatives for improving efficiency are largely focused on improving productivity at MDU level. In line with reporting of efficiencies in other sectors (such as the water industry), Network Rail may want to consider development of reports for ORR on key initiatives during CP4 that are driving efficiencies. Records of positive management actions could then be used to evidence progress of delivery of improvements reflected in MUC outputs. The ownership, progress and results from these initiatives could be reviewed to provide status reports. Some form of visualisation of the "glide-path" to meeting efficiency targets for CP4 could be provided.
- We recommend that MUCs are changed so that only time on tools is recorded - as stated in Network Rail's Annual Return for 2009 - to improve data quality.
- Our review of Network Rail Standard FRM702 (which provides guidance on MUC definitions) found that the document provides a coherent and consistent description of activities and processes. We would recommend that Network Rail continues to review FRM702 to improve its understanding and consistency of reported unit costs.
- Network Rail should present a business case which demonstrates the potential costs and benefits of linking the current work allocation (Ellipse) and cost recording (Oracle) IT systems to reduce the potential for mis-coding of timesheets and to reduce the scale of the requirement for manual data processing and checking.
- Network Rail should continue developing econometric approaches to maintenance cost analysis at MDU level. This may provide a useful "compensating measure" (ie complement MUC data) for the PR13 process.
- Network Rail should focus on moving costs out of general codes (MNT022 etc) and develop further MUCs to improve coverage.
- Network Rail should develop a programme for improving the coverage of MUCs which should include a reduction in the use of "general" MNT codes and the allocation of indirect head-office costs to MUCs.

Cost Analysis Framework (CAF)

1.12 The Cost Analysis Framework (CAF) is a process for recording volume and unit cost data from Network Rail's asset renewal (and other) projects. The CAF process has been in use since 2006 with the aim of providing data for the Annual Return and a greater level of transparency of unit cost efficiency.

1.13 The CAF process has been found to be reasonably robust. Some improvements could be made in terms of supporting documentation. Network Rail's use of actual cost data to model and challenge unit costs for assets has great value. This approach is frequently used in the utility and aviation sectors. The key issue in determining the effectiveness of the CAF however, is the level of coverage achieved. At present levels, we consider that coverage is insufficient to provide

enough confidence that the outputs from the CAF are usable for the tasks ORR has asked us to consider.

1.14 Coverage for renewals in 2009/10 is projected to reach 71% by the end of P13. This is somewhat below Network Rail's target of 85-90% but represents a considerable improvement from coverage of 47% in 2008/09. Track renewals projects do not follow the CAF process. The "adjusted" (CAF only) figure for 2009/10 coverage is therefore 60%.

1.15 We are unable to state why coverage is particularly low in areas such as Electrification, Plant and Estates. We believe that in areas of low coverage, Network Rail needs to provide further explanations for the shortfall in coverage as well as key management actions that have taken place to improve performance. This is pivotal to determining the appropriateness of the system for use during CP4 and as the basis of the determination stemming from PR13. Low coverage may be due to inadequate resourcing, a lack of familiarity with process, problems at Territory level or due to project scope falling outside of the Repeatable Work Item (RWI) structure. Further external audits as part of any future review could help to understand the reasons behind low coverage.

1.16 Our audit of sample CAF data and interviews found no examples of inappropriate allocation of direct or indirect costs. (This was not, however a full"year end" audit and was targeted at a sample of specific asset categories and territories.)

1.17 Our recommendations and observations are summarised as follows:

- Implement management action plans to resolve non-coverage at local level for the asset categories identified.
- Identify actions to be taken to deal with the "lag" (delay in capturing CAF data for a given control period due to the length of time for some projects to be closed out and CAF data captured) evidenced by this year's CAF returns - particularly with regard to the needs of PR13.
- Identify track renewals process benefits and implement across other asset categories particularly with regard to a "programme" approach to procurement and delivery.
- Improve the quality of Work Instructions with regard to context, roles and responsibilities (e.g. Responsible, Accountable Consulted and Informed (RACI) matrices) and toolboxes. Consider the use of process "Champions" by territory to provide advice and guidance.
- Performance measurement is clearly labour intensive. Network Rail should review whether present staffing levels are sufficient to service the CAF process.
- Consider the use of refurbishment project categories to reflect the extent of work being delivered (e.g. Cat A to C is common in the commercial fit-out sector). Network Rail's present project category structure is arguably basic. External consultation with sector experts may be advisable.
- Implement target benchmark rates into the UCM for RWIs where new technologies or construction methods are being implemented. This would provide greater visibility of performance targets and provide a benchmark to help monitor future performance.

Cost Efficiency Measure (CEM)

1.18 The CEM is a high level comprehensive financial KPI that aims to indicate the quantum of efficiency delivered by Network Rail in a given year. The CEM covers Network Rail's Operations, Maintenance & Renewals (O, M&R) activities - some 68% of total expenditure (as detailed in Network Rail's 2010 CP4 Delivery Plan). The CEM has been recently introduced by Network Rail for use in CP4. Network Rail has stated that the CEM is designed to fulfil three key purposes:

- It is a means to monitor progress against the "PR08 challenge" to deliver efficiencies with a trajectory of 21% over CP4.
- As a high level KPI to be used both internally and externally – by ORR, DfT and Transport Scotland (TS) to monitor efficiency.
- As a measure to determine 20% of the Management Incentive Plan and the General Bonus Scheme.

1.19 We have identified a number of observations about the complexity of the CEM that we think merit further consideration. These include the following:

- The extent to which the measure is actually understood by those who in part are remunerated by it.
- The extent to which the CEM measure is understood by non-executive directors.

1.20 Non-controllable costs are not included in the CEM. What constitutes a non-controllable cost should be agreed between Network Rail and ORR.

1.21 Currently, the CEM baseline does not consider efficiency against the determination as Network Rail uses the measure to reflect performance against its pre-efficient baseline. Steps could be taken which would provide the ORR with more of a narrative about the efficiencies reflected in the CEM. Firstly, we recommend that Network Rail issues variance reports (on at least a 6 monthly basis) detailing how efficiencies have been delivered through positive management actions. Secondly, Network Rail should consider calculating the CEM against the determination. This would enable ORR to understand how reported efficiencies against the pre-efficient baseline - and the determination - vary.

1.22 The CEM weights maintenance and volume efficiency equally, unlike the previous measure (the FEI). We consider that this is appropriate as it allows the CEM to reflect the behaviours that are encouraged through ORR's incentive framework. If renewals and maintenance were not weighted equally, the CEM would arguably give a distorted view of the actual efficiencies created by Network Rail in any given Control Period.

1.23 Due to data quality and coverage challenges that exist in the CAF and MUCS, it is difficult to place confidence in CEM "heat map". This problem is compounded by a lack of consistency in the baselines used in the CEM.

1.24 We consider the CEM has the potential to create a risk of "perverse" incentives (through its role in employee remuneration), even if this risk has diminished as a result of the CEM replacing the FEI. We are not stating that Network Rail has been manipulating efficiencies. However we believe a risk stems from the way in which Network Rail reports its renewal volume efficiencies and the apparent absence of a visible and auditable connection between cost efficiency and "sustainable" asset strategies. We consider the connection between volume efficiencies and asset sustainability needs to be formalised thorough the creation of a transparent process and appropriately documented, auditable decisions.

1.25 As a result of the concerns with the CEM that have been highlighted, we do not at this stage believe that the measure is either robust or fit for purpose. In terms of what is achievable in CP4, we consider a more definitive judgement cannot be made without at least two or three years of data.

1.26 In discussions with Network Rail, the company has asked us to suggest alternatives to the CEM. Network Rail should be expertly placed to develop further thinking in this area. Notwithstanding this, we do consider that the development of more comprehensive, auditable "efficiency improvement plans" which clearly define the "owner", impacts and timescale for the delivery of improvements along with details of positive management actions lying behind savings that are to be delivered, would be a significant step forward. Progress against the plans could be measured using Earned Value type analysis which indicates cost control and progress in creating value in a project against a pre-defined scope. This concept

is used in many companies and industries. Efficiency plans could build on the "visualisation" techniques used commonly by companies such as Tube Lines, London Underground (former Metronet infracos) Arriva Cross Country and Bombardier.

1.27 We believe that good practice in the regulated utility sector involves positive management actions to be identified in order to allow for efficiency savings for renewal projects to be "claimed". Whilst Network Rail has stated that its efficiency declarations will be audited at financial year end, we consider it is worthwhile evaluating the extent to which more regular audits (for example quarterly or on a six monthly basis) should be implemented – combined with the suggestions noted in the previous paragraph. This would reduce the risk of "surprises" at the end of the financial year. For 2009/10, at the time of writing, we understand the audit of efficiencies was yet to take place. It is therefore not possible for us to provide an opinion on the robustness or appropriateness of the audit process or indeed its results.

1.28 Our recommendations and observations are summarised as follows:

- Network Rail should consider bringing in concepts such as asset condition shortfall tests, residual life and residual value type measures into the review of asset sustainability.
- There is considerable scope for Network Rail to improve the way in which it devises and reports renewals efficiencies. There is strong evidence of increased awareness and motivation at a regional level to deliver renewals efficiencies. We would suggest that these initiatives are more robustly captured and controlled.
- Network Rail should consider undertaking a greater frequency of efficiency audits, so reducing the risk of year-end 'surprises'.
- An overlap period should be created for the CEM and FEI allowing comparison of the two measures. Network Rail should consider if the CEM could be restated for CP3 (perhaps from the CP2 "exit (or closing) position") and the FEI should also be calculated through CP4 and into CP5.
- The methods used to calculate the baselines for the numbers in the CEM "heat map" should be harmonised to improve consistency.
- Network Rail should consider redesigning the CEM "heat map". The colouring system should be removed, a weighting should be given next to each number on the heap map and the use of arrows and lines should be reconsidered.
- Network Rail should issue variance reports, on at least a 6 monthly basis, that detail how the efficiency reported by the CEM has been delivered.
- Network Rail should consider calculating the CEM against the determination.
- Auditable 'efficiency improvement plans' with clearly defined owners, impacts and timescales should be produced covering the delivery of efficiencies. These should give details of the positive management actions lying behind savings. Consideration should be given to monitoring progress against the plans using Earned Value type analysis.
- Visualisation techniques should be integrated with efficiency improvement plans'. This would help motivate staff at all levels of the organisation, make the transfer of knowledge associated with these initiatives more straightforward and make their audit more robust and transparent.

Financial Value Added (FVA)

1.29 The Financial Value Add (FVA) is a high level KPI introduced in 2009/10. This indicator is defined by Network Rail as "the differences between the ORR's income and expenditure determinations and Network Rail's actual income and expenditure."

1.30 For year three onwards from the beginning of this Control Period, Network Rail will be using the FVA as the sole measure to determine the level of Long Term Incentive Plan (L-TIP) for senior executives of the company.

1.31 The FVA has been developed as single measure to replace the two measures used to determine the level of senior management incentive payments during CP3. The previous measures, the Public Performance Target (PPT) and the cost reduction target (covering, controllable opex, maintenance, renewals) were focused on Network Rail's management's delivery of an efficient and punctual rail network.

1.32 We believe the FVA therefore represents an improvement upon the previous measures by virtue of its scope and potential stringency of the targets it sets for management.

1.33 The FVA has expanded the scope of business risks against which Network Rail's management performance is measured. We believe the aim of the FVA is to measure Network Rail's management's ability to manage all controllable business risks. We consider this should include financial risk management, tax risk management and long-term asset condition (as a proxy for maintenance of the firm's competitive advantage) to mention three value drivers identified within a traditional shareholder value analysis.

1.34 Our review of the FVA identified some risks currently defined as uncontrollable costs which the ORR considers Network Rail has some ability to manage such as the costs of the British Transport Police, financing costs and tax paid. Their inclusion in the FVA would arguably provide a more complete picture comparable to total shareholder returns in a private company. By way of illustration, we found that accretion interest on index linked debt and financial losses or gains from foreign currency revaluations are excluded from the FVA calculation. We believe these to be controllable as these are risks introduced to the business as a result of management decisions.

1.35 We note that the FVA does not include a measure for the long term quality of the company's asset base. Arguably, the inclusion of Schedule 4 and 8 costs/income measures the impact of management decisions on the quality and performance of the RAB potentially over a (one to two year) investment horizon. These compensation payments may not however reflect the potential for insidious decline in the quality or performance Network Rail's asset base over time.

1.36 Network Rail's management and the ORR could remove these risks by either allowing the ORR or a third party to set the annual baseline for the FVA or turn the FVA into a KPI measured over the entire Control Period rather than annually for the purpose of making L-TIP payments.

1.37 We have not been made aware by Network Rail's management of any external advice sought in the development of the FVA measure. We believe Network Rail's management would benefit significantly by further developing this measure in consultation with external stakeholders such as the ORR and Network Rail's statutory and regulatory auditors.

1.38 Our recommendations and observations are summarised as follows:

- We recommend the audit of the application of the regulatory accounting guidelines to the FVA be conducted in conjunction with the audit of the account balances for the regulatory accounts.
- At the year end, if not already planned, Network Rail considers providing a reconciliation of the FVA to the outturn shown in either the regulatory or financial accounts. This should be submitted with relevant supporting

explanations and evidence for audit with either the regulatory or financial accounts.

- Consideration is given to changing the basis of calculating the targets for the FVA to targets developed by a body independent of management. An alternative means would be an FVA target set by the ORR.
- Network Rail engages with the ORR to ensure the principles used in the derivation and calculation of the FVA are consistent with the principles envisaged when the FVA was developed.

Ove Arup & Partners Limited

20 May 2010

2 Introduction

Network Rail cost efficiency framework

2.1 As for many infrastructure intensive businesses, good quality unit costs are considered essential for the effective and efficient management by Network Rail of its activities. Equally, they are important to the Office of Rail Regulation (ORR) to help it to monitor Network Rail's progress in delivering efficiency, paint a wide picture of the business' performance and inform regulatory decisions.

2.2 During Control Period 3 (CP3) (April 2004 to March 2009) Network Rail developed a range of maintenance and renewals unit costs which the ORR used as part of its approach to monitoring Network Rail's efficiency. For Control Period 4 (CP4) (April 2009 to March 2014), Network Rail is committed to improving its unit cost framework. It has agreed with ORR that its new unit cost framework would be audited by the Independent Reporter (IR) - Arup. This report presents the findings from that audit process.

2.3 Network Rail has told us that it does not endorse all the findings of this report and it will provide further detail setting out its concerns as soon as possible.

Reporter mandate

2.4 ORR has asked the Independent Reporter to provide an opinion on:

- Network Rail's Unit Cost Framework (UCF) and in particular whether the unit cost framework is robust and fit for purpose for use by Network Rail to provide robust plans for CP5; how appropriate it is to be used for monitoring Network Rail's progress against the determination for CP4 (Periodic Review 2008 (PR08)); and as the basis for ORR's CP5 determination in 2013;
- whether the new Cost Efficiency Measure (CEM) robust and fit for purpose;
- whether the new Financial Value Added (FVA) measure robust and fit for purpose; and
- what is realistically achievable in CP4 (in terms of further improvements)?

2.5 Appendix D contains full details of the mandate.

2.6 The work Arup has undertaken has been made up of the following steps:

- a review of previous reports and documentation starting with the previous Independent Reporter's work on cost analysis and maintenance unit costs from January 2006;
- a series of interview sessions with Network Rail HQ staff who have areas of responsibility in relation to creation, implementation, review and publications of data and the measures under review;
- reviews of internal policy documents and presentation material provided by Network Rail;
- audit of data feeding into the Cost Efficiency Measure and Financial Value Added measures; and
- audit sessions with a number of Network Rail "territories".

2.7 Details of Arup's overall audit methodology can be found at Appendix I.

Report structure

2.8 The remaining chapters of this report are as follows:

- Chapter 3 details our review of Maintenance Unit Costs;
- Chapter 4 covers the Cost Analysis Framework (CAF);

- Chapter 5 the Cost Efficiency Measure (CEM); and
- Chapter 6 covers the Financial Value Added Measure (FVA).

2.9 Appendices provide details on the methodologies employed, a schedule of meetings held alongside our bibliography and information/query log used to manage the process of working with Network Rail and a range of other references and more detailed findings used or generated in the course of our review.

3 Maintenance Unit Costs (MUCs)

Introduction

3.1 Maintenance Unit Costs (MUCs) have been reported by Network Rail to ORR since 2006/07. In its Annual Return 2009 to ORR, Network Rail reported on 12 MUCs.

3.2 Many maintenance activities are prescribed by Network Rail Standards, such as the frequency of track inspections or routine maintenance of signals (these are termed Maintenance Scheduled Tasks – MSTs). Inspections are used to verify assumptions on the frequency of other maintenance work and they are used to identify more urgent (reactive) maintenance tasks.

3.3 In overall terms, maintenance accounts for some 17.5% of Network Rail's expenditure over CP4 (when measured using ORR's efficient expenditure determination for PR08) – some £5.016bn in 2006/07 prices. ORR's determination presents an efficiency "trajectory" (or assumed target) of 18% over CP4 when compared with ORR's pre-efficiency estimated level of expenditure.

3.4 Table 3.1 below shows that in broad terms, track maintenance, represents some 41% of maintenance costs, (excluding indirect and other costs) followed by signalling (12%) and telecommunications (6%).

Table 3.1: Breakdown of Network Rail maintenance expenditure by cost type for CP4

Core maintenance	% of total
Track	41%
Signalling	12%
Telecoms	6%
Electrification	3%
Plant & Machinery	1%
Core maintenance sub total	64%
Indirect costs	18%
Other costs	19%
Total	100%

Source: Determination of Network Rail's outputs and funding for 2009-14 (ORR).

Note: Based on Network Rail's proposed pre-efficient level of expenditure. Totals may not add up exactly due to rounding.

3.5 In generic terms, unit cost measures should provide a means of monitoring efficient delivery providing the following criteria are met (Halcrow, 2006):

- the activity must be robustly defined;
- volumes and costs must be accurately recorded and reported;
- the activity must represent a material part of Network Rail's work;
- a clear relationship between volumes and costs exists for each measure; and
- the activity must be repeated on a cyclical basis.

3.6 For Network Rail, meaningful unit cost measures can help to provide focus for managers and delivery teams to improve performance (through for example, benchmarking). The measures also provide a mechanism for indentifying and sharing best practice.

3.7 Since PR08, Network Rail has introduced new reporting systems and management procedures for MUCs. These were introduced by Network Rail to

improve data quality and to facilitate the identification of efficiencies at Maintenance Delivery Unit (MDU) level, as outlined above. MUCs are now reviewed on a regular basis at all levels of the organisation – from local Maintenance Delivery Units (MDUs) to Network Rail Board level.

3.8 This improvement process was summarised in a presentation by the Director for Infrastructure Maintenance to ORR on 12 September 2009; key elements of which included:

- Phase 2a establishment of the Delivery Unit as the standard comparison point;
- Phase 2b/ 2c devolving MUC activities to Section Manager level, to be completed in 2010/11; and
- use of benchmarking and theoretical MUCs to drive down average costs (commencing April 2010).

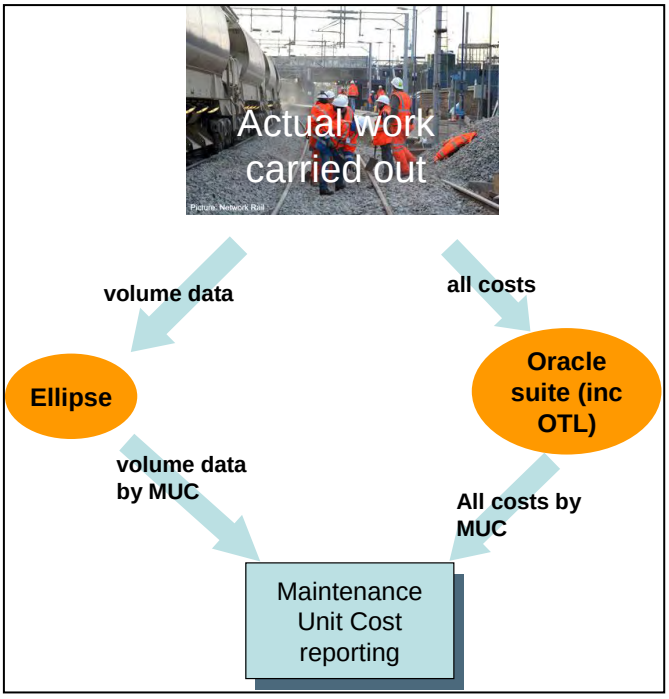
3.9 We comment on Network Rail's progress against this plan, later in this section of the report.

MUC Overview

3.10 The current MUC framework allows Network Rail to gather data on maintenance expenditure by Maintenance Delivery Unit (MDU), of which there are 40 across Great Britain.

3.11 Information flows are summarised in Figure 3.1 below.

Figure 3.1: Stylised overview of MUC Reporting



Source: Network Rail, September 2009

3.12 A more detailed process diagram is included in Appendix E.

3.13 The most important information systems related to MUCs are as follows:

- Ellipse work management system, which records the volume of activities that are undertaken (e.g. track miles inspected);
- Oracle system (OTL) for recording the cost of direct maintenance labour, allocated to MUCs; and

- Other costs such as materials, plant-hire and subcontract labour, costed through Network Rail's financial systems – BMIS.

3.14 Data are extracted from these systems into Excel, where macros are used to generate reports for each Delivery Unit. These reports are then circulated to the relevant local delivery teams and upwards to the senior management team. There are data quality risks when using Excel for post-processing of the data from corporate systems, which needs to be carefully controlled by Network Rail. We recommend that Network Rail should integrate these reports into one of their corporate systems to ensure that outputs can be generated in a more controlled environment.

3.15 Information on maintenance (unit cost) expenditure also feeds into the Financial Value Added (FVA) and Cost Efficiency Measures (CEM).

MUC Framework

3.16 Network Rail has developed the MUC framework to cover 44 unit costs, covering three high-level categories of: Permanent Way (P'way), Signalling and Telecommunications (S&T) and Other infrastructure (mostly off-track work such as vegetation management).

3.17 The ten MUCs with the highest expenditure are shown in Table 3.2 below.

Table 3.2: Top 10 MUCs captured by Network Rail

Ellipse Reference	Category	Description	% of total expenditure
MNT013	P'way	Level 1 track inspections	6.9%
MNT002	P'way	Rail changing	5.9%
MNT019	P'way	Manual correction of plain line track geometry	4.5%
MNT050	S&T	Point end routine maintenance	3.7%
MNT051	S&T	Signals routine maintenance	3.2%
MNT001	P'way	Manual ultrasonic inspection of rail	2.9%
MNT008	P'way	S&C unit renewal	2.7%
MNT007	P'way	S&C tamping	2.3%
MNT074	Other	Vegetation management	2.2%
MNT004	P'way	Plain line tamping	2.2%
Total	-	-	37%

Source: Network Rail, Management Accounts, Period 10 2009/10

Totals may not add up exactly due to rounding

3.18 As can be seen, the 'top 10' MUCs cover approximately 37% of total maintenance expenditure for 2009/10 on a pro-rated basis (i.e. as at P10 2009/10). We review the extent of "reliable MUC" coverage as a proportion of total maintenance expenditure further on in this section of the report.

3.19 The rules for reporting MUCs have been substantially revised in the past 12 months, with the intention of improving the understanding of cost drivers and to reduce the potential for data-coding errors. FRM702 is the key Network Rail Specification for Maintenance Unit Costs. The version that we reviewed is version 1.11 dated 1 October 2009. Our review of FRM702 found that in general the document provides a coherent and consistent description of standard

maintenance activities and the process for allocating labour and non labour costs. For each MNT activity there is a description of the activity and the unit of measure. The document now also includes descriptions of items specifically excluded, items specifically included and a list of example tasks.

3.20 The previous Independent Reporter identified some possible ambiguities with the definitions provided in the Draft 9A version of FRM702. It would appear that the majority of these ambiguities have been addressed in the latest version of the document available.

3.21 The document appears to be well understood at Route and Maintenance Delivery Unit (MDU) level. The evidence presented to us in our audits suggests that each Route has taken up initiatives to brief ground level staff on the interpretation of FRM702. There was also good evidence of the willingness of Route office staff to support Section Level staff by responding to any queries or problems relating to booking time, work volumes or material orders and through the provision of support materials such as job number cards and prompt sheets.

3.22 From the discussions we have had with Route and Maintenance Delivery Unit (MDU) level staff, there appears to be a general sense that MNTs are well defined, understood and applied consistently, but it was also clear that there needs to be constant attention to the allocation of time, costs and activities to ensure that the resulting unit costs are reliable.

3.23 A detailed review of FRM702 is contained in Appendix F which contains some recommendations for changes to the Standard. Network Rail may want to consider these changes as a means of improving the quality of data recording and improving the understanding of the individual measures.

3.24 In particular we note that in AR2009, Network Rail stated that MUCs would be amended so that only "time on tools" would be recorded "to improve data quality". This has not happened. Total time is still recorded for each MUC measure. We recommend that further OTL codes should be introduced for 2010/11 to allow maintenance staff to record both "time on tools" and other non-productive time (e.g. travel) against a specific MNT code. This would enable a greater understanding of cost drivers – on a like-with-like basis, whilst still allowing the costs to be aggregated at MUC level to enable consistent reporting.

Governance, systems and processes

3.25 Network Rail undertakes detailed and regular reporting of MUCs from MDU and Route level to Head Office, which occurs twice every reporting period. The reporting process is summarised below (based on our Western Route audit):

- Week 1: HQ Finance run MUC reports and send to Route and MDU; MDUs run reports on Ellipse volumes (to check for errors) and comment on the HQ reports;
- Week 2: MDUs review the initial MUCs and correct any apparent data issues (activity or cost mis-bookings) based on identification of any "gross" errors in the reported MUCs);
- Week 3: Ellipse volumes are corrected by MDU if required and the Route management team holds a Steering Group Meeting to review outputs. HQ Finance run the final MUC model reports, by MDU, which includes a 6-point action plan for each MDU to improve the quality of MUC reporting; and
- Week 4: BSMs run OTL exception reports for missing timesheets and outputs from the Route Steering Group Meeting are fed-back to MDUs.

3.26 At HQ level, we were told that Network Rail Board review a rolling "Top 6" MUCs each period, summarised by MDU.

3.27 The reports generated by Network Rail HQ contain commentary on each MDU, the national theoretical unit rates, local MDU theoretical unit rates and actual unit rates in the period. In addition, there are comments where mis-coding errors are identified which may have influenced the unit rates (up or down). The retrospective correction of any time/ activity bookings is dependent on the local MDU keeping good quality records of actual events. The process is time consuming and has the potential for introducing further errors into the reported MUCs. Our recommendations (summarised at the end of this chapter) could help to mitigate these risks.

3.28 Data improvement targets have also been identified for each specific MDU by Network Rail.

3.29 In addition, both Route/MDUs and Network Rail HQ told us that initiatives such as "Share with Pride" – an intranet based process for sharing best practice across MDUs - were used frequently at local level.

Accuracy of MUCs

3.30 A key indicator of the likely accuracy of data generated from a unit cost system covering repeatable activities is the extent of variation generated over time or between the different cost centres reporting data. Some MUCs are likely to be more accurate than others, due to the nature of work activities being measured. (For example, some activities are more frequently undertaken and therefore have a bigger "population" from which to generate results. Level 1 track inspection is the most obvious example of a MUC of this nature.)

3.31 As part of our review, we have looked at both year on year variances in some key unit costs as well as comparisons across Maintenance Delivery Units. The results we were provided with are shown in both Table 3.3 below and Table 3.4. The 2009/10 information shown below is to Period 10, rather than year-end.

Table 3.3: MUC variances – 2006/07 – 2009/10 (unaudited for 2009/10)

MUC outputs (DRAFT) 2009/10 (P10)	Maintenance Unit Cost 2008/09 prices				% change
MUC Description	2006/07	2007/08	2008/09	2009/10	2008/09 to 2009/10
Rail Changing	79	80	55	106	93%
Manual Spot Re-sleepering	142	148	138	173	25%
S&C Unit Renewal	10,480	8,812	8,817	10,674	21%
Replacement of S&C bearers	288	315	295	212	-28%
S&C weld repairs	NA	416	349	719	106%
Level 1 Track Inspections	42	48	54	87	62%
Weld Repairs of Defective Rails	NA	485	471	495	5%
Manual correction of plain line track geometry	15	15	18	19	7%
Point End Routine Maintenance	168	60	59	56	-6%
Signals Routine Maintenance	115	50	61	89	46%
Track Circuits / Train Detection Services	133	50	60	52	-13%

Source: Halcrow, Annual Return Audit 2009, August 2009; Network Rail Management Accounts to P10 2009/10

3.32 As can be seen in both Table 3.3 and Table 3.4 (overleaf) even with the track inspection and rail changing measures (which as noted in Table 3.2 are two of the largest unit cost categories) there is a wide variation in reported costs by MDU. The reported MUCs are influenced by changes in reporting requirements (Standard FRM702), differences in the balances of work between Routes and MDUs (as costs vary because of both the physical nature of the network such as the frequency of access points and work practices at MDU level) and ongoing data quality issues. We consider Network Rail should quantify the influence of each of these factors to explain the underlying variation in unit costs. Furthermore, reporting definitions for 2009/10 have changed, which means that year-on-year comparisons cannot be made. We believe Network Rail need to re-state prior-years' values where definitions have changed, so that meaningful comparisons can be made.

Table 3.4: Results for MUCs up to Period 10 2009/10, showing variation of values by Maintenance Activity Code (MNT) and Maintenance Delivery Unit

Ref	Activity Description	ANG	KNT	LNE	LNN	LNS	M&C	SCT	SSX	WES	WSX	Coefficient of Variaton
MNT001	Manual Ultrasonic Inspection of Rail	107%	3%	-19%	41%	66%	-31%	28%	38%	-38%	-42%	15%
MNT002	Rail Changing	72%	82%	-29%	-16%	14%	62%	-5%	-43%	-18%	36%	16%
MNT003	Manual Spot Re-sleepering	-10%	118%	-57%	2%	45%	21%	7%	55%	11%	66%	26%
MNT004	Plain Line Tamping	33%	45%	-18%	19%	33%	-60%	6%	54%	-40%	27%	10%
MNT005	Stoneblowing	36%	67%	26%	-29%	4%	-26%	13%	30%	-30%	6%	10%
MNT006	Manual Wet Bed removal	15%	10%	-27%	18%	55%	2%	-3%	121%	-6%	-34%	15%
MNT007	S&C Tamping	67%	6%	26%	19%	46%	-12%	-10%	-52%	-18%	-52%	2%
MNT008	S&C Unit Renewal	48%	29%	-30%	-7%	38%	-7%	-56%	7%	14%	-12%	2%
MNT009	Mechanical Spot Re-Sleepering					-5%				104%		50%
MNT010	Replacement of S&C bearers	69%	35%	-32%	-13%	52%	20%	20%	33%	-10%	2%	18%
MNT011	S&C weld repairs	36%	-22%	14%	-27%	83%	-42%	8%	78%	-14%	-54%	6%
MNT012	Mechanical Wet Bed removal	45%	43%	-56%	292%	3%	113%	243%	-12%	-15%	334%	99%
MNT013	Level 1 Track Inspections	-28%	31%	11%	28%	27%	34%	-30%	-45%	-4%	-22%	0%
MNT014	Mechanised Track Inspections			-32%		166%		-58%		-20%		14%
MNT015	Weld Repairs of Defective Rails	-4%	-37%	-15%	-14%	54%	-40%	27%	-11%	7%	35%	0%
MNT016	Installation of pre fabricated IRJs	85%	33%	9%	157%	25%	36%	-36%	169%	-80%	111%	51%
MNT017	Mechanical reprofiling of ballast	69%	24%	0%	102%	-34%	-22%	0%	11%	-18%	78%	21%
MNT019	Manual correction of plain line track geometry	0%	2%	19%	13%	20%	10%	3%	-45%	-31%	-11%	-2%
MNT020	Manual reprofiling of ballast	63%	-45%	53%	6%	16%	-12%	-25%	3%	-38%	23%	5%
MNT050	Point End Routine Maintenance	2%	-5%	-1%	9%	32%	6%	-18%	-31%	-7%	-7%	17%
MNT051	Signals Routine Maintenance	72%	-37%	42%	-1%	3%	-52%	18%	-52%	-34%	-34%	42%
MNT052	Track Circuits / Train Detection Services	-10%	29%	-5%	-35%	21%	-16%	1%	-4%	2%	2%	23%
MNT056	Level Crossings	-25%	85%	-14%	42%	26%	10%	-7%	-33%	16%	16%	36%

Source: Network Rail Management Accounts, Period 10 2009/10

3.33 Table 3.4 suggests that there is a wide variation at Maintenance Delivery Unit level in the MUCs compared to the national average. Some of this variability can be explained by differences in the nature of the route (electrification, high-speed rail, traffic density etc.) but the levels of variation do not appear consistent with those we would expect to see being produced from a stable reporting process, as demonstrated during our audit visits, which are discussed below.

3.34 It must be noted that the above outputs are not year-end figures and therefore there will be ongoing cost and activity allocation issues which will add to the variability of MUCs during the year. We would expect a thorough review by Network Rail at year-end, to ensure that unit costs reported in the Annual Return do not contain these errors. In addition, we suggest that Network Rail considers further measures on a quarterly or (if this is impractical) six-monthly basis to audit MUC data. This might have the advantage of providing more meaningful management information on maintenance unit costs before the full year audit of MUC data that takes place post year end.

3.35 Because of the variance in MUCs during the financial year, it would not have been productive for us to undertake a detailed audit of individual MUC costs. However, we recommend that this activity should be undertaken as part of the annual audit review for 2009/10, when the finalised numbers (costs and activities) for the year will be available.

3.36 As data quality improves, we would expect to see a smaller variation in comparable data for MUCs over time and for (big) variances to be comprehensively understood by Network Rail.

Coverage

3.37 Table 3.5 below summarises the progress that Network Rail has made in implementing the MUC framework since 2004/05. The number included in the Annual Return represents the number of measures which Network Rail considers is of sufficient data quality at the time of publishing.

3.38 Network Rail reported on 12 MUCs in their Annual Review for 2009, which it considered were reported in a robust manner. Coverage of these 12 MUCs (now 11 as “Arc weld of defective rails” is no longer recorded separately) was approximately 32%.

Table 3.5: Number of MUCs implemented and reported by Network Rail 2004/05-2009/10

Year	Number of MUCs Implemented	Number of MUCs reported in Annual Return
2004/05	15	0
2005/06	18	0
2006/07	18	9
2007/08	23	12
2008/09	44	12
2009/10	44	pending

Source: Halcrow Report 08/05/2009 “Preliminary Data on Efficiency 2008/09”, Network Rail Annual Return 2009

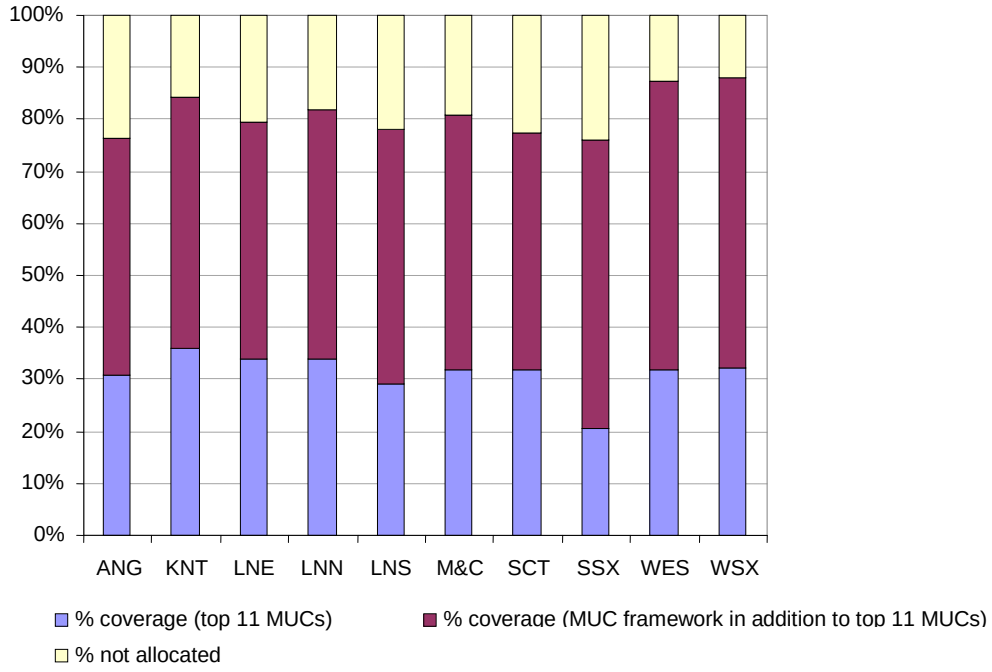
3.39 Network Rail noted in its 2009 Annual Return that it expected to publish a greater number of MUCs in Annual Return 2010, subject to satisfactory data quality. At the time of writing, Network Rail has not indicated how many MUCs will be reported in the 2010 Annual Return.

Table 3.6: MUC coverage by value and Route 2009/10 (to Period 10)

MUC coverage by Route (P10 2009/10)										
Route	ANG	KNT	LNE	LNN	LNS	M&C	SCT	SSX	WES	WSX
% coverage (top 11 MUCs)	31%	36%	34%	34%	29%	32%	32%	21%	32%	32%
% coverage (all MUC framework)	76%	84%	79%	82%	78%	81%	77%	76%	87%	88%
% not allocated	24%	16%	21%	18%	22%	19%	23%	24%	13%	12%

Source: Network Rail Management Accounts P10, 2009/10

Figure 3.2 MUC coverage by value and Route 2009/10 (to Period 10)



Source: Network Rail Management Accounts P10, 2009/10

3.40 As can be seen from Figure 3.2 above, approximately 80% of maintenance costs are allocated through the MUC framework (the "top 11 MUCs" as reported by NR in AR2009 account for approximately 30% of the total value). The remaining 20% relate to the indirect overheads for costs at Route level and above, which are not currently directly allocated to MUCs, together with some general MUCs which do not currently meet criteria for separate reporting.

3.41 Within the MUC framework there are three MNT codes that represent general activities: MNT022 "Other Pway", MNT053 "Other S&T" and MNT054 "Rapid response S&T". These codes are used to capture costs, but they do not have an associated unit of measure and therefore there are no corresponding MUCs for these costs. The total expenditure against these items is around 20% of the total. Network Rail is rightly monitoring cost and activity allocation against these codes, as they have the potential to distort results for the MUCs.

3.42 We expect that coverage of MUCs should improve in the next 1-2 years if Network Rail continues to focus on reducing the extent to which costs are booked to general MNT codes and developing a process for allocating indirect costs to the MUCs. Network Rail does not anticipate that MUC coverage as a percentage of total maintenance cost will materially increase over the next 1-2 years, as it does not believe that the MUCs will satisfy the criteria outlined in paragraph 3.5.

Indirect cost allocation

3.43 Indirect costs are allocated to MDU level within the MUC process, through standard daily rates by maintenance discipline, which are consistently applied nationally. These costs include indirect supervision staff at MDU level, accommodation, vehicles and so forth.

3.44 Network Rail explained that this process was undertaken by reviewing the historic P&L costs across the network (to MDU level) to derive indirect cost allocations. Network Rail told us that it has not reconciled these standard rates against actual costs, but that it expected any differentials to be small. This may be an issue that Deloitte should review as part of its audit process for 2009/10.

3.45 Network Rail is considering changing the cost allocation of pensions for direct labour in 2010/11, which would mean that it would be difficult to compare MUCs on a year-on-year basis unless restatement of historic data was undertaken. As elsewhere in this report, we strongly recommend that restatement of historic data is undertaken to preserve the integrity of the datasets in question and allow for meaningful comparisons to be made over time; a process that will help to provide confidence in MUCs in the future.

Developments since the Halcrow 2006 report

3.46 Since the Independent Reporter report "Audit of Network Rail's Roll Out of Cost Analysis Frameworks and Maintenance Unit Cost Measures" (January 2006), we understand the following actions have taken place against the issues identified:

- cost allocation for materials or plant that work across multiple activities is undertaken on the basis of the original purchase order or requisition. This may give rise to cost allocation problems if the materials or plant are used on multiple activities and if they are used across different reporting periods. This aspect should be tested during detailed audit of the final 2009/10 MUCs;
- there was an initial programme of activities for data improvement in MUCs (related to MIMS/ Ellipse data quality). There have been significant recent initiatives in this area over the past 12 months, but we have not seen evidence of a detailed improvement plan for the remainder of CP4;
- as part of an expansion of MUC framework to cover other areas of expenditure, Halcrow mentioned a potential MUC for level crossings. This has been implemented by Network Rail (MNT077) and covers approximately 1% of total maintenance investment. Other new MUCs have been introduced, particularly for off-track work such as vegetation management (2.2% of spend) which have been implemented and are now in a period of developing stability; and
- disparities in time, cost and activity volume recording. Halcrow noted that there were disparities in the booking of costs and activities to MUCs between areas and territories because of differences in interpretation and difficulties in the cost allocation process. There has been increased focus by Network Rail in the last 12 months to address these concerns, but these remain challenging issues for Network Rail to resolve in their entirety.

3.47 In the previous Independent Reporter report (2009) there were a number of MUC recommendations. Table 3.7 below summarises our understanding of developments since then.

Table 3.7: Status of previous MUC related recommendations

Halcrow recommendation/ observation	Current status
Recommend creation of area based MUC standard costings across all Routes and that a national method of variance reporting is instituted (10.1.41)	Reporting by MDU has been implemented and unit costs are reported across the business on a regular basis to understand the reasons for period movements in the measures.
Recommend that labour costs are captured independently to the timesheet system to avoid mis-charging of labour to specific MUCs (10.1.42)	We believe that labour cost allocation should be tied to the Ellipse work order process to ensure that mis-allocation issues are minimised (discussed in the chapter in more detail).
Method for process the MUC data before reporting and decision criteria for replacing collected data with estimated data should be reviewed and formalised. (10.1.43)	We understand that data extracts are taken directly from Ellipse, OTL and BMIS without manual intervention. Where required, corrections are made within these systems to correct any mis-bookings.
Systematic approach to collecting data entry errors in Ellipse. (10.1.44)	We understand that these controls are in place, but we have not verified this.
Responsibilities and accountability for data in Ellipse should be formalised and documented. (2007-R43)	New staff roles for BSMs at each MDU with SSMs.
Data quality levels in Ellipse are identified and reported with targets (2007-R44)	To cover in future detailed audit process.
Work activities should be described in detail to reduce the opportunity for local interpretation; to include documentation, communication and staff training (2007-R45)	Update of specification FRM702 has happened and we heard that a number of training sessions had taken place at Route and MDU level.

Source: Halcrow, Annual Return Audit 2009, Arup analysis

3.48 As part of the reorganisation process, Network Rail has introduced two new posts at MDU level with specific responsibilities for MUC data quality. These are the Business Support Manager (BSM) and Systems Support Manager (SSM).

3.49 During our audit visits, we spoke to a number of BSMs to understand their remit and understanding of the MUC process. In our view, these staff are making a positive contribution by providing a control and guidance function at MDU level – helping the Infrastructure Maintenance Delivery Managers (IMDMs) to influence behaviours.

Results from Territorial Audits

3.50 Our audit visits to Route offices in York, Swindon and Birmingham provided a high-level overview of the processes and controls that operate at Route and MDU level. We received a consistent message that MUCs were a high-priority issue for the business and that the costs were reviewed on a regular basis – from local MDU, Route and HQ level.

3.51 We focused with local staff on their understanding of variances at MDU and Route level for the MUCs. Their responses were reasonably consistent that this was a function of three main factors:

- MDUs at different stages of development/ focus on specific MUCs;

- specific characteristics of the rail network served by each MDU. For example, the extent of high-speed rail or the ease of access to the railway will influence the productivity of the maintenance teams;
- cost/ activity coding errors (on a period to period basis). When viewed on a period basis, mis-bookings require correction, which will influence the MUCs within period.

3.52 Local staff identified a number of areas where Ellipse coding could be improved to help understanding of cost drivers and to minimise the potential for mis-bookings. For example, Transport of materials (MNT021) can be interpreted differently at MDU level, leading to inconsistent reporting across a number of MUCs;

3.53 We find it somewhat surprising that a business case for systems integration between the work management system (Ellipse) and labour costing systems (OTL) has not yet been developed by Network Rail, when a layer of management has been introduced to improve data quality. The current approach may not be cost-effective and an integrated approach to data processing could help to minimise some of the inherent data-recording weaknesses such as manual processing of timesheets for maintenance staff.

3.54 During our audit visits, we identified some weaknesses with the current data management process for reporting of MUCs, which are discussed below:

- allocation of direct labour costs to MUCs relies on manual completion of timesheets by individual maintenance staff on a weekly basis and the costs are not automatically reconciled to the Ellipse work order activities, which would otherwise provide a check that timesheets were being completed accurately. We understand that this reconciliation process is not mandatory within Network Rail. Some MDUs undertake these checks on an ad-hoc basis. Local Section Mangers at MDU level are responsible for this checking process. This is a weakness in the current reporting process, which relies on maintenance staff remembering the details of their activities on a weekly basis, without a mandatory reconciliation process against work orders.
- materials costs are allocated to MUC (MNT) codes on the basis of their purchase order/ requisition, which can cause problems if the materials are subsequently used across multiple activities;
- we have seen evidence of accrual problems with materials that are purchased in bulk, as the costs are charged to the MUC immediately, when the activity may be completed over a number of periods, perhaps spanning a financial year; and
- costs and activities may be allocated to general MNT codes that do not have corresponding MUC measures, which may lead to errors in reporting of MUCs either being too high (if activities are booked to a general code) or too low (if costs are mis-booked).

3.55 In parallel with the development of national theoretical rates, individual MDUs have also developed their own theoretical MUC rates; a process which has two benefits:

- it enables them to understand the key drivers of MUCs in more detail; and
- it enables them to develop their own benchmark cost based upon the features and constraints of their own delivery unit.

3.56 Network Rail explained that particular MDU features such as the distance to access points, the type and duration of available possessions and the speed of traffic on the track will have a significant influence on the productivity and therefore cost of undertaking many maintenance activities.

Planned Efficiency Measures

3.57 At one level, Unit Cost measures are only of value if they assist with the delivery of management objectives by for example, informing plans to improve efficiency over time. In the CP4 Delivery Plan, Network Rail states that planned efficiency measures for 2009/10 have been identified and that efficiency plans for the remainder of CP4 are being developed as part of its wider transformation programme. For maintenance, CP4 delivery plan efficiency measures for 2009/10 included:

- reliability centred maintenance (RCM) of signalling equipment;
- improved rail head repair techniques;
- the use of automated ultrasonic track inspection equipment;
- in-sourcing of activities such as operational telecoms maintenance;
- more active management of rostering and overtime; and
- general productivity improvements.

3.58 During our audit visits to Route offices, we asked specific questions regarding the drivers of efficiency improvements and whether these were local or HQ initiatives. Route staff acknowledged that both local staff and HQ were driving improvements, but they did not point to evidence of structured efficiency plans generated at HQ level which reflect these specific initiatives. In addition, whilst there is strong evidence of increased awareness and motivation at a regional level to capture, review and share maintenance unit cost data (at the MTU and Route levels – such as through the "share with pride" initiative), we would suggest that positive management actions are more robustly captured and controlled. This would have a number of specific advantages including:

- ensuring that initiatives have an accountable "owner";
- that the timescales for delivery of initiatives are mapped out – reducing the risk of initiatives "falling off the radar";
- by using a standardised approach, efficiency initiatives can be "rolled up" and compared to targets for improvement that the relevant division or unit is aspiring to meet; and
- a transparent process which ensures that important questions (such as not impairing the longer term performance of the asset in question through short term cost reductions) could be used.

3.59 We consider that such an approach, when combined with so called "visualisation" techniques can help to motivate staff at all levels of the organisation, make the transfer of knowledge associated with these initiatives more straightforward and crucially, ensure their robustness and transparency from an audit perspective. Such plans help to "tell the story" or develop the narrative around efficiency plans. We consider such an approach is likely to find considerable favour with the Regulator.

3.60 This approach might also help to mitigate the following risks:

- the drive to reduce maintenance costs relies on good understanding of asset condition and rates of deterioration, particularly for long-life assets such as civils (bridges, tunnels etc.). On an annual basis, there is a risk maintenance activities could be reduced on some of these assets without an immediate apparent deterioration in performance, but in the long-term this could decrease the asset life and increase the need for future renewal expenditure; and
- in delivering an optimum asset management strategy, there can be trade-offs between maintenance and renewals. In some areas, renewal expenditure

could be deferred through increased maintenance expenditure. This policy would increase maintenance unit costs and therefore the implications of this trade-off would need to be captured and recorded very carefully.

How does Network Rail compare to other infrastructure organisations?

3.61 In our experience, in other infrastructure sectors, unit cost measures are predominantly used for capex projects rather than maintenance tasks. For example, in utility sectors such as water and gas distribution, unit cost measures have been applied to multiple companies for comparative efficiency purposes and they have been in place for a long period of time. This has helped to improve the consistency of reporting, although even in these sectors there are still concerns over data quality and coverage – even after a period of much stability in the reporting standards. For maintenance costing in the water sector, Ofwat uses a combination of standard unit costs (the costs are normalised to fit within a tightly defined specification) and econometric models, which are based on a number of years' historic data.

3.62 Many UK service and industrial sectors use time and activity based costing as part of their management information activities. Our experience from a number of other infrastructure companies in the UK, including water companies, gas distribution utilities and environment agencies (flood risk management) shows that very few (if any) of these organizations are attempting to capture maintenance unit costs at this level of detail. From our experience, a number of these organizations are developing an improved understanding of maintenance unit costs based on examination of costs within a specific asset class or geographic area, rather than being based on specific activities as is the case with Network Rail. We understand that the Environment Agency is currently implementing the use of hand-held work management devices to operations delivery staff across England & Wales, to capture information at a system level (using local supervision staff to record information, rather than for each individual operative). In the UK water sector, few companies have developed detailed maintenance unit costs, but capital maintenance costs are captured annually by asset classification (e.g. water treatment works).

3.63 In other parts of the rail sector, from our experience, recording of maintenance costs is also much in the development phase although there are pockets of activity where this does happen. This does not however mean we consider the collection of maintenance - related unit cost data is something that Network Rail should not be doing. If anything, the unusual industry structure for fixed rail infrastructure in Britain – with a *de facto* monopoly supplier - makes collection of these data all the more important.

3.64 We are aware that Network Rail has been using econometric techniques to understand the drivers of expenditure at an MDU level. This work is arguably at a relatively early stage of development. However, it has the potential to play a meaningful role in assisting the business to understand both the "root cause" of cost variance between comparable operating divisions and act as a helpful check on the quality of unit cost data being generated by the MDUs.

Conclusions

Is the unit cost framework robust and fit for purpose?

3.65 There has been an intensive focus on the MUC measures within Network Rail in the past 12 months. These measures are reported, reviewed and challenged on regular intervals by the senior management team. There have been changes in staff allocated (Business Support Managers and Systems Support Managers) to ensuring that data quality improves at MDU level. There has been a national roll-out and training process to ensure that staff are made aware of the importance of these measures. These are very positive developments.

3.66 Network Rail has implemented a robust reporting and governance process for MUCs, which includes clear reporting specifications and management action to deal with problems on a frequent basis. There has been intensive focus on

activities designed to improve MUC measures over the past twelve months. However, data quality is still poor, arising from shortcomings in time recording and cost allocation at a local level within the business and a lack of systems integration that could otherwise resolve some of the problems we have identified. Furthermore, the MUC reporting process relies on intensive management control to ensure that data quality is maintained. Taking these factors into account, we do not believe that the MUC framework is currently fit for purpose.

Is it appropriate for use as a monitoring tool during CP4?

3.67 From what we have seen in the recent audits, data quality should continue to improve providing that Network Rail continues to focus on its improvement.

3.68 In our opinion, a further 2-3 years of reliable reporting will be required before we can have confidence in the long-term consistency of MUC data, and a reliable time-series of unit costs can be obtained.

Can it be used for the PR13 determination?

3.69 At present, the use of the MUC framework at PR13 will depend on Network Rail continuing the good progress made on these measures in the past 12 months and as we have suggested above, it may be a period of 2-3 years before there is a reliable time-series of data that ORR can have confidence in.

Are the unit costs appropriately defined?

3.70 Our review of the Network Rail Standard FRM702 found that in general the document provides a coherent and consistent description of standard maintenance activities and the process for allocating labour and non labour costs. For each activity there is a description describing the activity and the unit of measure. The document now also includes descriptions of items specifically excluded, items specifically included and a list of example tasks.

3.71 There is scope for a further Network Rail review of the MUC Specification (FRM702) to ensure that unit costs are recorded and measured at an appropriate level, to improve the consistency of reporting and to aid in the understanding of cost drivers in the business.

Are unit costs aggregated appropriately?

3.72 There is a robust process for aggregating unit costs from MDU level to a national level for reporting purposes.

3.73 The process of reporting MUCs by MDU, Route and then nationally is appropriate, as this enables “buy-in” of the process at a local level and helps to develop their understanding of the importance of these measures. In some Routes, Network Rail is considering reporting MUCs by individual Section Manager, as a further development in this area.

Is the coverage wide enough to give an appropriate view of efficiency?

3.74 At present, the coverage of MUCs is around 30% for the measures previously reported in AR2009, which Network Rail believed were sufficiently reliable for reporting to ORR. Network Rail has not yet advised which MUCs will be reported in the 2010 Annual Return. On the basis of a 30% coverage, we do not consider this would be sufficient coverage to provide an appropriate view of efficiency at present.

Are unit costs determined in a framework that is clear, comprehensive and consistent?

3.75 The MUC framework is clearly defined, but there is still a number of improvements that could be made that would remove the risk of local interpretation of the Standards, such as the use of an MNT code for Transport of Materials. These can be resolved in the short term, through clarification or amendment of the existing Standard, supported by ongoing training of local MDU staff.

Comparison to CP3

3.76 There have been notable changes in Network Rail's approach to MUCs compared to CP3. This is as a result of senior management attention and engagement with maintenance staff at Route and MDU level. These changes appear to have had a positive effect on the attention given to improving data quality/reliability throughout the organisation. This is still considered as "work in progress" by Network Rail.

How does the approach compare to best practice?

3.77 Based on our experience, there are very few other infrastructure enterprises/sectors where maintenance unit costs are collected to the same level of detail found in Network Rail. It is more common for enterprises to focus their cost analysis activities on renewal and capital projects. However, as many maintenance tasks within Network Rail are repeated on a regular basis, recording maintenance unit costs within a clearly defined process has the potential to provide meaningful and useful information to better understand the organisation's maintenance costs.

3.78 Furthermore as noted above, Network Rail's position as a near monopoly provider of fixed rail infrastructure in Britain means that collecting maintenance unit cost data is an important means by which to understand the business' progress in meeting its efficiency targets and ORR's efficiency "trajectory".

Are there any risks?

3.79 We consider the main risk in the MUC data process is in relation to manual time and cost allocation processes. These rely on the diligence of maintenance workers to accurately allocate their time. Whilst this process appears to be improving as a result of increased management attention over the past 12 months, this will require ongoing attention to ensure that data quality is maintained.

What is realistically achievable in CP4?

3.80 Within CP4, it should be possible for Network Rail to continue to improve data quality to a level where reported MUCs can be used for developing Network Rail's business plan for CP5 and by ORR to inform the PR13 determination process.

3.81 With further work on the framework, increased coverage should also be possible. However, this is likely to make year-on-year comparisons difficult unless a process of re-stating prior years' unit costs is introduced.

Opinions/recommendations

Our recommendations and observations are summarised as follows:

Table 3.8: Recommendations relating to MUCs

No.	Recommendation to Network Rail	Location in Text	NR Data Champions	Arup proposed Due Date
2010.MUC.1	Currently individual MUCs vary widely during the year because of cost and activity recording problems. Network Rail attempts to resolve problems as part of a "week three" review process. We understand a formal internal audit of MUCs only takes place at year end. Network Rail should consider a number of interim close-outs during the year, so that a more reliable view of actual MUCs can be provided on an on-going basis.	3.34		Q2 FY'10
2010.MUC.2	Current initiatives for improving efficiency are largely focused on improving productivity at MDU level. In line with reporting of efficiencies in other sectors (such as the water industry), Network Rail may want to consider	3.58-3.60		Q2 FY'10

No.	Recommendation to Network Rail	Location in Text	NR Data Champions	Arup proposed Due Date
	development of reports for ORR on key initiatives during CP4 that are driving efficiencies. These positive management actions, could then be used to support evidence of delivery of improvements reflected in MUC outputs. The ownership, progress and results from these initiatives could be reviewed to provide status reports. The outputs could provide some form of visualisation of the "glide-path" to meeting efficiency targets for CP4.			
2010.MUC.3	We recommend that MUCs are changed so that only time on tools is recorded - as stated in Network Rail's Annual Return for 2009, "… to improve data quality".	3.24		Q2 FY'10
2010.MUC.4	Our review of Network Rail Standard FRM702 (which provides guidance on MUC definitions) found that the document provides a coherent and consistent description of activities and processes. We would recommend that Network Rail continues to review FRM702 to improve its understanding and consistency of reported unit costs.	3.23		Q2 FY'10
2010.MUC.5	Network Rail should present a business case which demonstrates the potential costs and benefits of linking the current work allocation (Ellipse) and cost recording (Oracle) to reduce the potential for mis-coding of timesheets and to reduce the scale of the requirement for manual data processing and checking.	3.53		Q2 FY'10
2010.MUC.4	Network Rail should continue developing econometric approaches to maintenance cost analysis at MDU level. This may provide a useful "compensating measure" (ie complement MUC data) for the PR13 process.	3.64		Q3 FY'10
2010.MUC.6	Network Rail should focus on moving costs out of general codes (MNT022 etc) and develop further MUCs to improve coverage.	3.41-3.42		Q2 FY'10
2010.MUC.7	Network Rail could develop a programme for improving the coverage of MUCs which should include the reduction in the use of "general" MNT codes and the allocation of indirect head-office costs to MUCs.	3.42		Q2 FY'10

4 Cost Analysis Framework (CAF) - Renewals

Introduction

4.1 The Cost Analysis Framework (CAF) is a process for recording volume and unit cost data from Network Rail's asset renewals, enhancements and major programmes of work. The CAF process has been in use since 2006 with the aim of providing data for the Annual Return and a greater level of transparency of unit cost efficiency. The scope of our audit covers the renewals programme only.

4.2 Since the 2008 Periodic Review, Network Rail has implemented a wide-ranging restructuring programme to improve cost effectiveness and assist it to deliver its renewals programme with increased efficiency.

4.3 In overall terms, renewals account for some 38% of Network Rail's expenditure in CP4 £10.8 bn (2006/07 prices) (when measured using ORR's efficient expenditure determination for PR08). ORR's determination represents an efficiency "trajectory" (or assumed target) of 23.8% when compared with ORR's pre-efficiency estimated level of expenditure.

4.4 Table 4.1 below shows that in broad terms, track renewals represent the largest share of renewals expenditure, followed by signalling and civil engineering.

Table 4.1: Breakdown of Network Rail renewal expenditure by cost type for CP4

Core maintenance	% of total
Track	32%
Signalling	20%
Civil engineering	17%
Operational property	11%
Telecoms	7%
Electrification	5%
Plant and machinery	3%
Information management	4%
Corporate offices	<1%
Discretionary investment	<1%
Unallocated overheads	<1%
Total	**100%**

Source: Determination of Network Rail's outputs and funding for 2009-14 (ORR).

Note: Based on Network Rail's proposed pre-efficient level of expenditure (Total may not add up exactly due to rounding).

4.5 Network Rail has implemented a project as part of its Efficient Infrastructure Delivery (EID) programme to improve performance and address the issues raised (regarding coverage, accuracy and reliability) by the previous Independent Reporter (Halcrow, Preliminary data on efficiency 2008/09, May 2009). The project has three phases:

- Phase 1 – Establishing a robust system, commitment and drive to collect data;
- Phase 2 – "Enhance the process", collection system and Unit Cost Modelling Tool. Increase data coverage, train personnel and roll out; and
- Phase 3 – Implement as "Business as Usual" (target date, July 2010).

4.6 At the time of the audit, Phase 1 was considered complete and Phase 2 was approximately 65% complete (ref. Network Rail presentation of 8th February 2010). Phase 3 (as noted above) is scheduled for completion in July 2010 after a one month period of testing (see Appendix H for Network Rail's Transformation Programme details).

CAF Overview

4.7 The CAF is a process that is intended to record the volume and unit costs of planned and/or completed renewals projects and the technical features or attributes of the work. The following form the key attributes of the CAF process:

- CAF procedures and guidance notes;
- a defined hierarchy for cost allocation; and
- data capture templates.

4.8 CAF procedures and guidance notes are available on the Network Rail intranet site and are also issued as "Work Instructions" by the Contracts and Procurement Team. These documents set out the procedures for how and when data should be recorded and submitted to a central repository within the Contracts and Procurement Team.

4.9 During our review, we were issued with the following Network Rail Work Instructions (WIs) to demonstrate the procedures and guidance notes in place:

- CAF Project Profile Reports Production;
- CAF Data Processing and Analysis;
- CAF Change Control Process;
- CAF Application and Reporting Process; and
- CAF (National) Template User Guide.

4.10 It should be recognised at this stage that of the seven renewals asset categories, track unit cost and volume efficiency is not reported using the CAF process. This alternative process is reviewed later in this section.

4.11 Providing a hierarchy for the collection of renewals projects costs is relevant and important for the following reasons:

- without a cost hierarchy, project costs cannot be analysed on a like for like basis or be relied upon for measuring efficiency; and
- a hierarchy and supporting tools and procedures improve the accuracy of volume and unit cost data, enabling performance improvement and importantly demonstrating efficient infrastructure delivery.

4.12 During our audit we were provided with the hierarchy for cost allocation and a draft CAF template (see Appendices J & K).

4.13 The hierarchy for cost allocation is as follows:

- Level 0: Division;
- Level 1: Asset Group;
- Level 2: Repeatable Work Items (RWIs);
- Level 3: Work Activity;
- Level 4: Current Material or Specification;
- Level 5: Proposed Material or Specification;
- Level 6: Solution Employed; and
- Level 7: Work Item.

Definitions

4.14 **Level 0** – Is the category for all renewals projects and may be useful in providing summary level data only.

4.15 **Level 1** – Asset groups for renewals projects are as follows:

- Track;
- Signalling;
- Telecommunications;
- Electrification;
- Civil Engineering;
- Operational Property;
- Plant & Machinery; and
- Other renewals.

4.16 **Level 2** – A Repeatable Work Item (RWI) is the highest level of project definition for renewals projects and is effectively the most common activities undertaken within this area of the business. In total there are 66 RWIs for renewals activities.

4.17 **Level 3** – A Work Activity denotes whether the RWI is a renewal, replacement or new build. Project costs can differ greatly between these categories so the categorisation of the RWIs into these activities is essential.

4.18 **Level 4** – Denotes the existing assets material or specification. In the case of a bridge repair for instance, this may denote whether the existing structure is of a concrete, steel plate or brick form of construction.

4.19 **Level 5** - Denotes the proposed material or specification. Again, for the example used, this may denote whether the proposed solution is to repair the bridge with new concrete, additional steel plate or brickwork repairs.

4.20 **Level 6** – Is an alternative to the Level 5 descriptor as a solution focused measure may be more appropriate than a given material or specification.

4.21 **Level 7** – A Work Item is the lowest form of category and in the case of our bridge repair example may be the cost of aggregates or types of concrete, steel plate sections of various sizes or repair mortar.

4.22 In theory, the hierarchy of costs allows detailed examination of unit costs for RWIs under differing conditions and circumstances with progressively greater levels of cost visibility.

4.23 Data capture templates are common documents available to all renewals project teams and are used to capture project data according to the Network Rail procedures and using the cost allocation hierarchy.

4.24 The CAF template for data capture was provided by Network Rail (see Appendix K) and worked examples demonstrated in meetings.

4.25 The CAF process is comparable to benchmarking systems used by other regulated and non-regulated industries and clients. As is the case with any benchmarking process, it is only as good as the quality and coverage of data captured and its relevance to the project or programme in hand.

Repeatable Work Items (RWIs)

4.26 As stated previously an RWI is the highest level of renewals work activity in the CAF process. Network Rail estimate that the recently updated RWI structure covers 85-90% of renewals project expenditure once non-work projects and projects falling below the CAF reporting threshold are taken into account.

4.27 The numbers of RWIs by asset category are shown in Table 4.2. The number of RWIs has increased since November 2009 in order to improve coverage.

Table 4.2 Number of Repeatable Work Items by asset category

Asset category	Number of RWIs
Civils	10
Electrification & plant	25
Plant	-
Estates	14
Signalling	6
Telecoms	9
Track	2*
Total	66

Source: Network Rail. *Note – whilst RWIs are defined for track renewals, the volume and unit cost data for this asset category is not collated using the CAF system.

4.28 For projects falling outside of the RWI structure (these costs fall into "indirect renewals costs" in the CEM), efficiency is measured in terms of the projects final cost versus the targeted expenditure in the Annual Business Plan. Projects that fall outside of the RWI structure are typically bespoke and include projects such as software and hardware upgrades to signalling systems.

4.29 Based on this RWI structure, Network Rail's target for renewals coverage is 85-90%.

Track Unit Costs and Volumes

4.30 We consider that in order to monitor volume and cost efficiency it is necessary to understand the processes used to collect data and how they perform. We believe that combining track and CAF data and using an overall indicator for coverage reduces the visibility of underlying performance and the efficiency of Network Rail's processes and management. For this reason our audit makes clear the difference in performance between the two processes.

4.31 Rather than managing track renewals on a project by project basis, the track renewals work bank is determined in advance and a programme budget agreed with targeted year on year efficiencies. The work bank for a given year is then entered into the programming software Primavera 3 and cost loaded with the budget for the individual track renewals projects. Financial approval is granted on the basis of the agreed programme of work for the year rather than for each project.

4.32 Actual costs, consisting of direct and indirect costs, are entered into Primavera 3 on a monthly basis to report on progress against the original budget. Direct costs include the contractor's reimbursable costs and the actual cost of free issue materials.

4.33 Indirect costs are allocated to the project on the same basis as those agreed in the work bank budget. As the efficient level of resources required to deliver the work bank is known in advance this is a rational and cost effective method of allocating costs rather than introducing the requirement for a very large number of financial transactions on a project by project basis.

4.34 The volume and cost of track renewals is reported on a periodic basis with the ability to analyse performance at the following levels:

- plain line – composite km of track plus a further 15 plain line sub-categories if required; and
- S&C – equivalent units plus a further 5 sub-categories if required.

4.35 Data presented to the ORR are the average cost of plain line and S&C renewals across the various categories.

4.36 CAF templates and procedures for this process are not used and the process for reporting track renewal volumes and costs has been embedded for some time.

CAF Governance and Systems

4.37 Network Rail's Contracts and Procurement team administers the CAF process nationally and is responsible for process definition, monitoring and recording CAF submissions, maintenance of the Unit Cost Model Database, deriving nationwide volume and unit cost efficiencies and auditing submissions.

System overview

4.38 The CAF process is shown in detail in Appendix L. The process is cyclical in nature, with the data produced through the CAF stages being used to inform future estimating and to challenge new project cost estimates.

4.39 CAF operates in tandem with Network Rail's project delivery strategy, known as "GRIP". GRIP breaks project delivery into stages with "Stage Gates" or approval milestones located at the end of each stage to review the project and approve progression to the next. Many organisations use gateway approval processes to manage project delivery, the most common of which is the RIBA Plan of Work. In the transport sector, BAA operates a similar process known as DIGS (Deliver and Implement Great Solutions).

4.40 At the outset of a project CAF cost data, stored within the Unit Cost Model database, are used to validate project cost estimates. These estimates are produced using the cost estimating system RIB that utilises cost data from completed projects and recognised industry sources (e.g. SPONS Civil Engineering Price Book).

4.41 At GRIP Stage 4 (completion of "Single Option Development"), the approved cost estimate data are transferred into the CAF data capture template. This is an important requirement of the CAF process as it allows project data to be accessed from long term projects that will not produce GRIP Stage 7 cost data for a number of years. The GRIP Stage 4 estimate is then transferred into the Unit Cost Model database.

4.42 Assuming that the project is approved and ultimately delivered, the GRIP Stage 4 estimate is updated using "Final Account" information at GRIP Stage 7. These data are then stored within the Unit Cost Model database and also used to update estimating data in RIB.

Unit Cost Modelling

4.43 The Unit Cost Model (UCM) database is an important tool in the CAF process. The database is intended to store all historic cost data both at GRIP Stage 4 and GRIP Stage 7 and is used to inform investment planning decisions and to challenge traditional cost estimates.

4.44 A screenshot from the UCM tool is shown in Appendix M. As shown in the sample of the UCM, historic cost data can be normalised to current rates and prices and used to predict the cost of future projects and volumes.

4.45 The UCM was reviewed by the previous Independent Reporter (Halcrow) and is outside the remit of this audit. We did however identify the opportunity to introduce targeted benchmark rates into the model to clearly differentiate between historic data and where new methods of working are anticipated to deliver a step change in unit costs.

CAF Coverage

4.46 Network Rail's original target unit cost coverage for renewals projects was 80%. Table 4.3, reproduced in the 2008 Halcrow report (Preliminary data on efficiency, 2008/09, May 2009) identified the target levels of cost coverage for each renewals asset. Actual levels of coverage achieved in 2008/09 are also provided.

Table 4.3: Target levels and levels reported of CAF coverage by asset grouping

Asset category	Target spend by asset reported through CAF	Actual spend by asset reported through CAF (2008/09)
Civils	60%	51.8%
E&P	91%	5.3%
Estates	80%	10.5%
Signalling & Telecoms	90% in both categories	6.7% & 48.5% respectively
Track	95%	73.2%

Source: Halcrow, Preliminary data on efficiency 2008/09, May 2009

4.47 In overall terms, against the Network Rail target of 80%, 46.8% of renewals spend was reported through the CAF process in 2008/09.

4.48 Performance in 2009/10 against a target of 85-90% coverage is as follows (note that categories have been expanded to match data provided by Network Rail on the 19th April 2010):

Table 4.4: Levels of CAF coverage by asset grouping 2009/10 (to Period 13)

Asset category	Delivery plan expenditure 2009/10 (£m)	Actual forecast expenditure 2009/10 (£m)	Actual spend by asset reported through CAF (2009/10)
Civils	375	396	99.5%
Electrification	120	78	5.5%
Fixed plant	141	21	16.4%
Estates	274	249	28.7%
Signalling	445	428	57.1%
Telecoms	326	53	34.9%
Track	705	705	91.1%
Totals	£2,386	£1,930	

Source: Network Rail

4.49 Estimated expenditure and CAF returns for P13 in 2009/10 are included in the above data resulting in 71% of renewals project expenditure being reported through CAF.

4.50 The key drivers of performance are the high volume of returns from track and civils asset categories and improved performance in Signalling and Estates. Excluding track, which does not follow the CAF process, results in an actual level of CAF coverage of 60%.

4.51 Our intention in excluding track is to provide an accurate view of the performance of the CAF process against Network Rail's own performance target of 85-90% coverage. In the auditor's opinion coverage should not be viewed holistically and instead viewed at asset level to identify areas of poor performance that require corrective management action.

4.52 From our audit work we have identified the key drivers of high performance in CAF returns as follows:

- ensuring an appropriate organisational structure exists at Territory level and that roles and responsibilities are clearly defined;
- providing adequate resources at territory level to produce the CAF returns; and
- asset cost hierarchies are defined and tested by both Network Rail, those delivering the assets plus recognised industry experts.

4.53 At the time of producing this report, Network Rail had not provided any explanation for areas of poor performance in Electrification, Fixed Plant, Estates and Telecommunications asset categories.

4.54 It is notable that a low coverage is not limited to complex asset categories. The coverage for Estates projects is particularly surprising given well defined industry standards for building cost hierarchies. Estates projects, be they new build or refurbishment, are easily categorised and knowledge of the cost hierarchy on such projects amongst contractors and construction cost professionals is high. Given the significant increase in estates spending in CP4 we would anticipate a rapid response to low coverage in this area.

4.55 We would also anticipate that Network Rail clearly maps out its management response to areas of low coverage to the Regulator.

4.56 During CP4 we consider that improved coverage is achievable but this will need to be demonstrated year on year to provide confidence in the system. Network Rail clearly believes this is achievable based on their target of 80-90% coverage.

4.57 If the trend of low coverage continues the evaluation of efficiency at PR13 will be problematic. We believe that Network Rail should detail its strategy for dealing with any project and data "lag" that occurs prior to evaluating efficiency at PR13.

4.58 In summary, the performance of the CAF can be categorised into "Process" and "Output". Based on the evidence collated we believe that the CAF "Process" is robust but that the "Output", or data coverage, is below target and does not at this time provide full confidence.

4.59 Until coverage targets have been met, and we would anticipate significant improvement in 2010/11, we can only state that CAF has the potential to help Network Rail and the ORR to monitor the business' progress against PR08 and contribute to PR13.

Developments since the 2006 Halcrow audit

4.60 In 2006 Network Rail identified a target of 80% of renewals expenditure to be reported using the CAF process. In 2008/09 Halcrow reported an overall coverage level of 48.8% against this target.

4.61 As noted earlier, the current target for data coverage is 85-90% and Network Rail has provided us with data that show that coverage of 71% has been achieved in 2009/10. This level of coverage falls to 60% once track renewals costs are excluded from the measure.

4.62 Commendable improvements have clearly been demonstrated in the coverage data for track and civils assets. Track, by its nature and the associated structure of the reporting system for this asset should be expected to consistently deliver greater than 85% coverage. Coverage of 99.5% in Civils is clearly positive and we anticipate that Network Rail will explain the cause of such a high performance and the learning that can be applied to other asset categories.

4.63 In summary, spend in 2009/10 of £552m across renewals asset categories excluding track has not been reported through the CAF process. The audit team has noted that improvements have been made in certain asset categories but that coverage by category is still well below Network Rail's own aspirations. The level of coverage should improve from completion of the EID. However ongoing management review and action is necessary to improve areas where coverage is significantly below expectations.

Findings from territorial audits

4.64 Findings from territory audits are included in Appendix N.

Third party experience

4.65 The CAF process draws comparisons with benchmarking processes that are common across the construction industry and those used by other regulated industries such as the aviation and utilities sectors. It is also possible to compare the CAF process against forms of cost analysis and data produced by organisations such as the RICS and the BCIS. Based on a comparison of industry best practice and practical experience of benchmarking processes used in other industries, the following points are intended to constructively highlight the positive and negative aspects of the CAF process:

Accountability – for the CAF process rests clearly with the Contracts and Procurement Team. Appropriate tracking tools and registers are maintained to monitor CAF returns and to identify those that are behind schedule. Our review of CAF performance data for 2009/10 has identified that in several asset categories performance is below target. We would expect clear management action to take place to identify the causes of below target performance and take corrective actions.

At the time of writing, Network Rail has not communicated the causes of high or low performance against renewals asset categories in 2009/10.

Process – the CAF process, in principle, was found to be well defined and in accordance with industry best practice. However "Output", or data coverage, is still clearly below target. Network Rail's responses to the audit findings thus far do not demonstrate that the reasons for high or low performance across asset categories are either understood or being made available to the Regulator.

We recommend that Network Rail demonstrates that clear management action is taking place to resolve the issue of data coverage and that this is made visible to the ORR.

Responsibility – at Territory level responsibility for production of the CAF returns was varied. For example, in the SW region a regular review of CAF returns for Civils was undertaken that prompted Commercial Managers to take action. In other regions, the Senior Commercial Manager was responsible. Opportunities may exist to pass this responsibility on to contractors undertaking the work with the Network Rail commercial team providing a review role. In other regulated industries it is frequently a contractual requirement for the contracts commercial team to provide information in a format that can be readily benchmarked.

Data storage – the UCM is the tool used to store CAF benchmarking data. This tool was considered to be in accordance with industry best practice.

Further improvement could be made to the UCM by introducing targeted benchmark rates for RWIs where significant future efficiencies have been identified.

Supporting tools – consist of Excel data capture templates. These documents were reviewed and found to be in accordance with industry best practice.

Procedures – were reviewed and found to be adequate. Further improvements could be made particularly with regard to "tool boxes" and a RACI (Responsible, Accountable, Consulted and Informed) matrix.

Coverage – (defined as the process "Output") is below the Network Rail performance target and management action is clearly needed to identify why this is the case to take corrective action. In comparison to industry best practice, performance is below standard particularly in areas with established cost hierarchies such as building works (Estates). The lag in project cost data provided in 2009/10 is a concern as this will affect the evaluation of renewals efficiency. If this trend continues, evaluation of renewals performance in relation to the PR13 determination will be problematic.

Feedback – our audit found little feedback taking place between the Contracts and Procurement Team and the Commercial Managers at Territory level. We would anticipate more direction at a senior level to appraise Commercial Managers of CAF targets, performance to date and in managing issues relating to late returns. It was also noted that at Territory level no Commercial Managers we talked to were aware of the importance of CAF returns in relation to the Cost Efficiency Measure (or the determination of Network Rail bonuses).

4.66 Overall, our audit and comparison with best practice concluded that the CAF process, in principle, is robust whilst the coverage, is below the required standard.

4.67 The positive aspects of the CAF process we have found include:

- a clear governance structure supported at senior management level;
- a well defined process; and
- the process makes use of sophisticated data capture template and database.

4.68 Aspects of the CAF process that we consider could be improved include:

- clearly demonstrating to ORR that where low coverage has been identified issues are understood and management actions have taken place to remedy problems;
- improving consistency of use at territory level;
- improving the quality of the "Toolbox" section in the CAF Work Instructions and;
- raising awareness of the importance of CAF at a local level particularly with regard to its effect on renewals performance measurement and determination of bonuses;
- providing context and a RACI matrix within the CAF Work Instructions; and
- providing cost data from the UCM back to managers at Territory level.

4.69 Issues that we consider require further attention relate to the implementation and most importantly, coverage of the framework. Much higher levels of data coverage for complex asset categories such as signalling have been witnessed in 2009/10 demonstrating that it is possible to improve performance.

Developments in CP4

4.70 The process of change under the EID programme and the improvements to the CAF process was a theme throughout our discussions with Network Rail. By the end of CP4, Network Rail anticipates a "step change" in the coverage of data, its quality and the ability to accurately model and challenge renewals project costs.

4.71 On current evidence, close monitoring of CAF coverage will be necessary in 2010/11 to provide confidence that the EID programme has met its stated

objectives and that appropriate management action is being taken to identify and resolve the causes of low data coverage.

4.72 In contrast to the MUC, we note that the CAF Unit Cost Model (UCM) appears to be driven solely by the outturn cost of renewals projects and that the model does not incorporate targeted benchmark costs. This is of interest when new techniques are identified to deliver renewals projects, such as the use of modular platforms. Inclusion of target rates in the UCM for such projects would provide greater visibility to the audit team that efficiencies are being targeted; recognising that a step change in the cost of certain renewals projects is anticipated in CP4.

4.73 In terms of process, CAF compares well with industry best practice. However, implementing and promoting the importance of the CAF since 2006 has presented difficulties as evidenced by the low coverage identified by Halcrow and in the levels of data coverage for 2009/10 above.

4.74 Our audit has identified the following risks:

- low level of utilisation in non-track asset categories (accounting for 63% of costs in 2009/10);
- low visibility of unit costs in these categories impacting Network Rail's ability to drive efficiency improvement across the business;
- a CAF performance "lag" that may affect Network Rail's ability to accurately measure renewals efficiency in time for the PR13 determination and;
- inadequate resources being made available to administer the CAF process through CP4, impacting the number and quality of CAF returns.

4.75 Overall, whilst the CAF process appears to be robust, coverage in 2009/10 does not yet provide an adequate level of confidence and should be reviewed again on completion of the EID programme. The review should demonstrate the effectiveness of the programme in delivering its objectives on completion of Phase 3.

Conclusions

4.76 As stated earlier in our report, we believe that measuring the performance of the CAF falls into two categories. These are "Process" and "Output". The CAF "Process" has evolved since 2006 into a robust process for collating and categorising unit cost and volume data. As a stand along process we have found it to be robust.

4.77 However the "Ouput", or data coverage, does not yet meet either Network Rail's target or the level of coverage that the auditor considers demonstrable of high performance. We have noted that Network Rail's response to date has not focused on explaining the causes of either high or low performance in the renewals asset categories. We strongly recommend that Network Rail reviews data coverage, provides reasons for high or low performance and details its management response to meet its own targets in 2010/11.

4.78 On the basis of the data coverage in 2009/10 we cannot yet state that the CAF is capable of measuring and demonstrating renewals efficiency. Coverage is the key issue in determining the appropriateness of the system for use during CP4 and as the basis of the determination stemming from PR13.

4.79 Based on Network Rail's data for 2009/10, a total of £552m from a full year forecast of £1.93bn will not be reported using the CAF process. This is a significant performance lag and should be addressed as soon as possible by Network Rail. We would anticipate that this lag is remedied early in the new financial year. A clear statement on the reasons for this lag in coverage data and the management actions that have been taken to remedy the issue would provide greater confidence in Network Rail's management of the CAF. Given the limited scope of external audits undertaken thus far we are unable to state why coverage is particularly low in areas such as Electrification, Plant and Estates. This may be

due to inadequate resourcing, a lack of familiarity with the process, problems at territory level or due to project scope falling outside of the RWI structure.

4.80 The "confidence gap" that we consider to exist is based on Network Rail's own evaluation and target for data coverage. A range of 85-90% coverage is considered achievable and we believe this should continue to be the benchmark against which performance is measured. We also believe that it is extremely important that performance is not measured holistically e.g. by the overall level of coverage across the asset categories. Consistently high performing asset categories such as Track and Civils continue to support categories performing below expectations and we believe it is important to understand underlying performance trends.

4.81 Our review found that unit costs are defined appropriately although improvements could be made to the Estates cost breakdown structure to recognise the varying degrees of scope in refurbishment projects. The audit team believes that unit costs and elements should continue to be reviewed as the CAF process matures. Overall, the framework for unit costs was clear, consistent and reasonably comprehensive.

4.82 Our audit of sample CAF data and interviews found no examples of inappropriate allocation of direct or indirect costs.

Table 4.5: Recommendations relating to the CAF

No.	Recommendation to Network Rail	Location in Text	NR Data Champions	Due Date
2010.CAF.1	Implement management action plans to resolve non-coverage at local level for the asset categories identified. Clearly demonstrate to the ORR that low coverage is being addressed.	4.53 4.54		Q2 FY'10
2010.CAF.2	Identify actions to be taken to deal with the "lag" (delay in capturing CAF data for a given control period due to the length of time for some projects to be closed out and CAF data captured) evidenced by this year's CAF returns - particularly with regard to the needs of PR13.	4.57		Q2 FY'10
2010.CAF.3	Identify track renewals process benefits and implement across other asset categories particularly with regard to a "programme" approach to procurement and delivery.	4.61		Q3 FY'10
2010.CAF.4	Improve the quality of Work Instructions with regard to context, roles and responsibilities (e.g. Responsible, Accountable Consulted and Informed (RACI) matrices) and toolboxes. Consider the use of process "Champions" by territory to provide advice and guidance.	4.64		Q2 FY'10
2010.CAF.5	Performance measurement is clearly labour intensive. Network Rail should review whether present staffing levels are sufficient to service the CAF process.	4.73		Q2 FY'10
2010.CAF.6	Consider the use of refurbishment project categories to reflect the extent of work being delivered (e.g. Cat A to C is common in the commercial fit-out sector). Network Rail's present project category structure is basic and external consultation with sector experts may be advisable.	4.54		Q2 FY'10

No.	Recommendation to Network Rail	Location in Text	NR Data Champions	Due Date
2010.CAF.7	Implement target benchmark rates into the UCM for RWIs where new technologies or construction methods are being implemented. This would provide greater visibility of performance targets and provide a benchmark to monitor future performance.	4.45		Q3 FY'10

5 Cost Efficiency Measure (CEM)

Background

5.1 The CEM is a high level comprehensive financial KPI that aims to indicate the quantum of efficiency delivered by Network Rail in a given year. It is a mechanism for capturing progress against cost efficiency targets. It is meant to be a comprehensive measure of efficiency.

5.2 The Cost Efficiency Measure (CEM) has been recently introduced by Network Rail for use in CP4. Network Rail has stated that the CEM is designed to fulfil three key purposes:

- a means to capture progress against the "PR08 efficiency challenge".
- as aan high level KPI to be used both internally and externally to monitor efficiency; and
- as a measure to determine 20% of the Management Incentive Plan and the General Bonus Scheme.

Fit into Network Rail's wider unit cost framework

5.3 The CEM draws on the MUCS, CAF and cost performance measures covering Operations, Maintenance, Support and Renewals. Enhancements and Non-controllable operational costs are not included. At its most "rolled-up" level, it represents Network Rail's high level aggregate measure of efficiency. The measure was developed by Network Rail in house. As far as we are aware, third party input into the development of the CEM (for example through comparative analysis with other regulated businesses to aid its development) did not occur.

5.4 A principal reason for the CEM being developed was to replace the Financial Efficiency Index (FEI). The FEI was revised in 2005/06, half way through CP3. We understand the FEI was dropped because Network Rail considered it to be incompatible with "an output based regulatory approach." Additionally, we understand the FEI did not take into account volume measures. This, along with other omissions, meant the FEI did not provide adequate coverage of different types of cost, and so had potential to create incentives that risked masking inefficient expenditure or activities that would "flatter" the measure. For example, it could incentivise the undertaking of many low cost activities to reduce unit costs, as volume efficiency was not included.

5.5 The CEM is designed to track efficiency within Network Rail on a yearly basis. This means that, in theory, it will show the extent to which the overall efficiency improvement target in Operations, Maintenance and Renewals, outlined in PR08, is being achieved. The PR08 target is 21% efficiency improvement against the outturn from the previous control period; to meet this target, Network Rail must create 23.4% efficiency against their baseline. Network Rail has stressed to us that they do not see the rationale for the CEM (or indeed other measures) being referenced against the determination as the business is not managed with the determination as a target *per se*.

Relevance of the CEM to ORR

5.6 The CEM is intended to indicate the efficiencies that have been achieved in a given year compared to a baseline. Consequently, it should in theory allow ORR to understand the extent to which Network Rail is achieving its efficiency targets. Network Rail views these targets as relative savings, as opposed to the requirement to reach an absolute value of total expenditure. This interpretation has resulted in this measure being developed to show the 'trajectory' of expenditure. Through the "heat map", with which the measure is displayed, the CEM shows how the total efficiency is built up and the different efficiencies being achieved.

5.7 The CEM measures the level of efficiency for the year to date and the full year forecast. It is also calculated for the control period forecasts, but this is not shown on the "heat map". The CEM gives an indication of Network Rail's "direction of

travel" in relation to achievement of efficiency targets. It does not however, provide any assurance that overall targets will be met as it is purely a financial measure and does not take reflect asset "sustainability" measures. Network Rail believes that ORR can place more confidence in the CEM as an efficiency measure than the FEI. Network Rail recognises that by creating a more comprehensive measure, its complexity has increased.

Definition, scope and extent of Cost Efficiency Measure coverage

5.8 The CEM reports the total cost efficiency of operating, maintenance, renewals and support costs as a percentage of a pre-efficient baseline, this is normalised to take into account changes to network capacity. Capacity is measured by vehicle miles and gross tonne miles.

The CEM formula as it is stated in the Network Rail KPI manual is as follows:

$$\text{Cost Efficiency} = \frac{1-(O+M+R+S) * \text{Capacity}}{\text{Baseline } O+M+R+S}$$

Where O= Ops efficiency, M = Maintenance efficiency, R = Renewals efficiency, S = Support efficiency. In addition, the CEM "heat map" also expresses Unit Cost efficiency, Volume efficiency, Other Direct Cost efficiency, Overhead (indirect efficiency).

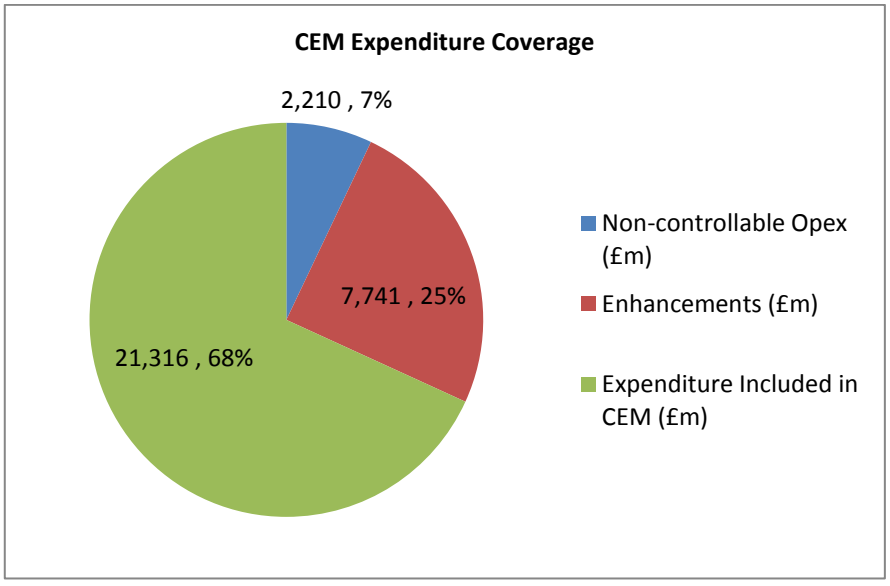
5.9 Network Rail states that the measure is designed to show the savings made by Network Rail through unit cost and scope efficiencies.

5.10 Each year, the Cost Efficiency Measure will measure cumulative efficiency across the whole of CP4 and the efficiency compared to the previous year. The targets for this Plan are expressed on an annual basis.

5.11 The CEM does not report income, Non-controllable costs or Enhancements.

5.12 Using Network Rail's 2010 CP4 Delivery Plan, it has been possible to estimate the proportion of Network Rail's total expenditure that will be covered by the CEM in CP4, given the measure's exclusions. We estimate that the CEM will cover approximately 68% of total expenditure, which is illustrated in Figure 5.1. The actual costs used to calculate efficiencies are taken from the general ledger.

Figure 5.1: Network Rail expenditure covered by the CEM.



Source: Network Rail

5.13 The highest level output of the CEM is "total cost efficiency"; it is displayed on a "heat map", Figure 5.2, which takes the form of a four-by-four matrix. The matrix splits the efficiencies into types of efficiency and area of expenditure:

Types of efficiency:

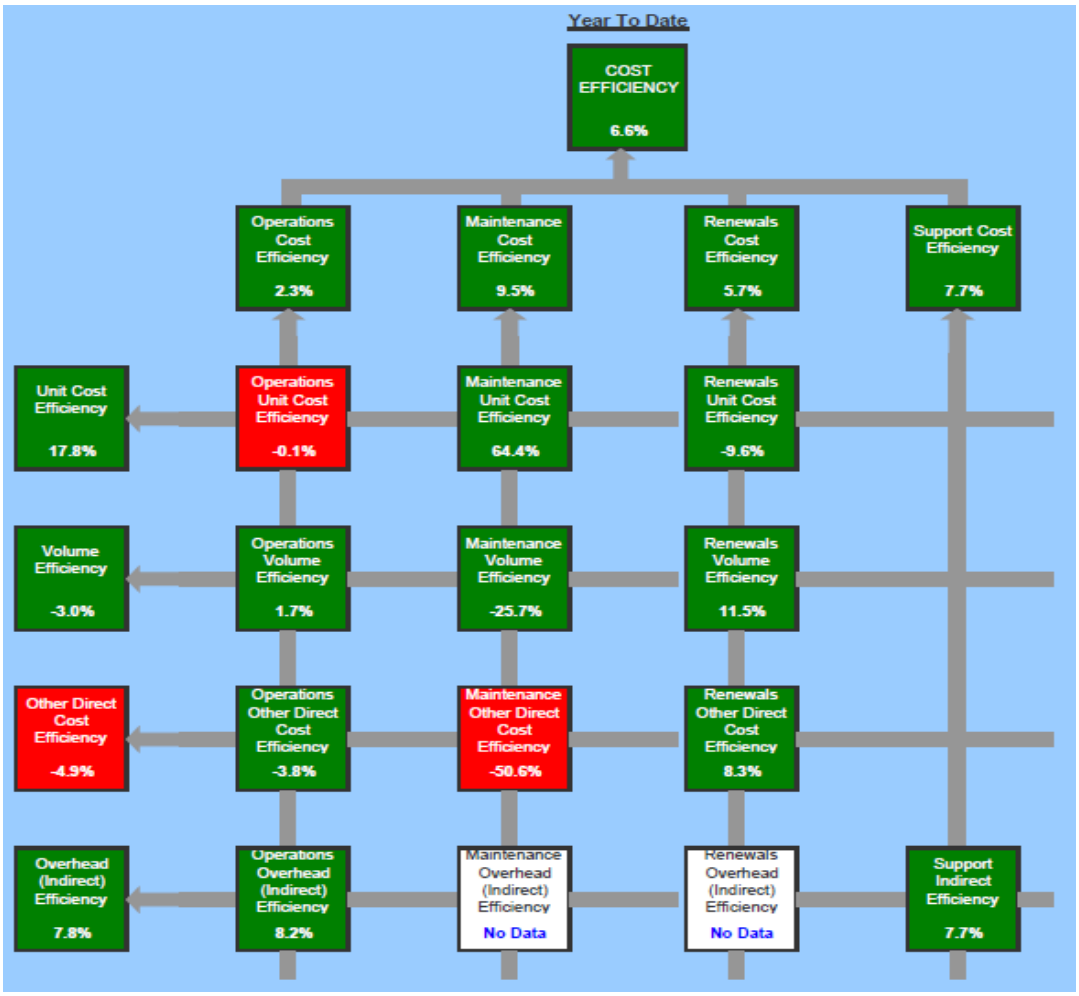
- unit and volume efficiencies for major volume related activities;
- other direct cost efficiencies where major volume related activities have not been robustly identified; and
- indirect costs

Areas of spend:

- Operations;
- Maintenance;
- Renewals; and
- Support

5.14 The "heat map" breaks down the total cost efficiency into its constituent parts allowing them to be viewed individually. It also displays the total cost efficiency for each of the areas of spend and type of efficiency.

Figure 5.2: Cost Efficiency Measure "heat map"



Source: Network Rail Management Accounts P10 (2009/10). Note "no data" does not mean that "no data" are included – costs for the two overhead categories are under other categories shown in the map.

5.15 For each element in the "heat map", efficiency is reported in two ways: through the colour of the element (red, green, orange or white) and a percentage in the relevant box. The colour represents efficiency against the Network Rail budget. The percentage figure represents efficiency against the baseline; a positive value represents a saving, so an improvement in efficiency. An orange box indicates that actual spend is equal to the Network Rail budget, a green box indicates that the actual spend has been less than the Network Rail budget and a red box indicates

the opposite. A white box means there are no data available (but see the note to Figure 5.2 above). The colour and percentage format can produce counter-intuitive results. For example, it is possible to spend less than the baseline, but more than the budget, which leads to a positive percentage, but a red colour. Conversely, it is also possible to have a negative number (ie spend more than the baseline) but a green shading (better than budget).

5.16 Unlike the FEI, the CEM weights renewals and maintenance efficiencies equally; £1 of renewals saving is equal to £1 of maintenance saving. Network Rail considers this is appropriate because (at one level) it removes the risk of incentivising the business to favour one activity over the other. In terms of measuring progress against an overall efficiency trajectory (for a given control period) this is probably an appropriate approach. However, as discussed elsewhere, a measure of "sustainable" asset management is not factored in to the CEM.

Governance, systems and processes

5.17 As with other KPIs, Network Rail has informed us that the CEM is "owned" by an executive board member who is responsible for it. In the case of the CEM, this is the Group Finance Director. KPIs are approved by the executive committee but there is no "formal" non-executive sign-off of KPIs.

5.18 The CEM requires inputs from number of sources throughout Network Rail. The accuracy of the efficiencies stated in the "heat map" is inevitably dependent on the accuracy of underlying data. Network Rail recognises that getting the quality of input data to an acceptable level is a significant challenge for the business. For renewals and maintenance, data that are used in the CEM "heat map" will be produced by the CAF and MUCS systems. Data quality and coverage issues that have been identified for the CAF and MUC will impact on the reliability of the CEM.

5.19 There is a further risk of misrepresentation that relates specifically to renewals volume efficiency. Judgements have to be made by Network Rail managers about how to allocate "not doing work" to slippage, scope changes and efficiency categories. The CEM's "accuracy" is inevitably dependent on the quality of the decision making process behind these judgements and note elsewhere the considerable scope that appears to exist to improve their "auditability".

5.20 "Heat map" data are collated from a number of discrete management information sources. We have not been able to review linked spreadsheets used to calculate the CEM and the "heat map"; consequently, it has not been possible to fully analyse how the CEM functions. We understand that the "heat map" itself is compiled manually from various outputs and is not part of a model. This means it is not possible to run scenarios or sensitivities to see how the (overall) measure varies by changing inputs.

Baselines used for CEM

5.21 The baseline is calculated differently depending on the area of spend, the type of cost efficiency and, in some of instances, the asset type. Table 5.1 shows baselines are derived from a selection of different sources, calculation methods and adjustments. The most significant issue with this is arguably a lack of consistency is the number of data sources that are used. These vary between actual expenditure and volumes, funding provided by ORR and Network Rail's forecasts. As a result, the baselines are generated using both real and synthesized information. There is also variation in the adjustments and the method of calculation. None of these intricacies are visible to the reader of a "heat map", so without really quite significant knowledge, it is not clear what is being measured and the caveats the reader should be aware of.

5.22 Although the variation in baselines may be justifiable to give an appropriate reflection of each element in the "heat map", in our opinion, the lack of consistency leads to additional complication and reduced transparency.

Table 5.1: Baseline sources for the CEM

Area	Type of Efficiency	Asset	Baseline
Renewals	Volumes		Funding provided by ORR in periodic review.
Renewals	Unit Costs		Forecast at Period 11.
Renewals	Other Direct Costs	Track	Expenditure in previous year.
Renewals	Other Direct Costs	Signalling	Pre-Efficient Target.
Renewals	Unit Costs	Civils	Unit cost curve baseline.
Renewals	Volumes	Civils	Volume of work undertaken in previous year.
Maintenance			Period 11 full year forecast adjusted for impact of incremental changes in CP4 delivery plan.
Operations			Period 11 Full Year Forecast adjusted for inflation.
Support			Period 11 Full Year Forecast adjusted for the impact of a number of incremental changes in the CP4 delivery plan.

Source: Network Rail

Appropriateness of CEM

5.23 It is not possible to compare the efficiency records from CP3, created using the FEI, and those produced in CP4 due to fundamental differences between the measures. This could be addressed by creating an overlap period for measures or ensuring that it is possible to restate historic data series using the new measure. Allowing comparisons between the previously accepted FEI and the new measure could create confidence in the new measure.

Monitoring of CP4 and CP5

5.24 Until there are two to three years of data available for the CEM we consider that it is not possible make a judgement as to whether it can be used to monitor Network Rail's efficiency performance in CP4 and CP5. This is not just because of the novelty of the CEM. As we have noted elsewhere data generated by the CAF and MUC that feed into the CEM also need to be recorded for a number of years.

5.25 Network Rail considers that the CEM provides less scope for "perverse" incentives than the FEI, the previous efficiency measure. This is achieved through equal treatment of renewals and maintenance efficiencies and by using a more comprehensive consideration of expenditure.

5.26 We consider however that there remains the risk of "perverse" incentives due to the limited scope of the measure; there is no visible or auditable link between efficiency and sustainable management of assets. We understand from discussions with Network Rail that efficiencies claimed by the delivery units are challenged centrally, so ensuring only "sustainable" efficiencies are recorded by the measure. However, Network Rail has not provided us with documentation detailing the audit process for these decisions. As things stand, we do not consider the risk of "perverse" incentives to be appropriately mitigated. With the current systems in place, it may be that efficiencies are being recorded, but there is a risk that savings may be being made at the long-term expense of the asset.

5.27 Two specific examples of "perverse" incentives can be illustrated using renewals volume efficiencies. Firstly in the case of volume efficiency, there is a risk that scope reductions, deferral or slippage may be reported as efficiency. Secondly, it is difficult to see how the CEM measure guards against a risk of underestimation

of the forecast volumes required for a Control Period. The risk exists that mid-way though the Control Period, having registered volume efficiencies, there is a need to do more work. This could create the risk of high volume efficiencies being declared at the beginning of the Control Period only to be followed by a reversal of this position later in (or indeed after) the Control Period in question.

5.28 As with the FVA, the figures reported by the CEM "heat map" are dependent on (amongst other things) three key factors:

- firstly the rigour with which efficiencies are "declared" by the business;
- secondly the quality of the unit cost inputs being reported by the MUC and CAF and thirdly;
- the existence of asset management policies/measures which ensure maintenance and renewal activities undertaken by Network Rail can be considered consistent with a "sustainable" railway approach.

5.29 We have covered the second of these issues elsewhere in our report. The third fundamentally, lies outside the scope of this review. It is however noted that Network Rail is working at present on the development of asset policies that are better designed to meet this concept. In relation to the existing asset stewardship measures (and their constituent parts), it is a moot point as to whether deferrals in renewals or maintenance activity (that would show up immediately as a betterment in the CEM) would be appropriately reflected in relevant asset condition measures. We would suggest that concepts such as asset condition shortfall tests, residual life and residual value type measures (as used in the London Underground PPP) are considered. This is because we consider these sorts of asset based measures (that Network Rail could set itself – in conjunction with the ORR) would make measurement of efficiency gains potentially more transparent and open to scrutiny and challenge.

5.30 We consider there is considerable scope for Network Rail to improve the way in which it devises and reports renewals efficiencies (such as those that are volume based). Whilst there is strong evidence of increased awareness and motivation at a regional level to deliver renewals efficiencies, we would suggest that these initiatives are more robustly captured and controlled as positive management actions. Adopting this approach could help to ensure that:

- initiatives have an accountable "owner";
- that the timescales for delivery of initiatives are mapped out – reducing the risk of initiatives "falling off the radar";
- by using a standardised approach, efficiency initiatives can be "rolled up" and compared to targets for improvement that the relevant division or unit is aspiring to meet; and
- a transparent process which ensures that important questions (such as not impairing the longer term performance of the asset in question through short term cost reductions) could be used.

5.31 We consider that such an approach, when combined with so called "visualisation" techniques can help to motivate staff at all levels of the organisation, make the transfer of knowledge associated with these initiatives more straightforward and crucially, make their audit more robust and transparent. They also help to "tell the story" - or develop the narrative around efficiency plans. We consider such an approach is likely to find considerable favour with the ORR.

Conclusions and recommendations

5.32 The CEM represents a further development of Network Rail's attempt to measure cost efficiency across the business. It replaces the Financial Efficiency Index that itself was changed and then dropped in favour of the CEM at the beginning of CP4. As things stand, this means that it is not possible to straightforwardly make like with like comparisons with respect to Network Rail's progress in delivering efficiency over time. This could be remedied by creating an overlap period for the two measures or taking steps to restate historic data using the CEM methodology. Network Rail may well argue that there is little point in restating data – particularly for CP3 - using the CEM. However, by doing so, Network Rail would arguably be able to demonstrate the extent to which the CEM is actually an appropriate indicator of efficiency when compared with other measures and "the story so far" in delivering efficiency gains. Even if an argument against the practicality of restating CP3 data is sustainable, we would maintain that certainly for CP4 and into CP5, a consistent measure of efficiency should be used.

5.33 Conceptually, the way in which the CEM is calculated is logical. Recording efficiencies against a pre-efficient baseline should produce meaningful and useful information on Network Rail's efficiency related performance. However, due to a lack of consistency in how the baseline is calculated, the information produced is potentially confusing and hard to place confidence in. This issue could be resolved by harmonising baseline calculations. For example, all the baselines could be calculated using data from one source (such as the CP4 delivery plan or the determination). The way in which the CEM is displayed, through the "heat map", is also logical, at a conceptual level. It breaks down total efficiency into different elements. However, under more detailed consideration, there are a number of problems that we consider lead to complexity and difficulties in comprehending the measure.

5.34 We believe the combined use of colours and numbers without explanation on the "heat map" is confusing and can lead to counter-intuitive interpretation. Without a strong grasp of the intricacies of the "heat map", it is difficult for users to understand. It is also not obvious how the different numbers combine to create the total cost efficiency as there is no indication of the weighting of different elements. As a result, it is not possible to understand the real significance of each box in the matrix in relation to the total efficiency value being displayed. The use of arrows and lines in the "heat map" gives the impression that the numbers are combined to create the overall efficiency measure for the business. This is not how the number is calculated: the overall number is independent of the other numbers in the "heat map". We consider that the "heat map" could be re-designed to deal with these problems. The colouring system should be removed or clearly explained; a weighting should be given next to each number on the heap map; and the use of arrows and lines should be reconsidered.

5.35 We have a number of observations about the complexity of the CEM that we think merit further consideration. These include the following:

- the extent to which the measure is actually understood by those who in part are remunerated by it; and
- the extent to which the CEM measure is understood by non-executive directors.

5.36 The CEM omits non-controllable operational expenditure and enhancements. We understand the CEM covers 68% of total expenditure as provided in Network Rail's 2010 CP4 Delivery Plan (ie. all of Operations, Maintenance and Renewals costs excluding non-controllable items). Understandably, non-controllable costs are not included in the CEM because it would, at one level, not be appropriate for Network Rail to report efficiencies against costs and risks it cannot manage. What constitutes a non-controllable cost should be agreed between Network Rail and ORR. We note however that the usefulness of the measure increases through the inclusion of as much of Network Rail's expenditure as possible that lies within its control.

5.37 Currently, the CEM baseline does not consider efficiency against the determination as Network Rail uses the measure to reflect performance against its pre-efficient baseline. Steps could be taken which would provide the ORR with more of a narrative about the efficiencies reflected in the CEM. Firstly, we recommend that Network Rail issues variance reports (on at least a 6 monthly basis) detailing how efficiencies have been delivered through positive management actions. Secondly, Network Rail should consider calculating the CEM against the determination. This would enable ORR to understand how reported efficiencies against the pre-efficient baseline - and the determination - vary.

5.38 The CEM weights maintenance and volume efficiency equally, unlike the previous measure (the FEI). We consider that this is appropriate as it allows the CEM to reflect the behaviours that are encouraged through ORR's incentive framework. If renewals and maintenance were not weighted equally, the CEM would arguably give a distorted view of the actual efficiencies created by Network Rail in any given Control Period.

5.39 Due to data quality and coverage challenges that exist in the CAF and MUCS, it is difficult to place confidence in CEM "heat map". This problem is compounded by a lack of consistency in the baselines used in the CEM.

5.40 We consider the CEM has the potential to create a risk of "perverse" incentives (through its role in employee remuneration), even if this risk has diminished as a result of the CEM replacing the FEI. We are not stating that Network Rail has been manipulating efficiencies. However we believe a risk stems from the way in which Network Rail reports its renewal volume efficiencies and the apparent absence of a visible and auditable connection between cost efficiency and "sustainable" asset strategies. We consider the connection between volume efficiencies and asset sustainability needs to be formalised thorough the creation of a transparent process and appropriately documented, auditable decisions.

5.41 As a result of the concerns with the CEM that have been highlighted, we do not at this stage believe that the measure is either robust or fit for purpose. In terms of what is achievable in CP4, we consider a more definitive judgement cannot be made without at least two or three years of data.

5.42 In discussions with Network Rail, the company has asked us to suggest alternatives to the CEM. Network Rail should be expertly placed to develop further thinking in this area. Notwithstanding this, we do consider that the development of more comprehensive, auditable "efficiency improvement plans" which clearly define the "owner", impacts and timescale for the delivery of improvements along with details of positive management actions lying behind savings that are to be delivered would be a significant step forward. Progress against the plans could be measured using Earned Value type analysis which indicates cost control and progress in creating value in a project against a pre-defined scope. This concept is used in many companies and industries. Efficiency plans could build on the "visualisation" techniques used commonly by companies such as Tube Lines, London Underground (former Metronet infracos) Arriva Cross Country and Bombardier.

5.43 We believe that good practice in the regulated utility sector involves positive management actions to be identified in order to allow for efficiency savings for renewal projects to be "claimed". Whilst Network Rail has stated that its efficiency declarations will be audited at financial year end, we consider it is worthwhile evaluating the extent to which more regular audits (for example quarterly or on a six month basis) should be implemented – combined with the suggestions noted in the previous paragraph. This would reduce the risk of "surprises" at the end of the financial year. For 2009/10, at the time of writing, the audit of efficiencies was yet to take place. It is therefore not possible for us to provide an opinion on the robustness or appropriateness of the audit process or indeed its results.

5.44 Table 5.2 below lists the recommendations that relate to the CEM. The first eight recommendations are improvements that we consider could be made to the CEM as it currently stands. The final two recommendations detail initiatives that could either supplement or replace the CEM.

Table 5.2: Recommendations relating to the CEM

No.	Recommendation to NR	Location in Text	NR Data Champions	Arup proposed Due Date
2010.CEM.1	Network Rail should consider bringing in concepts such as asset condition shortfall tests, residual life and residual value type measures into the review of asset sustainability.	5.29		Q3 FY'10
2010.CEM.2	There is considerable scope for Network Rail to improve the way in which it devises and reports renewals efficiencies. There is strong evidence of increased awareness and motivation at a regional level to deliver renewals efficiencies, we would suggest that these initiatives are more robustly captured and controlled.	5.30		Q3 FY'10
2010.CEM.3	Network Rail should consider undertaking a greater frequency of efficiency audits, so reducing the risk of year-end 'surprises'.	5.44		Q3 FY'10
2010.CEM.4	An overlap period should be created for the CEM and FEI allowing comparison of the two measures. Network Rail should consider if the CEM could be restated for CP3 (perhaps from the CP2 "exit (or closing) position") and the FEI should also be calculated through CP4 and into CP5.	5.32		Q2 FY'10
2010.CEM.5	The methods used to calculate the baselines for the numbers in the CEM "heat map" should be harmonised to improve consistency.	5.33		Q3 FY'10
2010.CEM.6	Network Rail should consider redesigning the CEM "heat map". The colouring system should be removed, a weighting should be given next to each number on the heap map and the use of arrows and lines should be reconsidered.	5.34		Q3 FY'10
2010.CEM.7	Network Rail should issue variance reports, on at least a 6 monthly basis, that detail how the efficiency reported by the CEM has been delivered.	5.37		Q3 FY'10
2010.CEM.8	Network Rail should consider calculating the CEM against the determination.	5.37		Q3 FY'10
2010.CEM.9	Auditable 'efficiency improvement plans' with clearly defined owners, impacts and timescales should be produced covering the delivery of efficiencies. These should give details of the positive management actions lying behind savings. Consideration should be given to monitoring progress against the plans using Earned Value type analysis.	5.43		Q4 FY'10

No.	Recommendation to NR	Location in Text	NR Data Champions	Arup proposed Due Date
2010.CEM.10	Visualisation techniques should be integrated with efficiency improvement plans'. This would help motivate staff at all levels of the organisation, make the transfer of knowledge associated with these initiatives more straightforward and make their audit more robust and transparent.	5.43		Q4 FY'10

6 Financial Value Added (FVA)

Introduction

6.1 The Financial Value Add (FVA) is a high level KPI introduced in 2009/10. This indicator is defined by Network Rail as "the differences between the ORR's income and expenditure determinations and Network Rail's actual income and expenditure." The same document also notes that "This single measure (FVA) is defined as the value added in the relevant three year period, over and above the amount determined by the ORR for the relevant period."

6.2 For year three onwards from the beginning of this Control Period, Network Rail will be using the FVA as the sole measure to determine the level of Long Term Incentive Plan (L-TIP) for senior executives of the company.

6.3 The FVA is a relevant measure to the ORR as it forms part of the Management Incentive Plan[1] Statement (MIP) – which fulfils one of Network Rail's licence conditions. The MIP is a means of incentivising the management of Network Rail to deliver an efficient railway network.

6.4 In addition, as an important mechanism for determining the remuneration of senior directors, the FVA will be a high profile and material measure to a number of internal and external stakeholders; DfT, Transport Scotland and Network Rail's auditors and remuneration committee.

Definition, scope and extent of the FVA measure

6.5 The FVA replaces two measures used as the basis of the L-TIP which used a "blended" public performance target to measure the performance of the network and progress against the ORR's efficiency targets in cost reduction (covering, controllable opex, maintenance, renewals).

6.6 The FVA not only measures cost efficiency, it also attempts to measure performance through the inclusion of a measure of performance against Schedule 4 (compensation to train operators for possessions) and Schedule 8 revenues (related to TOC delay related performance).

6.7 The annual FVA is equal to the sum of the variance between Network Rail's outturn cost and delivery plan in the following account areas:

- controllable income including Schedule 4 and Schedule 8 income;
- controllable opex;
- maintenance;
- interest payment;
- tax rebates and penalties; and
- renewal and enhancement expenditure after adjustments for work slippages.

6.8 The elements of the FVA calculation are described below.

- **Income** - this represents all single till controllable income, which is consistent with the treatment of income in the regulatory accounting guidelines. We have been informed that the FVA income represents the regulatory income less electrification income and fixed access supplementary income, plus income from property sales and an adjustment for Schedule 4 and 8 income which is accounted for separately within the FVA calculation;
- **Schedule 8 income** - represents the net cost or income arising from Network Rail's compensation payments to train operating companies (TOC and FOCs for freight) for passenger or freight delay minutes. The net cost for Schedule 8

[1] The term MIP is also used by Network Rail to refer to the annual portion of the Management Incentive Plan Statement.

(and Schedule 4 described below) replaces the previous public performance target used to calculate the L-TIP in 2008/09;

- **Schedule 4 income** - represents the net cost or income arising as a result of network possession by Network Rail leading to compensation to TOCs. Network Rail's determination traditionally includes an allowance for this type of expenditure, with a possibility for Network Rail to outperform the determination.
- **Controllable Opex** - represents operations costs such as insurance, pensions, human resources and finance. This excludes items such as traction electricity, cumlo rates and British Transport Police costs over which Network Rail has limited control. The guidelines for the treatment and definition of non-controllable opex are included in the Annex B of the regulatory accounting guidelines;
- **Maintenance** - Maintenance expenditure relates to activities that Network Rail carries out in order to sustain the condition and capability of the existing infrastructure but which do not involve significant replacement of assets. We understand from management that the definition and treatment of these balances are consistent with Annex B of the regulatory accounting guidelines;
- **Interest** - we understand the interest charge in FVA includes interest payable with the exception of accretion interest (interest that forms part of the principal on index-linked bonds) and gains and losses arising from hedging strategies;
- **Tax rebates and penalties** - This reports (exceptional) cash tax receipts or payments within the period; and
- **Renewals and enhancements** - the definition and treatment of enhancement and renewal expenditure are as prescribed in the regulatory accounting guidelines. We understand that these are calculated in accordance with them. Renewal and enhancement slippages (which are netted off against spend in the respective account area) are provided on a periodic (4 weekly) basis by Territories.

6.9 The FVA is therefore supposed to represent the controllable additional value Network Rail has delivered beyond ORR's determination assuming it achieves or betters the determination over a given three year period.

6.10 We understand from Network Rail's management that data used in the calculation of the FVA are obtained directly from Network Rail's financial systems, with the exception of the adjustments to capital expenditure investment. As noted in chapter 5, this is collected by returns and is subject to a significant level of management judgement as to the level of expenditure relating to renewals or enhancements which has been deferred and the reduction in this expenditure which has arisen as a result of efficiencies.

6.11 Management have informed us that the information analysed in the FVA is collected and aggregated in accordance with regulatory accounting guidelines. We have not audited the application of these guidelines to the FVA.

6.12 We understand that any adjustments made to these balances will be reflected in the regulatory accounts. For example this year we understand Network Rail will make a £27m adjustment to the FVA income and maintenance costs to reflect slippage in expenditure on the National Station Improvement Programme. A similar adjustment will be made to the regulatory accounts for 2010. It has not been possible for us to undertake a detailed testing of account balances to verify Network Rail's correct application of the rules above to the FVA as this is the first year of the FVA's operation and at the time of undertaking our work, financial year end was yet to occur.

6.13 We therefore recommend the audit of the application of the regulatory accounting guidelines to the FVA be conducted in conjunction with the audit of the account balances for the regulatory accounts.

Governance systems and processes

6.14 We understand from Network Rail that the FVA measure was developed by Network Rail's management as a proxy for the returns to shareholders in a private company in each financial period. The measure is comparable to other measures of shareholder return such as the Shareholder Value Analysis (SVA), Economic Value Add (EVA) and Economic Profit (EP), discussed below.

6.15 Whilst we note that in Network Rail's Annual Report and Accounts reference is made to consultation and AGM approval in relation to certain aspects of the L-TIP and also Network Rail's statement (in the presentation made to Non-executive Directors on 19 November 2009) that the FVA measure is "verifiable and agreed with ORR [meaning] any change would be difficult". However, at the time of writing, we have not been presented with any other evidence of independent third party consultation on the appropriateness, completeness or correct application of the FVA measure *per se* to Network Rail's business. We understand the measure has been formally adopted or approved by Network Rail's executive board. The ORR has informed us that it has yet to formally comment on the adoption of the FVA. We are not aware of any formal engagement with Network Rail's statutory auditors who will be responsible for signing off the true and fairness of the director's remunerations note in the financial accounts.

6.16 Network Rail has informed us that the ORR was made aware that the FVA would be a key measure several months ago and have yet to receive a formal rejection from the regulator. In response the ORR have informed us that it has made its concerns regarding the FVA clear to Network Rail.

6.17 Network Rail's management has informed us that most of the data used to calculate the FVA (with the exception of renewal and enhancement slippages) are collected and stored in Network Rail's Oracle based financial systems and controls environment. We understand this is audited annually as part of the audit of the statutory and regulatory accounts. Whilst we have not reviewed this environment as part of this engagement, we believe the ORR and Network Rail's management will be able to place reliance on the regulatory and financial audit opinion for this.

6.18 The capital expenditure portion of the FVA is designed to measure only the efficiency on renewal and enhancement expenditure which takes place within a reporting period. In order to achieve this, renewals and enhancements expenditure is adjusted to reverse out the effect of planned but deferred renewals and enhancement expenditure (slippages)[2] and must also by definition treat bringing forward (accelerating) expenditure in the same way (ie neutrally).

6.19 We understand the FVA is manually calculated in Excel spreadsheet templates developed by Network Rail's central finance function. We have not been able to verify the accuracy of the data extraction process, nor have we assessed arithmetic accuracy of Network Rail's FVA calculations. However, Network Rail's management have informed us that the results of the FVA are reviewed for error or misstatement by senior members of the finance team at the end of each period.

6.20 An auditable accurate measure for the outturn of the FVA cannot be provided by Network Rail until the end of the regulatory period (or perhaps annually), when balances, data source and the control environment used to produce the FVA have been audited and appropriate adjustments made. We believe introduction of the recommendations discussed in this section would allow the ORR to place reliance on the governance systems around this measure and therefore the validity of the measure.

6.21 Because of the use of manual excel calculations, we consider there may be a high level of audit risk when the FVA is reviewed by parties, including Network Rail's

[2] The term slippage in the FVA refers to the net slippage i.e. schemes deferred to later in the control period less the schemes brought forward from later in the control period.

internal audit. We therefore recommend at the year end, that if not already planned, Network Rail considers providing a reconciliation of the FVA to the outturn shown in either the regulatory or financial accounts. This should be submitted with relevant supporting explanations and evidence for audit with either the regulatory or financial accounts.

Key risks

6.22 In this section we discuss potential risks associated with this measure identified as part of our work. Where possible we identify controls Network Rail either has or could introduce to serve as mitigations.

- **Incentive and the risk of management "manipulation" through the setting of the delivery plan** - the FVA is measured against Network Rail's Delivery Plan, which Network Rail is required to prepare and update each year. This means Network Rail's management is responsible for setting the trajectory of the delivery plan within the control period as long as the delivery plan trajectory set aims to achieve the efficiency set out in the determination. This could potentially incentivise Network Rail's management to set low efficiency targets in the early part of a Control Period in order to allow the company to deliver good FVA results in the early part of the Control Period. The use of management derived target as a means of assessing the performance of management will always present the risk and incentive for management manipulation. We therefore recommend consideration is given to changing the basis of calculating the targets for the FVA to targets developed by a body independent of management. An alternative means would be an FVA target set by the ORR. Network Rail has stated that they believe by not rejecting Network Rail's Delivery Plan, the ORR has accepted the FVA. In its response, the ORR rejected Network Rail's view on this.

- **Omission of controllable income and expenditure** - the principle of the FVA is to reward the managers of Network Rail for the financial management of risks within their spheres of control. As a result Network Rail's, management has chosen to exclude income and expenditure which is deemed to be uncontrollable, such as income and expenditure associated with traction electricity, cumlo rates and British Transport Police costs. These are disaggregated from controllable operating expenditure and income as defined by the Regulatory Accounting Guidelines. We noted during our discussions with Network Rail's management that they had elected to exclude elements of financial risk management such as accretion interest and financial losses or gains from foreign currency revaluations. However it could be argued that both of these arise as a result of strategies put in place to manage financial risk and therefore controllable income or expenses. This treatment could potentially apply to other balances in Network Rail's financial or regulatory accounts. Shareholder Value Analysis (which we consider is the best practice equivalent to the FVA) typically includes a measure of the management of financial risk through an assessment of the enterprise's weighted average cost of capital. We note from our discussions with the ORR that there are a number of items of income and expenditure currently classified as non-controllable which ORR believes Network Rail has the ability to manage (in terms of outturn income and expenditure). We recommend Network Rail engages with the ORR to ensure the principles used in the derivation and calculation of the FVA are consistent with the principles envisaged when the FVA was developed.

- **Incorrect application of accounting policies, financial adjustments and accounting judgements** - as noted above most of the balances in the FVA calculation are calculated following the regulatory accounting guidelines. Some of these balances are subject to adjustments and accounting judgement. This presents the risk of error in the calculation which may be

difficult to identify. We therefore recommend at the year end, that Network Rail considers providing a reconciliation of the FVA to the outturn shown in either the regulatory or financial accounts. This should be submitted with relevant supporting explanations and evidence for audit with either the regulatory or financial accounts.

- **Long-term deterioration in asset condition** - the FVA unlike Shareholder Value analysis (SVA) only measures financial variables which affect returns to shareholders. In SVA the seventh value driver is the competitive advantage period, which measure the period of time an organisation can continue to charge superior prices for a product. This allows the organisation to analyse if there are any long term negative effects of decisions such reducing costs. If costs are reduced too much this may affect the non-financial measure of competitive advantage period. In the case of Network Rail a proxy measure could be a measure looking at the long term quality of the regulated asset base, which is the source of Network Rail's competitive advantage. This allows the management of Network Rail to gain a more comprehensive picture of the impact of financial decisions on the core objective of the business which is orientated around cost effective whole life management of the network subject to safe and other standards.
- **The single till regime may result in focus on non core business areas** - the FVA includes single till income and expenditure which does not directly relate to the operation and stewardship of the regulated asset base. Because of the contribution the FVA currently has to determining 50% of the potential bonus pool for senior management, it could create a "perverse" incentive to focus on managing easier to achieve non-core efficiencies or income growths than efficiencies in managing the network. Again the presence of a non financial measure within the FVA calculation such as a long term asset condition measure would allow Network Rail's management to be aware when financial management priorities are having a negative effect on the quality of the RAB.

Best practice in other industries

6.23 There is a number of financial KPIs used by private companies to measure financial governance and returns to shareholders. In this section we evaluate the advantages and disadvantages of three KPIs used to measure the financial performance and returns on equity capital invested.

6.24 Shareholder value analysis – the SVA was an approach developed in the 1980s as a means of estimating the value of the shareholders' stake in a business and therefore the impact of strategic decisions on returns to the company. The SVA measures the present value of free cash flows to the shareholders over a planning horizon.

6.25 This measure looks at the 7 value drivers which affect the return to shareholders of a commercial entity:

- revenue;
- operating margins;
- the cash tax paid;
- incremental capital expenditure;
- investment in working progress;
- the cost of capital; and
- competitive advantage period.

Advantages of SVA:

- longer term measure which takes into consideration the impact of strategic decisions over the investment horizon;
- the SVA allows for the impact of a decision in one area to be assessed on another. For example, the impact of reducing capital expenditure on maintenance or competitive advantage; and
- the seven value drivers can be broken down into more detailed and practical performance measures to incentivise lower tiers of management.

Disadvantages of SVA:

- the SVA is based on forward projects, which by their nature are subject to uncertainty, potentially providing misleading results; and
- the competitive advantage period is a non-financial measure which would be difficult to apply to an organisation like Network Rail which is in a monopoly position. However this driver could be adapted to measure the quality of the network which is the source of Network Rail's competitive advantage.

6.26 Residual Profit after notional dividends (Economic Profit). EP describes the surplus earning of a business after the deduction of all expenses including a deduction for the cost of using investor's capital in generating the profit. It is calculated as EP = Operating profit after tax less capital charge.

Advantages of EP:

- this measure can be based on either the financial or regulatory accounts with minimal adjustments, which means the measure is transparent and auditable.

Disadvantages of EP:

- the measure is only a financial measure and therefore does not consider the impact of management decisions on the quality of Network Rail's asset base.

6.27 Economic Value Add is a single year measure which can be determined by making 164 adjustments to accounts produced under UK GAAP, these include adjustment to remove non-cash items and the addition of a notional charge for the opportunity cost of equity capital to measure the increase in shareholder above the expected rate of return**.**

Advantages of EVA:

- this measure provides a more accurate measure of the cash flow generated in a business.

Disadvantage of EVA:

- this measure is more complicated and less transparent because of the adjustments which are required;
- this measure will have limited applicability if Network Rail decided to continue basing this measure on the regulatory accounts rather than the statutory accounts which the EVA was designed to be used with.

Conclusions and Recommendations

6.28 The FVA has been developed as single measure to replace the two measures used to determine the level of senior management incentive payments during CP3. The previous measures, the Public Performance Targets (PPT) and the cost reduction targets (covering, controllable opex, maintenance, renewals) were focused on Network Rail's management's delivery of an efficient and punctual rail network.

6.29 According to Network Rail the previous L-TIP measure risked failing to provide sufficient incentives to ensure the efficient stewardship and management of all of Network Rail's assets. We believe even as a single measure, the FVA provides greater coverage of the range of management responsibilities than the previous two measures. The inclusion of the net cost/income from Schedules 8 and 4, which represent compensation from Network Rail to TOCs for train delays and railway possessions for engineering works respectively, allows the FVA to include a measure of the impact of management decisions on the quality of the network – albeit over a relatively short period of time.

6.30 We note the two previous measures also only incentivised Network Rail's management to achieve the targets set out in ORR's determination. The FVA by measuring management's ability to outperform Network Rail's delivery plan (which should be consistent with the ORR's determination) should potentially deliver additional efficiency savings over the term of a control period.

6.31 We believe the FVA therefore represents an improvement upon the previous L-TIP measures by virtue of its scope and potential stringency of the targets it sets for management.

6.32 As mentioned above, the FVA has expanded the scope of business risks against which Network Rail's management performance is measured. We believe the aim of the FVA is to measure Network Rail's management's ability to manage all controllable business risks. We consider this should include financial risk management, tax risk management and long-term asset condition (as a proxy for maintenance of the firm's competitive advantage) to mention three value drivers identified within a traditional shareholder value analysis.

6.33 Our review of the FVA identified some risks currently defined as uncontrollable risk which the ORR considers Network Rail has some ability to manage such as the costs of the British Transport Police, financing costs and tax paid. Their inclusion in the FVA would arguably provide a more complete picture comparable to total shareholder returns in a private company. For example we found Network Rail's management have excluded accretion interest on index linked debt and financial losses or gains from foreign currency revaluations from the FVA calculation. We believe these to be controllable risk as these are risks introduced to the business as a result of management decisions.

6.34 We note that the FVA does not include a measure for the long term quality of the company's asset base. Arguably, the inclusion of Schedule 4 and 8 costs/income measures the impact of management decisions on the quality and performance of the RAB potentially over a (one to two year) investment horizon. These compensation payments may not however reflect the potential for insidious decline in the quality or performance Network Rail's asset base over time

6.35 We have not been made aware by Network Rail's management of any external advice sought in the development of the FVA measure. We believe Network Rail's management would benefit significantly by further developing this measure in consultation with external stakeholders such as the ORR and Network Rail's statutory and regulatory auditors. Benefits may include:

- the development of a more complete measure which ensures Network Rail's management are measured on and therefore concentrate on managing all business risks;
- early and considered sign-off by Network Rail's external auditors who will be responsible for opining to the truth and fairness of remuneration payments made a result of the FVA in three years' time;
- development of a transparent and auditable FVA approach; and
- the introduction of new ideas on how to make the FVA reflect the long term management of the business.

6.36 The previous L-TIP measures were measured against the ORR's pre-efficiency determination for Network Rail, which provided an independent performance

measurement baseline. The introduction of the FVA and the move to measure performance against the ORR's post-efficiency determination has lead Network Rail to use the delivery plan for the annual baseline. Whilst the ORR independently verifies that the delivery plan is consistent with the final determination, the delivery plan is not subject to its formal approval.

6.37 The use of an annual FVA measure allows Network Rail's management to monitor performance. However, the use of a management developed baseline as a means of measuring the FVA performance, presents the risk of management manipulation through the setting of unchallenging efficiency targets in the early years of a Control Period. This means it would be theoretically possible for Network Rail's management to outperform annual Delivery Plans in the early part of CP4, receive L-TIP payments through the FVA but ultimately fail to achieve the targets set in the determination.

6.38 Network Rail's management and the ORR could remove these risks by either allowing the ORR or a third party to set the annual baseline for the FVA or turn the FVA into a KPI measured over the entire Control Period rather than annually for the purpose of making L-TIP payments.

Table 6.1: Recommendations relating to the FVA measure

No.	Recommendation to Network Rail	Location in Text	NR Data Champions	Arup proposed Due Date
2010.FVA.1	Application of the regulatory accounting guidelines to the FVA should be audited in conjunction with the audit of the account balances of the regulatory accounts.	6.13		Prior to audit of regulatory accounts 2009/10
2010.FVA.2	Consider providing a reconciliation of the FVA to the outturn shown in either the regulatory or financial accounts. This should be submitted with relevant supporting explanations and evidence for audit with either the regulatory or financial accounts.	6.21		Prior to audit of regulatory accounts 2009/10
2010.FVA.3	Consider changing the basis of calculating the targets for the FVA to targets developed by a body independent of management. An alternative means would be an FVA target set by the ORR.	6.22		Q3 FY'10
2010.FVA.4	Network Rail engages with the ORR to ensure the principles used in the derivation and calculation of the FVA are consistent with the principles envisaged when the FVA was developed.	6.22		Q2 FY'10

Appendix A

Meetings

A1 Meetings

No.	Discussed	Attendees	Date
1	CEM and FVA	Rob Evison (Network Rail), Liam Rattigan (Network Rail), Alexander Jan (Arup), Paul Davies (Arup), Mark Morris (Arup), Patrick Ogun-Muyiwa (Arup)	05/02/2010
2	MUCS	Rob Evison (Network Rail), Michael Gurtenne (Network Rail), John Gerrard (Network Rail), Andy Whitaker (Network Rail), Alexander Jan (Arup), John House (Arup), Paul Davies (Arup), Patrick Ogun-Muyiwa (Arup)	05/02/2010
3	Renewals	Rob Evison (Network Rail), Steven Blakely (Network Rail), Richard Henstock (Network Rail), Steven Coe (Network Rail), Robin Hamilton (Network Rail), Alexander Jan (Arup), Jonathan Yates (Arup)	08/02/2010
4	CEM and FVA	Liam Rattigan (Network Rail), Alexander Jan (Arup), Jonathan Yates (Arup), Paul Davies (Arup)	16/02/2010
5	Renewals and CAF	Mark Morris (Arup), Dan Philips (Arup), Paul Davies (Arup)	23/02/2010
6	Corporate Benchmarking	David Smallbone (Network Rail), Rob Evison (Network Rail), Alexander Jan (Arup), Jonathan Yates (Arup), Paul Davies (Arup), Mark Morris (Arup)	01/03/2010
7	Efficient Infrastructure Delivery Programme	Ian Ballentine (Network Rail), Rob Evison (Network Rail), Jonathan Yates (Arup), Paul Davies (Arup), Mark Morris (Arup)	01/03/2010
8	Provenance of CEM and FVA	Charles Robarts (Network Rail), Jonathan Schofield (Network Rail), Rob Evison (Network Rail), Mark Morris (Arup), Paul Davies (Arup), Alexander Jan (Arup)	03/03/2010
9	Audit Visit, LNE Route	Rachel Thomas (Network Rail), Nigel Hunter (Network Rail), Wendy Horne (Network Rail), Jonathan Yates (Arup), John House (Arup), Michael Cunningham (Arup)	11/03/2010
10	Audit Visit, Western Route	Brian Woodman (Network Rail), Neil Edmunds (Network Rail), Jonathan Yates (Arup), Michael Cunningham (Arup)	12/03/2010
11	Review meeting on MUC issues	John Gerrard (Network Rail), Michael Gurtenne (Network Rail), Jonathan Yates (Arup), Michael Cunningham (Arup)	12/03/2010
12	FVA	Liam Rattigan (Network Rail), Paul Davies (Arup), Patrick Ogun-Muyiwa (Arup)	15/03/2010

No.	Discussed	Attendees	Date
13	Audit Visit, Track Renewals London North West Territory	Daljinder Chatta (Network Rail), Mark Griffiths (Network Rail), Adrian Bird (Network Rail), Mark Morris (Arup)	17/03/2010
14	General Update	Charles Robarts (Network Rail), Alexander Jan (Arup), Jonathan Yates (Arup)	18/03/2010
15	Audit Visit, Track Renewals London North East Territory	Richard Dooley (Network Rail), Mark Morris (Arup)	18/03/2010
16	Audit Visit, Signalling Renewals London North East Territory	Tony Smith (Network Rail), Mark Morris (Arup)	18/03/2010
17 (Planned)	Audit Visit, Civils Renewals Nationwide	Chris Bryson (Network Rail), Julian Humphreys (Network Rail), Mark Morris (Arup)	22/03/2010

Appendix B

Documents Reviewed

B1 Documents Reviewed

Ref no.	Date Received	Title	File Name	Received from	Comments
D1	29/01/2010	Financial Value Added 2009/2010	FVA - external	Liam Rattigan Network Rail	Financial Value Added pro forma for 2009/2010 Period 10
D2	29/01/2010	Cost Efficiency Heat Map Measure 09/10 P10	CEM Heatmap p10 GB	Liam Rattigan Network Rail	Cost Efficiency Heat Map for 2009/2010 Period 10
D3	03/02/2010	Network Rail: Corporate KPI Manual	KPI Manual	Rob Evison Network Rail	Key Performance Indicator Manual. Gives details of each of the KPI.
D4	03/02/2010	Cost Efficiency Measure	ORR Cost Efficiency Document	Rob Evison Network Rail	Explains cost efficiency measures.
D5	03/02/2010	Cost Efficiency Measure	CPD Presentation to ORR reports Feb10	Rob Evison Network Rail	Presentation explaining CEM and FVA
D6	03/02/2010		20100205issuelogV2	Rob Evison Network Rail	ARUP issues log amended by Rob Evison
D7	04/02/2010		CAF Info.zip	Rob Evison Network Rail	Zip file containing document D20-D33
D8	04/02/2010		UCM Tool	Rob Evison Network Rail	Unit cost modelling tool: provides cost curves based on historical data which has been captured under the CAF, against which current or future project unit volumes can be plotted to derive benchmark costs and volumes.
D9	04/02/2010	Unit Cost Modelling Tool Guidance	UCM Tool Guidance (GN)	Rob Evison Network Rail	Guidance on the UCM Tool
D10	04/02/2010		UCM CBS Hierarchy	Rob Evison Network Rail	List of renewal and enhancement activities
D11	04/02/2010		Signalling Cost Allocations & Norms	Rob Evison Network Rail	List of activities required in a renewals project.
D12	04/02/2010		National CAF Template	Rob Evison Network Rail	CAF Template.
D13	04/02/2010		National CAF Template Completion Guide	Rob Evison Network Rail	Guide to completing National CAF Template
D14	04/02/2010		CAF Tracker (project level)	Rob Evison Network Rail	Details and status of each project that has been entered into CAF.
D15	04/02/2010	National CAF Template Completion Guide	CAF Template User Guide (GN)	Rob Evison Network Rail	User guide for CAF Template.
D16	04/02/2010	CAF Project Profile Reports Production	CAF Project Profile Reports Projection (WI)	Rob Evison Network Rail	Guidance on how to report project unit costs and associated contextual/ technical factors.

Ref no.	Date Received	Title	File Name	Received from	Comments
D17	04/02/2010	CAF Data Processing and Analysis	CAF Data Processing and Analysis (WI)	Rob Evison Network Rail	Guidance on how to process and analyse reported unit costs and associated contextual/ technical factors.
D18	04/02/2010	CAF Change Control Process	CAF Change Control Process (WI)	Rob Evison Network Rail	Guidance on how to carry out change control of elements of the Cost Analysis Framework.
D19	04/02/2010	CAF Application and Reporting Process	CAF Application and Reporting Process (WI)	Rob Evison Network Rail	Guidance on the process for reporting and collecting project unit costs and associated technical/ contextual factors under the Cost Analysis Framework.
D20	04/02/2010	CAF Actual Project Profile Reports (APPRs = CAF 7) Summary	CAF Actuals Summary	Rob Evison Network Rail	Shows value of planned projects against CAF Actual Reports received.
D21	04/02/2010		CAF 1.2 Data	Rob Evison Network Rail	Database containing a collection of project data.
D22	08/02/2010	Scotland - Cost Efficiency Heat Map Measure	Cost_Efficiency_Heat_Map Scot draft	Greg Smith ORR	Cost Efficiency Heat Map for Scotland 2009/2010 Period 9
D23	08/02/2010	Cost Efficiency Heat Map Measure 09/10 P9	Cost_Efficiency_Heat_Map GB P9v1	Greg Smith ORR	Cost Efficiency Heat Map for the GB 2009/2010 Period 9
D24	08/02/2010	England and Wales - Cost Efficiency Heat Map 09/10 P9	Cost_Efficiency_Heat_Map draft E&W	Greg Smith ORR	Cost Efficiency Heat Map for England and Wales 2009/2010 Period 9
D25	08/02/2010	Network Rail Financial Report P9 2009/10	P9 Finance Pack	Greg Smith ORR	Network Rail Financial Report 2009/2010 Period 9
D26	08/02/2010	Track Renewals Cost Efficiency - Year to Date P10	Schedule for Track MBR	Rob Evison Network Rail	Track renewal cost efficiency schedule 2009/2010 Period 10
D27	08/02/2010	LNE Operations Cost Efficiency - Year to Date P10	Schedule for LNE MBR	Rob Evison Network Rail	LNE cost efficiency schedule
D28	08/02/2010	Efficiency and Unit Cost Measurement	ORR LTR 261109	Rob Evison Network Rail	Letter from Network Rail to ORR giving details on adjustments to baseline for 2009/2010 Period 10
D29	08/02/2010	England and Wales - Cost Efficiency Heat Map 09/10 P10	Cost_Efficiency_Heat_Map E&W P10	Rob Evison Network Rail	Cost Efficiency Heat Map for England and Wales 2009/2010 Period 10
D30	08/02/2010	Scotland - Cost Efficiency Heat Map Measure P10	Cost_Efficiency_Heat_Map Scot P10	Rob Evison Network Rail	Cost Efficiency Heat Map for Scotland 2009/2010 Period 10

Ref no.	Date Received	Title	File Name	Received from	Comments
D31	08/02/2010	Cost Efficiency Heat Map Measure P10	CEM heatmap p10 GB	Rob Evison Network Rail	Cost Efficiency Heat Map for GB 2009/2010 Period 10
D32	08/02/2010	Network Rail Financial Report P10	P10 Finance Pack	Rob Evison Network Rail	Network Rail Financial Report 2009/2010 Period 10
D33	08/02/2010	Information Requests for CEM/FVA Meeting	Information Requests for CEM/FVA Meeting (Email from Rob Evison)	Rob Evison Network Rail	Email from Rob Evison. Explains where to find non-controllable costs and gives cost elements as a proportion of total expenditure for CEM.
D34	09/02/2010	Efficiency and unit cost measurement	Efficiency_and_unit_cost_measurement[1]	Greg Smith ORR	Letter from ORR to Network Rail highlighting their questions and concerns about the Network Rail efficiency and unit cost measurements.
D35	09/02/2010	Maintenance FRM702	ORR-#370790-v1-September_Unit_Cost_meeting_documentation	Greg Smith ORR	Specifies a procedure for capturing unit cost data and ensures consistency of unit definitions and cost allocation principles.
D36	10/02/2010	Fw: Information request from Renewals/ Enhancement Meeting	Fw: Information request from Renewals/ Enhancement Meeting (Email from Rob Evison)	Rob Evison Network Rail	Email discussing information and attachments that were requested from the Renewals and Enhancement Meeting (08/02/10)
D37	10/02/2010	Audit of Network Rail Unit Cost Framework - Information for Meeting with ARUP 8th Feb 2010	Draft Presentation ARUP V3 PH	Rob Evison Network Rail	Presentation from Renewals and Enhancements Meeting on 08/02/10.
D38	10/02/2010	Transformation Programme - Unit Cost Modelling	Endwk4P11UCM	Rob Evison Network Rail	Transformation Programme Overview: Gantt chart for the transformation of unit cost modelling system (renewals).
D39	10/02/2010	Maintenance Unit Costs Update for ORR	Unit Costs 0909 (2)	Rob Evison Network Rail	First half of document. Presentation given to ORR by Network Rail on 12th Sept 2009. Contains updates on restructuring of MUCS: league tables with in Network Rail; sharing good practice within the business; regression analysis; implementation of new MUCS modelling system, ie use of Oracle / Ellipse system, reduction in MUCS variance.
D40	10/02/2010	Maintenance Unit Costs Update for ORR	Unit Costs 0909 (2)	Rob Evison Network Rail	Second half of document. Presentation given to ORR by Network Rail on 13th Sept 2009. Contains updates on restructuring of Capital Projects Cost Modelling: overview of 3 phases involved with enhancing the CAF system to make it more effective.
D41	10/02/2010	CAF Actual Project Profile Reports (APPRs = CAF 7)	CAF Actuals Summary P11	Rob Evison Network Rail	Planned and actual completed value of CAF projects.

Ref no.	Date Received	Title	File Name	Received from	Comments
		Summary			
D42	10/02/2010		CAF Tracker P11	Rob Evison Network Rail	Summary of CAF projects for P11
D43	11/02/2010	Unit Cost Analysis - Signalling	Signalling UC Analysis	Rob Evison Network Rail	Shows how signalling projects are performing against unit cost targets. Example of how unit cost data is used in the business. (See email for more details)
D44	11/02/2010	Email from Rob Evison (FW: ORR Reporter Audit of Network Rail Unit Cost and Efficiencies - Track Data)	Email from Rob Evison (FW: ORR Reporter Audit of Network Rail Unit Cost and Efficiencies - Track Data)	Rob Evison Network Rail	Provides information on issues R2 to R6.
D45	12/02/2010	Email from Rob Evison (FW: Arup Information Request)	Email from Rob Evison (FW: Arup Information Request)	Rob Evison Network Rail	Provides information and documents that relate to the MUCS meeting with Network Rail 05/02/2010
D46	12/02/2010	Infrastructure Maintenance - Activity Unit Costs	Maintenance Unit Costs v1 0	Rob Evison Network Rail	Presentation from Network Rail to ARUP on 05/02/2010. Covers funding challenge, MUCS overview, MUCS process and continuous improvement process; unit cost reporting cycle and output; how MUCS are used to reduce costs; regression analysis; and regression and MUCS in business planning.
D47	12/02/2010	Maintenance Unit Costs (Automated Actuals) - By Routes Consolidation	Data M3 & M6 request	Rob Evison Network Rail	MUCS data that relates to M3 and M6 on issues list.
D48	12/02/2010	0809 - Supplied to Halcrow	Data Request M4	Rob Evison Network Rail	MUCS data that relates to M4 on issues list.
D49	12/02/2010	Level 3 Asset Data Maintenance Reference Data Change	Network Rail_L3_AMG_AK00251	Rob Evison Network Rail	Relates to quality of Ellipse Data. This document describes the process used when changing selected reference data held in Network Rail asset information systems.
D50	12/02/2010	Level 3 Asset Data Maintenance Reference Data Change	Network Rail_L3_AIF_002 Procedure for changing reference data in asset systems	Rob Evison Network Rail	More resent version of D64.
D51	12/02/2010	Ellipse Work Management Handbook.zip	Ellipse Work Management Handbook.zip	Rob Evison Network Rail	Ellipse Work Management Handbook

Ref no.	Date Received	Title	File Name	Received from	Comments
D52	12/02/2010	Network Rail Transformation Programme	TPProg Summary110210	Rob Evison Network Rail	Overview of Network Rail Transformation Programme. Requested in Renewals meeting 08/02/2010
D53	04/02/2010	Cost Analysis Framework (CAF)	Cost Analysis Framework	Rob Evison Network Rail	Explains CAF, who needs to use it and the process. It also gives a list of related documents that are stored in CAF Info.zip
D54	12/02/2010	Untitled	DQuIP Plan 25-09-2009	Rob Evison Network Rail	Data quality improvement plan (DQuiP) for Ellipse Data
D55		Independent Reporter: Audit of Network Rail's Roll Out of Cost Analysis Frameworks and Maintenance of Unit Costs	Halcrow_caf-muc_final 2006 report	Downloaded	Halcrow 2006 independent Reporter Audit of CAF and MUCS
D56	17/02/2010	Network Rail CP4 Delivery Plan 2009 Enhancement programme: statement of scope, outputs and milestones	Network RailEnhancements Document June 2009pdf	Downloaded	Network Rail 2009 Delivery Plan
D57	17/02/2010	Network Rail Strategic Business Plan CP4	Network RailStrategic Business Plan April2008 update	Downloaded	Network Rail Strategic Business Plan Update CP4
D58	17/02/2010	Annual Return 2009 (Improving Local Communities)	Network Rail2009 Annual Return	Downloaded	Network Rail Annual Return 2009
D59	17/02/2010	Control Period 4 Delivery Plan 2009	CP4 Delivery Plan 2009	Downloaded	Network Rail Control Period 4 Delivery Plan 2009
D60	17/02/2010	Independent Reporter A: Annual Return Audit 2009 Final Report	AR09_Audit_Report_Final	Downloaded	Halcrow Independent Reporter A Annual Return Audit 2009
D61	17/02/2010	Assessing Network Rail's Scope for Efficiency Gains (LECG)	C67EF85Fd01	Downloaded	A report by LECG for Network Rail covering the pace at which other regulated infra/util. companies have achieved efficiency saving; Network Rail's likely rate of efficiency improvements; and the way in which these result might be applied to determine efficiency targets for CP4.

Ref no.	Date Received	Title	File Name	Received from	Comments
D62	17/02/2010	RE: Arup Network Rail Meeting yesterday on FVA and CEM (Email from Liam Rattigan)	RE: Arup Network Rail Meeting yesterday on FVA and CEM (Email from Liam Rattigan)	Liam Rattigan Network Rail	Email from Liam Rattigan that follows up from the meeting with Network Rail on 15/02/2010 that covered FVA and CEM. It contains information on the reports from the delivery units that make up the FVA and an example of the FVA calculation.
D63	17/02/2010	Investment Budget Variance Analysis - YTD summary P10	Variance IM	Liam Rattigan Network Rail	Variance Analysis schedules from the IM (territory/function) reporting unit (delivery units) showing the efficiency they have recognised.
D64	17/02/2010	Investment Budget Variance Analysis - YTD summary P10	Variance II ENHANCEMENTS	Liam Rattigan Network Rail	Variance Analysis schedules from the II ENHANCEMENTS (territory/function) reporting unit (delivery units) showing the efficiency they have recognised.
D65	17/02/2010	Investment Budget Variance Analysis - YTD summary P10	Variance II SP&C SIGNALLING	Liam Rattigan Network Rail	Variance Analysis schedules from the II SP&C SIGNALLING (territory/function) reporting unit (delivery units) showing the efficiency they have recognised.
D66	17/02/2010	Financial Variance Analysis - Spend Enhancements P10	P10-10 Group reporting variance template	Liam Rattigan Network Rail	Schedule showing the level of efficiency that has been validated following central checking of delivery unit reports for renewals and enhancements.
D67	17/02/2010	Cost Efficiency - Plane Track Renewals	P10-10 Track Renewals v2	Liam Rattigan Network Rail	Spreadsheet showing Unit Cost analysis for Track Renewals
D68	17/02/2010	Example of efficiency recognition	CEM volume example	Liam Rattigan Network Rail	A worked example showing how volume cost efficiencies are calculated and the effect of deviating from Network Rail forecasts.
D69	18/02/2010	Assessing Network Rail's scope for efficiency gains over CP4 and beyond: a preliminary study	No copy of file	Downloaded	Oxera and LEK Report. Aims to arrive at an initial estimate of the range of potential efficiency improvements in operations, maintenance and renewals that Network Rail could achieve over CP4 and CP5.
D70	18/02/2010	Advice on Network Rail's Strategic business Plan for CP4	Arup internal document		Arup Report. Addendum to 'Engineering Advice on Network Rail's Enhancement Programme', an Arup report for ORR in June 2008
D71	18/02/2010	Network Rail's scope for efficiency gains in CP4	No copy of file	Downloaded	Oxera Report. An assessment of efficiency gains achievable by Network Rail in operations, maintenance and renewals which was intended to inform the 2008 periodic review.
D72	18/02/2010	Independent Reporter Part C Services Best Practice Review - Final Report Using the AMCL Excellence Model	No copy of file	Downloaded	Report by Asset Management Consulting Limited (AMCL). Assessment of Network Rail's asset management capabilities.

Ref no.	Date Received	Title	File Name	Received from	Comments
D73	10/03/2010	Halcrow Preliminary Efficiency Report 20008-09 v1_0	Independent Reporter A	Downloaded	Halcrow Report focusing on Network Rail's 2008/09 Period 1-12 data for the efficiency section of Annual Return 2009.
D74	08/03/2010	RE Arup Issues Log V7	Preliminary Data on Efficiency 2008/09	Rob Evison Network Rail	Email from Rob Evison covering F11, F12, R9
D75	08/03/2010	P10 % of Scot costs direct	Final Report	Rob Evison Network Rail	Spreadsheet showing the percentage of costs allocated to Scotland and percentage that is direct when calculating the FVA.
D76	08/03/2010	FINANCIAL VARIANCE ANALYSIS - SPEND RENEWALS	P1--10 Group reporting variance template YTDadj	Rob Evison Network Rail	Spread sheet that relates to R12 that shows the areas of movement on a period by period basis.
D77	09/03/2010	RE: Arup Issues Log V7 reply 2	RE: Arup Issues Log V7 (Email from Rob Evison)	Rob Evison Network Rail	Email from Rob Evison providing information that relates to R15.
D78	09/03/2010	Cost Apportionment Rules for 2010 / 2011 Business Plan Process	Cost apportionment v5-0	Rob Evison Network Rail	Sets out consistent rules for apportioning costs to Work Type categories. Relates to R15.
D79	09/03/2010	II Track - Chart of Accounts	Chart of Accounts v9-0	Rob Evison Network Rail	Track design and development account codes.
D80	10/03/2010	RE: Arup Issues Log V7 F11 -Scotland allocation	RE: Arup Issues Log V7 F11 -Scotland allocation (Email from Rob Evison)	Rob Evison Network Rail	Email covering how cost is allocated in Scotland. It contains a further attached email on this subject.
D81	11/03/2010	Arup Issues Log - items R10 and R13	Arup Issues Log - items R10 and R13 (Email from Rob Evison)	Rob Evison Network Rail	Email from Rob Evison providing information that relates to R10 and R13.
D82	11/03/2010	EFFICIENCY SCORECARD for all Type A or B Work - Version 6	Scorecard ORR Report	Rob Evison Network Rail	Spreadsheet containing information that relates to R10.
D83	12/03/2010	RE: Arup Issues Log V7 - items M13, M14, M15	RE: Arup Issues Log V7 - items M13, M14, M15 (Email from Rob Evison)	Rob Evison Network Rail	Email from Rob Evison providing information that relates to M3, M4, M6, M11, M12, M13, M15, M16 and M17.
D84	12/03/2010	P13 Data 0809	Data Request M4 v2.0	Rob Evison Network Rail	Spread sheet containing disaggregated data (Average Territory Maintenance Unit Costs) for the 12 MUCs reported by Halcrow for 2008/09 P13 data in their 2009 Audit Report (p.183). Covers M4.
D85	12/03/2010	RE: Arup Issues Log V7 - items M13, M14, M15	RE: Arup Issues Log V7 - items M13, M14, M15 reply 2	Rob Evison Network Rail	Email from Rob Evison that discusses the internal audit of efficiencies that is to be undertaken by Network Rail.

Ref no.	Date Received	Title	File Name	Received from	Comments
D86	12/03/2010	Financial Value Added Board Presentation	Financial Value Added	Rob Evison Network Rail	Presentation given by Patrick Butcher (Network Rail) to the Non-Executives regarding the FVA. Relates to F14.
D87	16/03/2010	Maintenance Unit Costs (Automated Actuals) - By Routes Consolidation	MUC Data P10 0910 Consolidated by Route for Arup Data Request v1.0.	Michael Gurtenne	Spreadsheet that contains a summary of the unit rate and QTY by route and a theoretical unit rate backup sheet. These relate to maintenance.
D88	05/03/2010	CEM Packs	CEM Packs (Folder)	Rob Evison Network Rail	Contains 5 zipped files for P1, P5 and P10, each of which contains CEM documents.
D89	05/03/2010	Finance Packs	Finance Packs	Rob Evison Network Rail	Contain finance packs for P1-P11.

Appendix C

Issues and Queries Log

C1 Issues and Queries Log

Maintenance Issues and Queries

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Date	Status	Response
M1	Information Request	Please provide a copy of the latest version of the Company Specification FRM702 – Reporting of Maintenance Unit Costs	18/01/10	Closed	Received from ORR Greg Smith 09/02/2010 Version 11.1
M2	Information Request	Please provide an outline of how MUC data is being used by Network Rail to manage the business and plans (if any) as to how the role of these data will develop and change over time.	18/01/10	Closed	This question was covered by meeting held 03/02/10 (1530) with Michael Gurtenne, John Gerrard and Andy Whittaker. Cost Efficiency Measure presentation sent through
M3	Information Request	Please provide the latest available MUC data for 2009/10, presented by Territory level, with a combined (GB) summary.	18/01/10	Closed	Info provided by NR on 12/02/2010, this relates to period 10. If more recent information is available, that NR would prefer us to use, then please provide.
M4	Information Request	Please provide disaggregated data (Average Territory Maintenance Unit Costs) for the 12 MUCs reported by Halcrow for 2008/09 P13 data in their 2009 Audit Report (p.183)	18/01/10	Closed	Info provided by NR on 12/02/2010. P12 provided on 12/03/2010, see D84.
M5	Information Request	What is the 5 year rolling maintenance efficiency improvement against CP3/ CP4 (please provide % cumulative efficiency data) against regulatory targets.	18/01/10	Closed	See PR08 Final Determination
M6	Information Request	Please provide information on the number of maintenance activities associated with each MUC and total maintenance expenditure in 2009/10, by Territory, for the same period that the MUCs were calculated (e.g. if unit costs are based to P12, then the other data should be for the same period).	18/01/10	Closed	What is the value of spend for each Ellipse/ MUC activity, by Route for 2009/10 (latest available info), so that we can see where the most expendiure is happening (e.g. [ ]% of maintenance spend is on [ ] activity.
M7	Information Request	Please provide the latest Company Policy/ Procedure on data quality control for maintenance information in Ellipse.	18/01/10	Closed	See email 12/02/2010, including docs: Dquip_Plan25-09-2009.pdf; NR L3 AMG AK0025.pdf; NR L3 AIF 002 Procedure…pdf; Ellipse work management handbook.zip
M8	Information Request	Please provide the latest Company Policy/ Procedure (or statement) on how information is processed and how data quality is controlled when	18/01/10	Closed	As M7

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Date	Status	Response
		calculating MUCs.			
M9	Information Request	Please provide a statement on the plans for improving the quality of MUCs and the anticipated timescales, coverage and accuracy of the unit costs. What obstacles or problems does Network Rail foresee in implementing this plan and how could these risks be mitigated?	18/01/10	Open	How NR are responding to Halcrow recommendations in their 2009 report (para 3.3.15 (page 9).
M10	Meeting Request	We would like to review data processing for a sample of MUCs from the original input of maintenance activities and costs, to the final processed outputs that are presented in the Annual Statement. This should include a sample test of unit costs across a number of Territories – one of which should be Scotland and including a demonstration of the systems involved for data processing. Meeting to be arranged to facilitate this audit, to cover the 12 MUCs identified in item 4 above.	18/01/10	Open	
M11	Meeting Request	Please could we have a follow-up meeting with Michael Gurtenne on MUC's; eg OH allocation process and for him to demonstrate the information processing and validation?	10/02/10	Closed	Further meeting required with Michael Gurtenne, particularly to understand the new OH allocation process (OTL); and ongoing imrpovement workstreams that were outlined in the presentation of 5 February 2010.
M12	Information Request	Please could you provide a written statement on key changes in the MUC process from CP3 to CP4 (definitions, data sources/ processing/ validation)?	10/02/10	Closed	Covered in presentations (various) by NR; Follow-up: please provide any accuacy statistics relating to MUC's (e.g. data quality tracking in Ellipse) that shows how NR are managing incoming data quality.
M13	Information Request	For the 12 main MUC's reviewed by Halcrow in 2009, is it possible for NR to provide a breakdown of the unit cost into components such as internal labour (directly allocated); materials; MDU overheads; HO overheads; external labour/ suppliers; etc. - to give us some indication of the realtive cost inputs within these measures?	26/02/10	Closed	
M14	Information Request	For the response provided to M3 on MUC's by Route: please provide the breakdown of MUC's for each MDU	02/03/10	Closed	Received a sample of this data.
M15	Information Request	For the response provided to M6 on MUC's by Route: please provide the detail requested on the volume of activity related to each MDU by Route (e.g. how many rail yards were replaced for MNT002 in each Route?)	02/03/10	Closed	Received a sample of this data.

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Date	Status	Response
M16	Information Request	For MDU's, does NR collate information on how much maintenance activity is planned or reactive? If this is available, please could we see the summary for each MUC? [this can be discussed in Meeting M11 if possible]	02/03/10	Closed	Covered in meeting on 12/03/2010 with Michael Gurtenne and John Gerrard.
M17	Information Request	Please provide the Network Rail unit cost policy documents. (As discussed in the meeting with Ian Ballentine on 01/03/2010).	04/03/10	Closed	Maintenance Unit Cost policies are covered in FRM702 (D35).
M18	Information Request	Please provide any accuacy statistics relating to MUC's (e.g. data quality tracking in Ellipse) that shows how NR are managing incoming data quality.	24/03/10	Open	

Renewals Issues and Queries

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Raised by	Date	Status	Response
R1	Information Request	Please provide an outline of how CAF data is being used by Network Rail to manage the business and plans (if any) as to how the role of the data will develop and change over time.	Jonathan Yates	18/01/10	Open	Partially covered - evidence has been provided at a strategic level but the use of CAF data to manage the business at a Territory level has been varied, based on the limited number of audits undertaken to date.
R2	Information Request	Please provide a copy of the latest version of the latest Specification for recording, reporting and analysis of renewals unit cost (CAF framework).	Jonathan Yates	18/01/10	Closed	CAF specification sent 04/01/10 together with CAF model and other supporting files.
R3	Information Request	Please provide the latest available Renewals unit costs and unit cost indices for 2009/10, presented by Territory level, with a combined (GB) summary, to the similar level of detail as the 2009 Annual Report to ORR (e.g. 16 plain line track, 3 S&C renewal activities etc.)	Jonathan Yates	18/01/10	Open	Info to follow from Network Rail. Numbers would not yet be finanalised for Annual Return.
R4	Information Request	Please provide information on the volume of activities (data-points) recorded against each renewal unit cost for 2009/10 and how this compares to the actual number of CAF returns provided by Territory.	Jonathan Yates	18/01/10	Closed	CAF tracker details 1073 projects to be recorded in 2009/10. 369 project returns o/s at Period 11. Data provided on a territory basis.
R5	Information Request	What is the total renewals expenditure in 2009/10, by Country, for the same period as item R4 above.	Jonathan Yates	18/01/10	Closed	Data provided by Territory including forecast to year end.
R6	Information Request	Please provide a statement on the plans for future development of the CAF framework and the anticipated timescales, coverage and accuracy of the unit costs. What obstacles or problems does Network Rail foresee in implementing this plan and how could these risks be mitigated?	Jonathan Yates	18/01/10	Closed	Presentation provided in meeting on 8th February 2010. Development of the new CAF is anticipated by April 2010 with all relevant staff trained in its purpose and use. Obstacles are awareness of staff of the usefulness of the system, existing Cost Breakdown Structures and the "cleansing" of historical data.

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Raised by	Date	Status	Response
R7	Information Request	We would like to review data processing for a sample of renewals unit costs, from the input of renewals activities and costs, to the final processed outputs that are presented in the Annual Statement. Ideally, this would cover a sample test of unit costs across a number of Territories – one of which should be Scotland and including a demonstration of the systems involved for data processing.	Jonathan Yates	18/01/10	Open	To be covered in the Audit
R8	Information Request	Please provide a statement or evidence of how the inconsistent application of inflation indices, identified in the 2009 annual audit for renewals, has been addressed.	Mark Morris	10/02/10	Open	Liam Rattigan to provide.
R9	Query	Are baseline costs and NR costs adjusted for inflation on the same basis? What policies are in place to provide assurance to the regulator?	Mark Morris	10/02/10	Closed	Information regarding this issue is covered in an email from Rob Evison received on 08/03/2010.
R10	Information Request	Please provide the supporting period 10 reports for the following major renewals projects: 1) Great Eastern OLE renewal 2) NASR Phase 1 3) Northampton resignalling 4) Glasgow Central Resignalling Please demonstrate correlation of data presented with the period 10 finance pack.	Mark Morris	10/02/10	Closed	Information regarding this issue is covered in an email from Rob Evison received on 11/03/2010. See D81 and D82
R11	Query	With regard to the proposed KPI framework, please detail why performance against budget ("Budget Variance") is not incorporated into the Cost Efficiency Measure.	Mark Morris	10/02/10	Closed	
R12	Query	Please demonstrate how the £30m of net efficiencies in period 10 was calculated and substantiate the movement since period 9 of £18m.	Mark Morris	10/02/10	Closed	Information regarding this issue is included in an email from Rob Evison on 08/03/2010.
R13	Query	Please provide a statement detailing the process of making financial accruals for projects in support of Full Year Forecasting data.	Mark Morris	10/02/10	Closed	Information regarding this issue is covered in an email from Rob Evison received on 11/03/2010. See D81.
R14	Query	How does NR intend to demonstrate efficient management of its cost base for renewals over CP04 notwithstanding the monitoring of out-turn costs?	Mark Morris	10/02/10	Open	Not provided

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Raised by	Date	Status	Response
R15	Information Request	Please provide the Network Rail unit cost policy documents. (As discussed in the meeting with Ian Ballentine on 01/03/2010).	Alexander Jan	04/03/10	Closed	Unit cost policy documents provided in file attached to email from Rob Evison received on 05/03/2010. See D90 and D91. Also see D78 and D79 received on 09/03/2010.

CEM Issues and Queries

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Raised by	Date	Status	Response
C1	Information Request	Please provide a high-level introduction to the Cost Efficiency Index, including an overview of its objectives, how the information is presented to ORR and how the underlying data captured, processed and analysed.	Jonathan Yates	18/01/10	Closed	Response received from Liam Rattigan 29/1/10. In prep for meeting on 2nd Feb (rescheduled to Friday 5/02/10)
C2	Information Request	Please provide the definition for the Cost Efficiency Index measure	Jonathan Yates	18/01/10	Closed	See KPI Manual received 03/02/10
C3	Query	Please explain how both income and costs are incorporated into the measures	Jonathan Yates	18/01/10	Closed	
C4	Query	How was the baseline calculated and what aspects of opex are included?	Jonathan Yates	18/01/10	Closed	Baseline was explained in the meeting on 03/02/10; see KPI Manual
C5	Query	How are overheads and other indirect costs allocated?	Jonathan Yates	18/01/10	Open	Clarification required on renewals and maintenance overheads
C6	Query	How are costs for England, Wales and Scotland calculated?	Jonathan Yates	18/01/10	Open	
C7	Query	How is the source information validated and checked?	Jonathan Yates	18/01/10	Open	
C8	Query	What are the plans for future development of this measure and the anticipated timescales, coverage and accuracy of this measure? What obstacles or problems does Network Rail foresee in implementing this plan and how could these risks be mitigated?	Jonathan Yates	18/01/10	Open	
C9	Information Request	Please provide internal statements on data control, processing and validation for the CEI	Jonathan Yates	10/02/10	Open	
C10	Information Request	Please provide formula(s) used for volume based efficiency measures for renewals	Jonathan Yates	17/02/10	Closed	See email from Rob Evison 05/03/2010
C11	Query	How was the CEM measure arrived at?	Jonathan Yates	17/02/10	Closed	Covered in meetings with Charles Robarts and John Scofield on 03/03/2010 and meeting with David Smallbone on 01/03/2010
C12	Information Request	Please provide the underlying spreadsheet of the CEM for period 1, 5 and 10.	Alexander Jan	04/03/10	Open	Spreadsheets provided by NR via memory stick, see D88. This information has no explanation so is difficult to utilitise.

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Raised by	Date	Status	Response
C13	Information Request	Please provide Network Rail Forcasts for CEM expenditure for CP4 split into the following categories; Total Maintenance, Maintenance Overheads, Total Renewals, Renewals Overheads, Enhancements, Controlable Opex, Non-controlable Opex.	Paul Davies	23/03/10	Open	

FVA Issues and Queries

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Raised by	Date	Status	Response
F1	Query	Please provide a high-level introduction to the Financial Value Added measure, including an overview of its objectives, how the information is presented to ORR and how the underlying data captured, processed and analysed.	Jonathan Yates	18/01/10	Closed	Response received from Liam Rattigan 29/1/10. In prep for meeting on 2nd Feb (rescheduled to Friday 5/02/10)
F2	Information Request	Please provide the definition for the Financial Value Added measure	Jonathan Yates	18/01/10	Closed	Received KPI Manual V4 and presentation on 03/02/10
F3	Query	Please explain how both income and costs are incorporated into the measures	Jonathan Yates	18/01/10	Closed	Follow-up meeting requested to cover this item, covered in F10.
F4	Query	How was the baseline calculated and what aspects of opex are included?	Jonathan Yates	18/01/10	Closed	Presentation 03/02/10 and adjustments letter 08/02/10
F5	Query	How are overheads and other indirect costs allocated?	Jonathan Yates	18/01/10	Closed	Not applicable
F6	Query	How are costs for England, Wales and Scotland calculated?	Jonathan Yates	18/01/10	Closed	Not applicable
F7	Query	How is the source information validated and checked?	Jonathan Yates	18/01/10	Closed	Covered in meeting 05/02/10, but need follow-up information
F8	Query	What are the plans for future development of this measure and the anticipated timescales, coverage and accuracy of this measure? What obstacles or problems does Network Rail foresee in implementing this plan and how could these risks be mitigated?	Jonathan Yates	18/01/10	Open	Follow-up meeting requested to cover this item, see F10. Not covered in meeting.
F9	Information Request	Please provide a procedure or statement on how information is validated / checked for FVA measure.	Jonathan Yates	10/02/10	Open	
F10	Meeting Request	Meeting request to review the data process and outputs for FVA with Liam Rattigan	Jonathan Yates	10/02/10	Closed	Meeting with Liam Rattigan to discuss FVA on 15/02/2010
F11	Information Request	Please provide cost allocation details for Scotland (ie the proportion of costs that are directly allocated)	Jonathan Yates	17/02/10	Closed	See email from Rob Evison Received on 08/03/2010. Additional information provided in an email from Rob Evison Received on 10/03/2010 (D90)
F12	Query	How was the FVA measure arrived at?	Jonathan Yates	17/02/10	Closed	Covered in meeting with John Scofield and Charles Robarts on 03/03/2010

Ref No	Issue/ Query	Matter/ Description/ Specific Information Required	Raised by	Date	Status	Response
F13	Information Request	Please provide backup information for enhancements/ renewals efficiency/ deferal calculations showing the values claimed by the delivery units and HQ adjustments, plus the previous 10 periods submissions and calculations.	Jonathan Yates	17/02/10	Open	
F14	Information Request	Please provide a copy of Patrick Butcher's presentation to non-execs about the FVA.	Alexander Jan	04/03/10	Closed	Presentation provided on 12/03/2010.
F15	Information Request	Please provide all the Financial Period reports to date along with submissions and calculations for the FVA (we have had a couple but really need to see the set) - is there any written commentary that goes with these? If so, please can we see these too?	Alexander Jan	04/03/10	Open	Provided by NR via a memory stick on 05/03/2010. See D89. Calculations and submissions have not been provided.
F16	Information Request	Please provide the underlying spreadsheet of the FVA for period 1, 5 and 10.	Alexander Jan	04/03/10	Open	

Appendix D

ORR Mandate

D1 Part A independent reporter mandate: audit of the robustness of Network Rail's unit cost framework

Introduction

Good quality unit costs are vital for the effective and efficient management by Network Rail of its activities, and they are important for us in order to be able to monitor and understand the company's performance and inform regulatory decisions.

Over control period 3 (CP3), Network Rail developed a range of maintenance and renewals unit costs which the ORR used as part of its approach to monitoring Network Rail's efficiency.

For control period 4 (CP4), Network Rail is improving its unit cost framework, and we have agreed with Network Rail that its new unit cost framework would be audited by the reporter. This mandate provides the background to this audit and sets out the issues that should be addressed as part of the work to provide an opinion on the robustness of Network Rail's unit cost framework.

In addition, Network Rail has developed a new cost efficiency measure and financial value added measure for CP4. Whilst the definition of each of these is comparatively straightforward and transparent, we would like an opinion on the robustness of both of these measures. Network Rail will forward its definitions of these measures to the reporter.

Background

During CP3, Network Rail developed its cost analysis framework (CAF) covering renewals and its maintenance unit costs (MUCs).

At the beginning of CP3, Network Rail had in place renewals unit cost measures for track, civils and signalling renewals expenditure covering roughly 90%, 50% and 20% of expenditure in each category respectively. The company had agreed to migrate from these measures to its CAF during the control period. Network Rail aimed to develop unit cost measures for renewals activities that should have covered 80% of renewals expenditure in CP3.

Network Rail also aimed to develop its MUC's with a bespoke information system to source the data from the maintenance work management system (MIMS) and financial system (BMIS). The process was meant to initially cover 18 repeatable work activities expanding throughout the course of CP3.

For more information, please see Halcrow's 2006 audit of Network Rail's unit cost roll out. The report can be accessed at: http://www.rail-reg.gov.uk/upload/pdf/Halcrow_caf-muc_final.pdf.

During the course of CP3, progress in rolling out both the MUC's and CAF's has been slow. Data quality issues have persisted with the MUC's, although the quality of the CAF data has been better. Each year the independent reporter gave both the MUC's and the CAF low confidence grades in their audit of Network Rail's annual return.

Therefore, any comparisons of Network Rail's unit costs against our 2003 access charges efficiency assumptions (which were based on improvements in efficiency measured by unit cost) were largely indicative. We reached our final view on Network Rail's CP3 efficiency based on the difference between the company's budget and our ACR2003 assumption.

For further information on our assessment of Network Rail's efficiency, please see our 2009 annual finance and efficiency assessment. This can be accessed at: http://www.rail-reg.gov.uk/upload/pdf/404.pdf.

During CP4, it will be important for Network Rail to continue to improve the coverage and quality of its unit costs, both for its own management purposes and for us. We have had a

number of meetings with the company to better understand their plans to improve the scope and coverage of both maintenance and renewals unit costs.

Reporter mandate

The reporter should provide its opinion on:

- Network Rail's unit cost framework. In particular is the unit cost framework robust and fit for purpose for use by Network Rail to provide robust plans for CP5 and is it appropriate for us to use in CP4 to monitor PR08 and as the basis of our PR13 determination?
- Is the new cost efficiency measure robust and fit for purpose?
- Is the new financial value added measure robust and fit for purpose?
- What is realistically achievable in CP4.

The audit will need to address the following issues for the new cost efficiency measure and the financial value added measure:

- Are the appropriate income and costs included in the measures e.g. "hypothecated gains in other single-till income"?
- Is the baseline appropriate for both measures e.g. "non-controllable costs"?
- Is the process for calculating the separate measures for England & Wales and Scotland appropriate?
- How do the measures compare to best practice?
- Is the treatment of opex appropriate?
- Is the weight given to the various costs in the measures appropriate e.g. should a pound of renewals be equal to a pound of maintenance/opex or interest?

The audit will also need to address the following issues for unit costs and where relevant for the new cost efficiency measure and the financial value added measure:

- Definition. Are the unit costs defined appropriately? For example:
- Do they properly reflect the activities being measured and include the relevant income and cost elements (e.g. overheads).
- Is the allocation of indirect costs appropriate?
- For maintenance unit costs, it will be necessary to consider whether the disaggregation of maintenance activities is appropriate.
- For both maintenance and renewals unit costs we would expect a sample of key unit costs to be examined and tested in detail.
- Are there any perverse incentives?
- Aggregation issues. Are the unit costs aggregated appropriately across different types of job and geography, and calculated appropriately for England & Wales and Scotland? For example:
- Is the focus on maintenance delivery units (MDUs) correct for the maintenance unit costs?
- Is the process for calculating separate unit costs for England & Wales and Scotland appropriate?

- How does Network Rail validate the results of the unit cost calculations?
- Coverage. Is the coverage of the unit costs across the range of activities/expenditure categories appropriate i.e. is the coverage wide enough to give an appropriate view of efficiency?
- Baseline. Is the baseline (2008-09) appropriately determined.
- Framework. Are the unit costs determined in a framework that is clear, comprehensive and consistent? For example:
- How is Network Rail intending to deal with changes that it might make to the framework over CP4 so that there is consistency over time but at the same time where improvements are identified they are made?
- Are the costs accurately calculated?
- Are the supporting information systems and processes being used reliable.
- Are there appropriate governance processes/management controls to check/correct for errors etc, and to roll-out and implement the framework.
- Is the process for recognising expenditure deferral appropriate?
- Comparison to CP3 and best practice. For example:
- What are the key changes to the approach used in CP3?
- How does Network Rail's framework compare to best practice?
- Risks, uncertainties and issues. Are there any risks, uncertainties and issues in using this unit cost framework. Can an estimate of the range of accuracy of the unit costs be made, if so what is it?
- Recommendations. If appropriate, what are the recommendations for addressing any risk, uncertainties and issues and improving the robustness of the unit costs. Please also explain any obstacles or problems that Network Rail will have in implementing these recommendations.

Deliverables and timescale

We require a draft report to be delivered no later than 1 March 2010, and a final report to be delivered no more than 15 working days after comments by us and Network Rail on the draft report. The report should address all of the points raised in this mandate. In doing the work, the reporter will be required to work closely with Network Rail to understand their unit cost framework and the cost efficiency measure and the financial value added measure. In addition to the report, we require a presentation setting out the reporter's findings. The specific timing of this presentation can be agreed with us.

Approach and resources

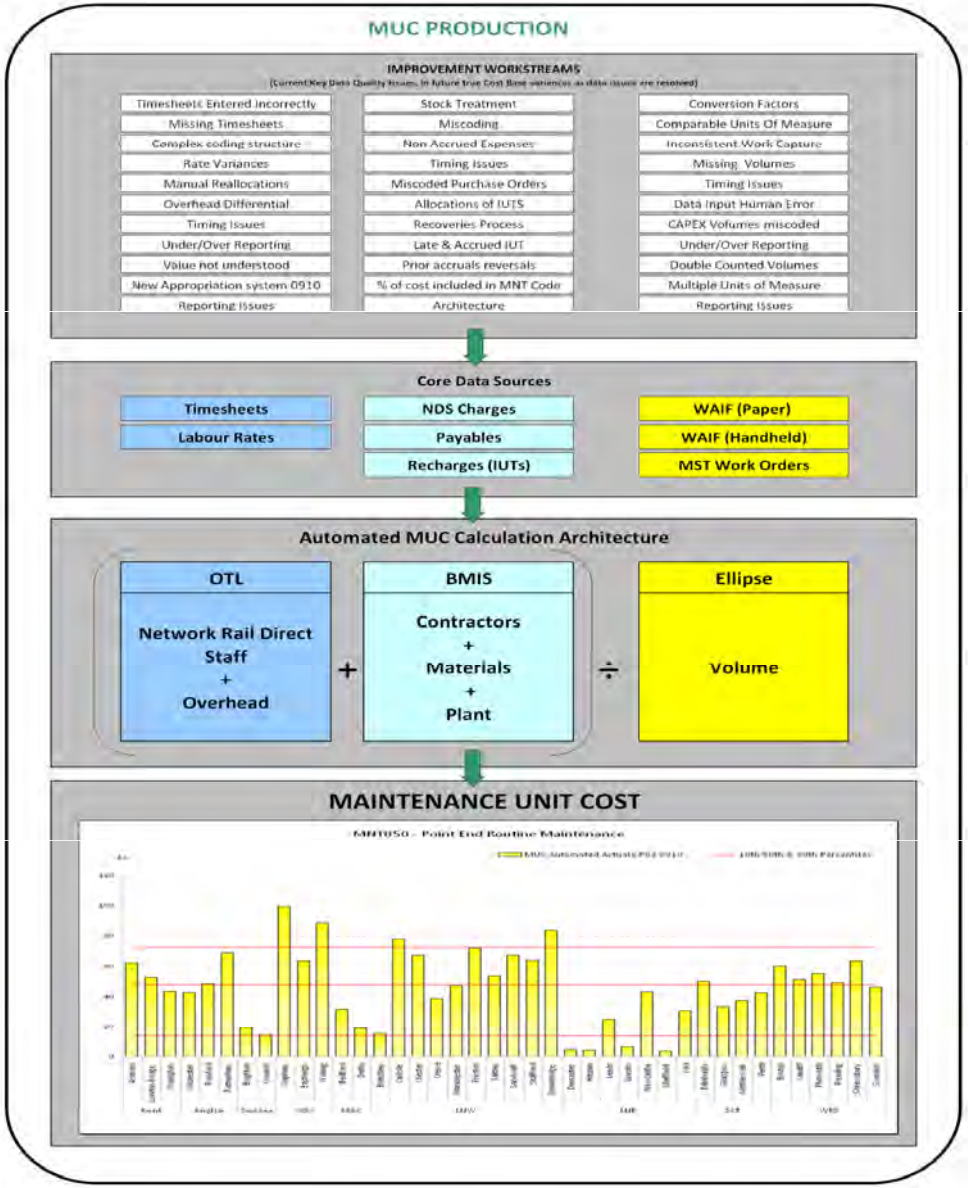
The proposal to fulfil this mandate should set out the proposed methodology, the personnel to be involved, their estimated time input and the estimated cost. The contract will be a fixed price contract.

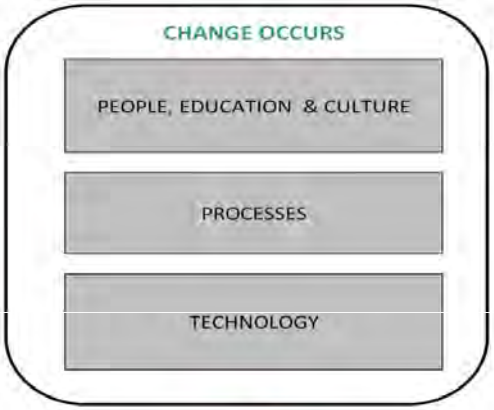
December 2009

Appendix E

MUC process

MUC Process





CONTINOUS

IMPROVEMENT

Appendix F

Review of FRM702

F1 Review of Network Rail Specification: Maintenance FRM702

As part of the audit process carried out by Arup in March 2010 a review of Network Rail Company Specification FRM702 Reporting of Maintenance Unit Costs was carried out. This document defines the standard maintenance activity codes (MNT codes) to be used to support the reporting of Maintenance Unit Costs (MUCs) and the relevant Ellipse standard job numbers which make up each MNT code. The document also defines the standard units of measure, conversion rates and cost allocation and reporting rules.

A detailed review of some of the MNT definitions was carried out by Halcrow in 2009 and discussed in their report "Independent Reporter A Preliminary Data on Efficiency 2008/09". This review provided a useful analysis of the main Permanent Way MNTs, offered possible explanations for variances in unit rates observed and made a number of recommendations regarding the document and its role in supporting the reporting of Maintenance Unit Costs.

For the purpose of this initial review of the MUC reporting process it is not proposed to carry out a similar level of review. Rather, this report will provide an overview of the latest revision of FRM702 made available to Arup and comment on its suitability for supporting the MUC reporting process. This review will also examine the comments made by the previous reporter regarding FRM702 and discuss the extent to which these comments have been addressed or whether they are still valid.

The previous reporter noted:

"For unit cost information to be useful to ORR it is critical that the activity being carried out is defined clearly and that this definition is understood and applied consistently across the company and over time. Activities that can only be described imprecisely allow different individuals the opportunity to interpret differently the scope of activity that is to be included within the unit cost measure."

A clear definition for each of the MNTs is vital for the process of unit costing to work. The previous reporter therefore picked up on a number of issues relating to FRM702 which could affect the quality and accuracy of the booking of work volumes completed. The version of FRM702 available to the previous reporter was 'Draft 9A', the version reviewed for this report was 11.1 dated 1/10/2009.

The previous reporter identified some possible ambiguities with the MNT definitions provided in the Draft 9A version of FRM702. It would appear that the majority of these ambiguities have been addressed in the latest version of the document available.

Our review of FRM702 found that in general the document provides a coherent and consistent description of the standard maintenance activities and the process for allocating labour and non labour costings. For each MNT activity there is a description describing the activity and the unit of measure. The document now also includes descriptions of items specifically excluded, items specifically included and a list of example tasks.

The document appears to be well understood at Route and Maintenance Delivery Unit (MDU) level. The evidence presented to us in our audits suggests that each Route has taken up initiatives to brief ground level staff on the interpretation of FRM702 and what it means for them. There was also good evidence of the willingness of Route office staff to support Section level staff by responding to any queries or problems relating to booking time, work volumes or material orders and through the provision of support materials such as job number cards and prompt sheets.

From the discussions we have had with Route and Maintenance Delivery Unit (MDU) level staff there appears to be a general feeling that the MNTs are well defined, understood and applied consistently. Questions asked during the audit process seemed to support this, although there do appear to be a small number of measures which could benefit from further clarification.

MNT007 provides the definition for S&C tamping. The definition for S&C tamping specifies that the plain line elements associated with the run in and run out from an S&C unit should be booked separately to MNT004 Plain Line Tamping. Whilst the definition is clear and all the Routes we spoke to understood this definition it was acknowledged that some Routes do not apply this philosophy, preferring to book all work associated with S&C tamping to MNT007. The lengths associated with running in and running out of an S&C unit are generally small, typically 100 yards or so, and this difference in application may have only a marginal effect on unit costs. Nevertheless, it would be preferable if the measure accurately defined the information being captured on the ground.

The second measure we encountered some variation with was the use of MNT013 Level 1 Patrolling Track Inspections. This definition has changed since the previous reporter's review. Previously, small items of work carried out as part of the patrollers' duties, such as attention to clips and bolts, were required to be captured separately under the relevant standard job numbers. In the latest version of FRM702 this requirement has been changed such that any attention to fixings and fastenings carried out by patrollers is included within the patrolling job definition unless the work requires a specific revisit to site. This change is likely to provide more consistency in the booking of time by patrol staff as there is less ambiguity surrounding when a task should be charged to a different job number. It may have been unreasonable to expect patrolling staff to raise Work Arising Forms (WAIFs) each time additional works were carried out over the length of a patrol route. However, we have found evidence that the previous interpretation of this definition may still be in use in some MDU areas.

The other main potential source of ambiguity is MNT022 "P-Way Maintenance Other". This maintenance task encompasses a broad range of activities which it is not currently deemed beneficial to derive specific unit costs for. There are a number of standard jobs within MNT022 which could conceivably be used for work covered by other MNT codes. Examples include:

Standard Job No.	Job Description	Possible Conflict
09227	Ballast-Shoulder Clean-Manual	Possible confusion with MNT006 Manual Wet Bed Removal
09228	Ballast-Shoulder Clean-Mechanical	Possible confusion with MNT012 Mechanical Wet Bed Removal
09229	Ballast – Dig out Contaminant	Possible confusion with either MNT006 or MNT012 Wet Bed Removal
09360	Ballast-Repair-Mech. asstd – sleepers out	Possible confusion with MNT012 Mechanical Wet Bed Removal
09361	Ballast-Repair-Mech. asstd – T Panel out	Possible confusion with MNT012 Mechanical Wet Bed Removal
09365	Track PL – Renew Rail <60'-Fishplate Mech	Possible confusion with MNT002 Rail Changing
09366	Track PL – Renew Rail <60'-Welded Mech	
09367	Renew PL F'plate Rail >18.2m<216m-Mech	
09368	Renew PL Weld Rail >18.2m<216m-Mech	

The main problem this potentially poses is that work volume could be booked to one code and time might end up going to a different code within MNT022. This would result in inaccurate unit costs being reported. From the high level audits carried out it is not possible to comment on whether the above possible conflicts are a major concern.

However, based on the Routes visited there is good evidence that Route and MDU level staff are aware of the potential for costs or volumes to become lost within MNT022.

Furthermore there is good evidence of the Routes proactively checking the use of the MNT022 codes to ensure time and volumes are being appropriately coded.

It may be beneficial to review some of the standard jobs contained within MNT022 with a view to rationalising this maintenance task to make coding simpler for those using the system.

The other main concern raised by the previous reporter was that FRM702 does not:

“provide sufficient guidance to Maintenance Delivery Unit (MDU) Section Managers as to the resources to employ or the methods used. This means disparity in unit costs between the MDUs may be due to variations in work methods.”

It is agreed that the approach to a task and the method of work is likely to significantly affect the unit rate. However, it would appear that this is one of the key benefits of the MUC reporting regime to Network Rail. There was very good evidence from all Routes visited of MUC data being actively analysed down to MDU level and on some Routes down to Maintenance Engineer level focusing on those activities with significant differences in unit cost. The evidence presented showed that this analysis process results in working methods being questioned in an open and collaborative way to understand why some MDUs are able to deliver certain maintenance tasks for less than others. This has led to the spread of best practice, where identified, in terms of resourcing and planning tasks. Furthermore there is evidence of this best practice and collaboration being spread across the country between different Routes.

It is felt, therefore, that it is beneficial that the MNT definitions do not provide guidance on how to resource the tasks. Allowing visibility of the variation in MUCs due to resource planning appears to be promoting positive sharing of best practice from ground level upwards. An improved level of buy in to the MUC reporting process at a Section Manager level is more likely to be achieved if there is a clear benefit to Section Managers and a sense of ownership of the part of the process.

Appendix G

Extract from Period Unit Cost reporting at MDU level

G1 Extract from Unit cost reporting at MDU level

ELLIPSE Ref	Activity Description	Activity Unit	Reading MDU						
			National Theoretical rate	DU Theoretical rate	DU BP rate	DU Actual P10	DU Actual P11	P13 forecast @P11	NR comments
MNT002	Rail Changing	Rail Yard	167	178	138	65	67	178	Volumes high; rate low as a result
MNT003	Manual Spot Re-sleepering	No of sleepers	271	323	313	234	240	235	Rate low du e to materials costs incurred in 2008/09
MNT008	S&C Unit Renewal	No S&Cs Units	21,433	31,048	18,211	13,552	13,687	18,211	Volume & rate okay
MNT010	Replacement of S&C bearers	No of S&C Bearers	510	501	649	97	97	99	Volumes high - from Capex at Reading; rate low; correct by P12
MNT011	S&C weld repairs	No of Repairs (weld)	880	782	663	812	794	782	[no comment]
MNT013	Level 1 Track Inspections	Track Miles Inspections	97	90	70	106	104	103	[no comment]
MNT019	Manual correction of plain line track geometry	Track Yards	31	29	27	8	8	29	Volume high due to double-counting in Ellipse (complex MNT with numerous standard jobs with large range in unit rates)
MNT050	Point End Routine Maintenance	Services	148	94	184	47	45	94	Volume ok, rate low as some costs in MNT053; journal to correct by P10
MNT051	Signals Routine Maintenance	Services	105	75	47	75	77	75	[no comment]
MNT052	Track Circuits / Train Detection Services	Services	87	145	64	33	32	145	Volume ok, rate low as some costs in MNT053; journal to correct by P10
MNT014	Mechanised Track Inspections	Track Miles Inspections	n.a	n.a	n.a	n.a	n.a	n.a	None for Reading MDU

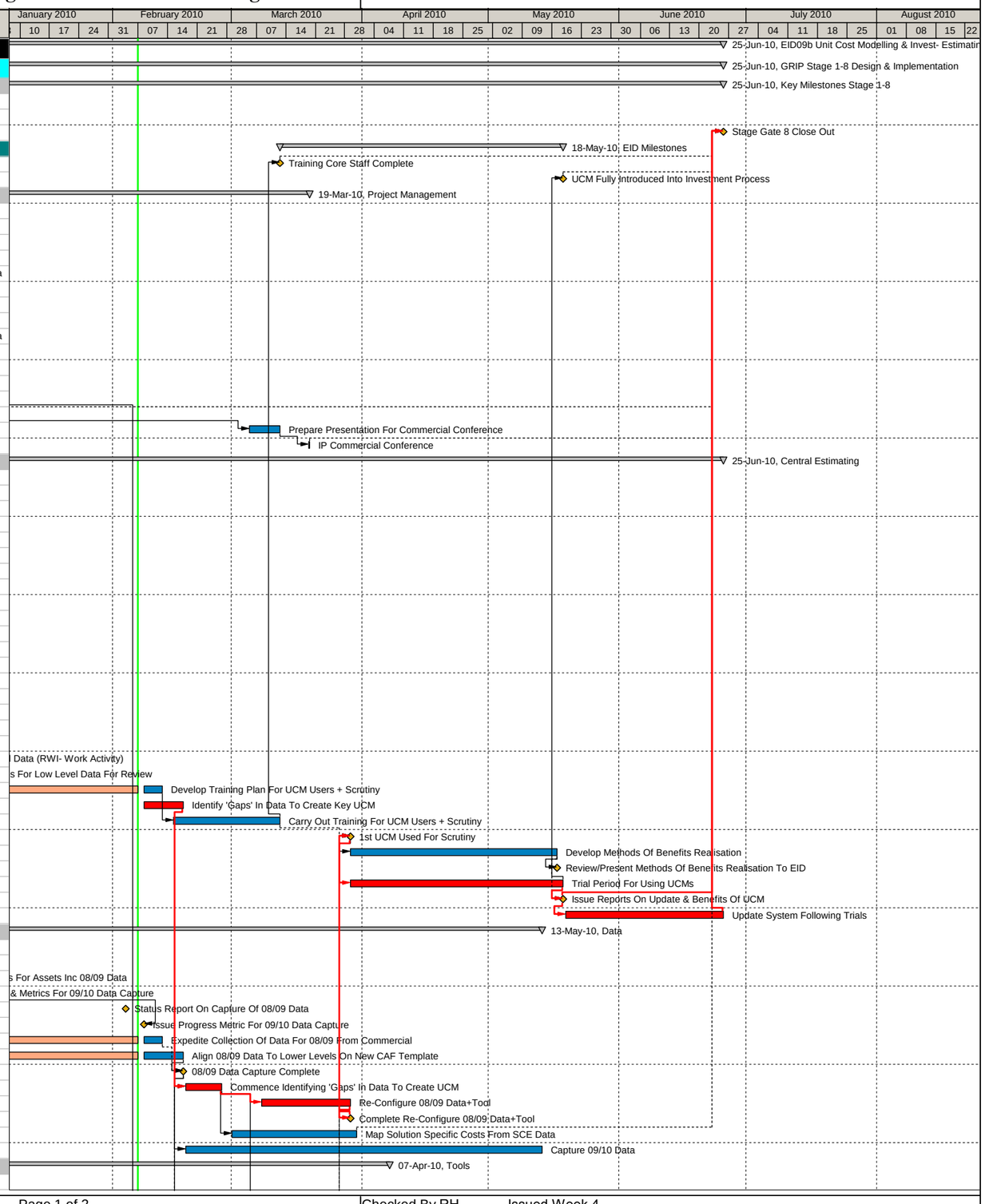
Appendix H

Transformation Programme – Unit Cost Modelling

Transformation Programme- Unit Cost Modelling

05-Feb-10 11:48

Activity ID	Activity Name	At Completion Duration	Original Duration	Start	Finish	Physical % Complete	Responsible Person
EID09b Unit Cost Modelling & Invest- Estimating System (Tactical)		236.0d	236.0d	21-Jul-09 A	25-Jun-10		
GRIP Stage 1-8 Design & Implementation		236.0d	236.0d	21-Jul-09 A	25-Jun-10		
Key Milestones Stage 1-8		236.0d	236.0d	21-Jul-09 A	25-Jun-10		
A1090	Start Stage 4	0.0d	0.0d	21-Jul-09 A		100%	
A2110	Stage Gate 4 Formailsed	0.0d	0.0d		09-Nov-09 A	100%	Steve Coe
A2150	Stage Gate 8 Close Out	0.0d	0.0d		25-Jun-10	0%	Steve Coe
EID Milestones		44.0d	44.0d	12-Mar-10	18-May-10		
A2350	Training Core Staff Complete	0.0d	0.0d		12-Mar-10	0%	
A2360	UCM Fully Introduced Into Investment Process	0.0d	0.0d		18-May-10	0%	
Project Management		153.0d	153.0d	13-Aug-09 A	19-Mar-10		
A1220	Hold Interactive Planning Meeting For Data Capture	0.0d	0.0d	13-Aug-09 A		100%	Steve Coe
A1620	Prepare Draft Presentation To ORR	4.0d	4.0d	18-Aug-09 A	21-Aug-09 A	100%	Steve Coe
A1630	Issue For Review Presentation	0.0d	0.0d		24-Aug-09 A	100%	Steve Coe
A1580	Plan Collection Of 08/09 Data With Commercial	9.0d	4.0d	18-Aug-09 A	28-Aug-09 A	100%	Steve Coe
A1320	Issue Schedule For 08/09 Data Capture	0.0d	0.0d		07-Sep-09 A	100%	Krishan Rabadiya
A1640	Prepare Backup Information For Presentation To ORR	10.0d	10.0d	24-Aug-09 A	07-Sep-09 A	100%	Steve Coe
A1660	Issue Presentation By Email	0.0d	0.0d		07-Sep-09 A	100%	Steve Coe
A1670	Review Presentation By Phone	0.0d	0.0d	08-Sep-09 A		100%	Steve Coe
A1420	Issue Schedule For Period 1-6 09/10 Data Capture	0.0d	0.0d		10-Sep-09 A	100%	Krishan Rabadiya
A1650	Dry Run Presentation To ORR	1.0d	1.0d	11-Sep-09 A	11-Sep-09 A	100%	Steve Coe
A1290	Date For Meeting With ORR To Justify £105M Funding	0.0d	0.0d		15-Sep-09 A	100%	
A2160	Planning Session To Develop Plan For Implementation Phase	11.0d	10.0d	02-Oct-09 A	19-Oct-09 A	100%	Steve Coe
A1880	Mobilise Change Manager (Part time)	7.0d	5.0d	16-Nov-09 A	24-Nov-09 A	100%	Steve Coe
A2170	Re-issue PMP	0.0d	0.0d		04-Dec-09 A	100%	Steve Coe
A2330	Prepare Presentation For Commercial Conference	6.0d	6.0d	05-Mar-10	12-Mar-10	0%	Robin Hamilton
A2340	IP Commercial Conference	1.0d	1.0d	19-Mar-10	19-Mar-10	0%	Stephen Blakey
Central Estimating		236.0d	236.0d	21-Jul-09 A	25-Jun-10		
A1160	Issue UCM Hierarchy For Final Review	0.0d	0.0d	21-Jul-09 A		100%	Robin Hamilton
A1490	Issue Current Value Of Data Points For Assets	0.0d	0.0d		29-Jul-09 A	100%	Robin Hamilton
A1230	Assess TRACK Data	2.0d	2.0d	31-Jul-09 A	03-Aug-09 A	100%	Robin Hamilton
A1440	Develop UCM Flowcharts	9.0d	25.0d	27-Jul-09 A	07-Aug-09 A	100%	Robin Hamilton
A1450	Issue UCM Flowcharts	0.0d	0.0d		07-Aug-09 A	100%	Robin Hamilton
A1210	1st Issue National CAF Template	0.0d	0.0d		07-Aug-09 A	100%	Rob Oswald
A1530	Identify Lower Level Data Needed	10.0d	10.0d	27-Jul-09 A	07-Aug-09 A	100%	Robin Hamilton
A1350	Develop List Projects	18.0d	9.0d	21-Jul-09 A	13-Aug-09 A	100%	Robin Hamilton
A1190	Issue Draft List Projects 08/09 And 09/10 Period 1-6	0.0d	0.0d		14-Aug-09 A	100%	Robin Hamilton
A1570	Prepare Communication To Commercial On 08/09 List And 09/10 Period 1-6	1.0d	1.0d	17-Aug-09 A	17-Aug-09 A	100%	Steve Coe
A1540	Organise Lower Level Data Input (RWI- Work Activity)	14.0d	10.0d	03-Aug-09 A	21-Aug-09 A	100%	Robin Hamilton
A1510	Finalise UCM Hierarchy	27.0d	10.0d	21-Jul-09 A	26-Aug-09 A	100%	Robin Hamilton
A1520	Approve Final UCM Hierarchy	0.0d	0.0d		26-Aug-09 A	100%	Robin Hamilton
A1360	Expedite Comments On Templates, Rules & Definition	13.0d	10.0d	10-Aug-09 A	27-Aug-09 A	100%	Robin Hamilton
A1270	Agree Templates, Measurement Rules & Coverage Definition	0.0d	0.0d		28-Aug-09 A	100%	Robin Hamilton
A1600	Issue CAF Templates & Guidance Notes For Use	0.0d	0.0d		28-Aug-09 A	100%	Rob Oswald
A1690	Issue CAF Templates & Guidance Notes For Comments	0.0d	0.0d		28-Aug-09 A	100%	Robin Hamilton
A1260	Convert TRACK Data	52.0d	14.0d	04-Aug-09 A	16-Oct-09 A	100%	Rob Oswald
A1550	Input Lower Level Data (RWI- Work Activity)	89.0d	14.0d	17-Aug-09 A	18-Dec-09 A	100%	Robin Hamilton
A1560	Issue UCM Curves For Low Level Data For Review	0.0d	0.0d		18-Dec-09 A	100%	Robin Hamilton
A2200	Develop Training Plan For UCM Users + Scrutiny	47.0d	10.0d	07-Dec-09 A	12-Feb-10	20%	Robin Hamilton
A1720	Identify 'Gaps' In Data To Create Key UCM	8.0d	8.0d	08-Feb-10	17-Feb-10	0%	Robin Hamilton
A2210	Carry Out Training For UCM Users + Scrutiny	20.0d	20.0d	15-Feb-10	12-Mar-10	0%	Robin Hamilton
A1960	1st UCM Used For Scrutiny	0.0d	0.0d	29-Mar-10		0%	Robin Hamilton
A2240	Develop Methods Of Benefits Realisation	32.0d	32.0d	29-Mar-10	17-May-10	0%	Robin Hamilton
A2250	Review/Present Methods Of Benefits Realisation To EID	0.0d	0.0d		17-May-10	0%	Robin Hamilton
A2130	Trial Period For Using UCMs	34.0d	34.0d	29-Mar-10	18-May-10	0%	Robin Hamilton
A2140	Issue Reports On Update & Benefits Of UCM	0.0d	0.0d		18-May-10	0%	Robin Hamilton
A2220	Update System Following Trials	27.0d	27.0d	19-May-10	25-Jun-10	0%	Robin Hamilton
Data		169.0d	173.0d	11-Sep-09 A	13-May-10		
A1760	Assign Resource For Data Analysis	20.0d	5.0d	19-Oct-09 A	13-Nov-09 A	100%	Robin Hamilton
A1750	Mobilise Resource For Data Analysis	0.0d	0.0d	16-Nov-09 A		100%	Rob Oswald
A1500	Issue Current Value Of Data Points For Assets Inc 08/09 Data	0.0d	0.0d		01-Dec-09 A	100%	Robin Hamilton
A1410	Develop Process & Metrics For 09/10 Data Capture	65.0d	5.0d	21-Sep-09 A	18-Dec-09 A	100%	Robin Hamilton
A1460	Status Report On Capture Of 08/09 Data	0.0d	0.0d		04-Feb-10 A	100%	Robin Hamilton
A1430	Issue Progress Metric For 09/10 Data Capture	0.0d	0.0d		08-Feb-10	0%	Robin Hamilton
A1590	Expedite Collection Of Data For 08/09 From Commercial	108.0d	79.0d	11-Sep-09 A	12-Feb-10	85%	Robin Hamilton
A1680	Align 08/09 Data To Lower Levels On New CAF Template	70.0d	16.0d	09-Nov-09 A	17-Feb-10	80%	Robin Hamilton
A1700	08/09 Data Capture Complete	0.0d	0.0d		17-Feb-10	0%	Rob Oswald
A1729	Commence Identifying 'Gaps' In Data To Create UCM	7.0d	7.0d	18-Feb-10	26-Feb-10	0%	Rob Oswald
A1730	Re-Configure 08/09 Data+Tool	15.0d	15.0d	08-Mar-10	29-Mar-10	0%	Rob Oswald
A1950	Complete Re-Configure 08/09 Data+Tool	0.0d	0.0d		29-Mar-10	0%	Rob Oswald
A2370	Map Solution Specific Costs From SCE Data	22.0d	22.0d	01-Mar-10	30-Mar-10	0%	Robin Hamilton
A2120	Capture 09/10 Data	58.0d	58.0d	18-Feb-10	13-May-10	0%	Rob Oswald
Tools		124.0d	123.0d	09-Oct-09 A	07-Apr-10		
A1740	Re-Design UCM Storage+CAF Template	5.0d	10.0d	09-Oct-09 A	16-Oct-09 A	100%	Rob Oswald



Summary | Actual Work | Critical Remaining Work

Milestone | Remaining Work

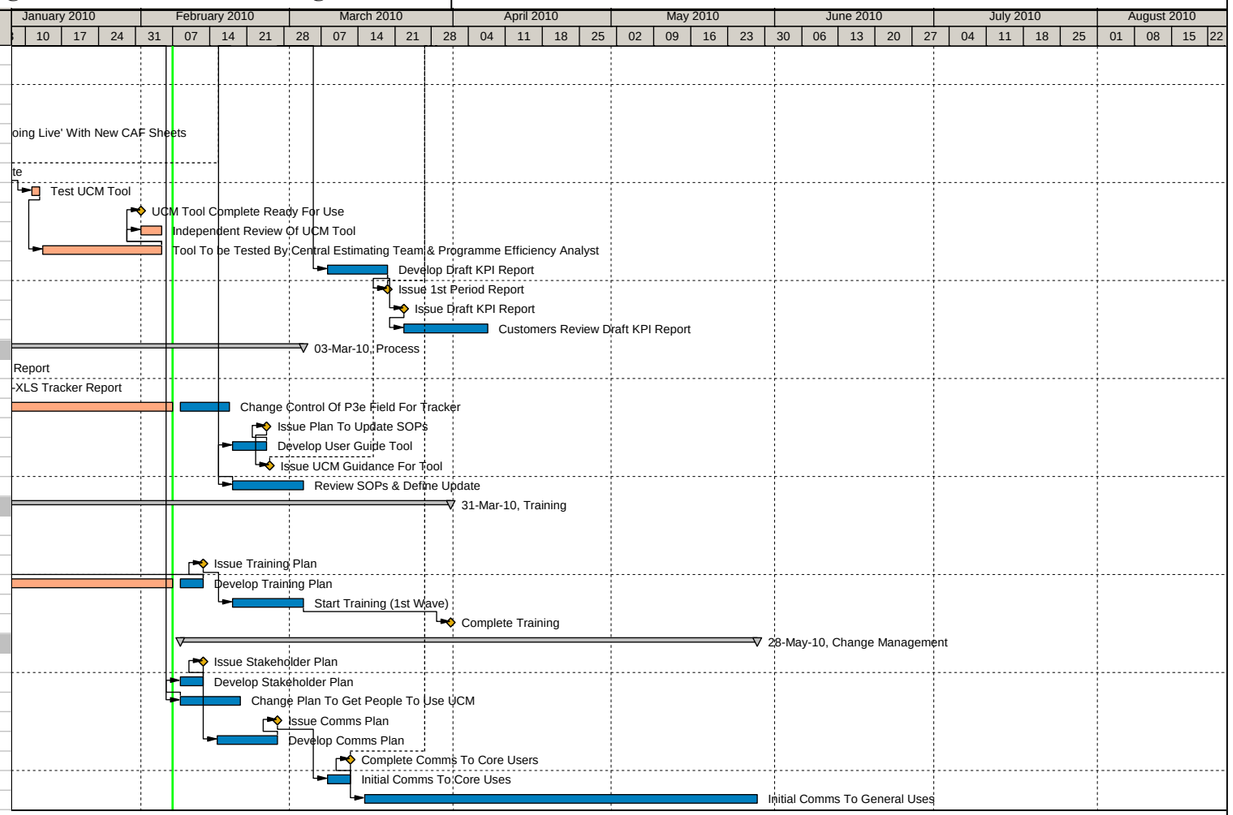
Checked By RH Issued Week 4

Approved By SC Period 11

Transformation Programme- Unit Cost Modelling

05-Feb-10 11:48

Activity ID	Activity Name	At Completion Duration	Original Duration	Start	Finish	Physical % Complete	Responsible Person
A1940	Start Pilot	0.0d	0.0d	19-Oct-09 A		100%	Rob Oswald
A1990	Finalise Export From Templates To Data Store+Graphs	0.0d	0.0d		09-Nov-09 A	100%	Rob Oswald
A2080	Develop Export From Templates To Data Store+Graphs	15.0d	9.0d	19-Oct-09 A	09-Nov-09 A	100%	Rob Oswald
A1930	Complete Pilot	0.0d	0.0d		23-Nov-09 A	100%	Rob Oswald
A2020	Prepare & Issue Communication For 'Going Live' With New CAF Sheets	14.0d	6.0d	09-Nov-09 A	27-Nov-09 A	100%	Rob Oswald
A1920	'Go Live' Connect	0.0d	0.0d		30-Nov-09 A	100%	
A1770	UCM Tool Complete	0.0d	0.0d		18-Dec-09 A	100%	Rob Oswald
A2270	Test UCM Tool	2.0d	2.0d	11-Jan-10 A	12-Jan-10 A	100%	Rob Oswald
A2320	UCM Tool Complete Ready For Use	0.0d	0.0d		01-Feb-10 A	100%	Robin Hamilton
A2280	Independent Review Of UCM Tool	4.0d	11.0d	01-Feb-10 A	05-Feb-10 A	100%	Steve Coe
A2310	Tool To be Tested By Central Estimating Team & Programme Efficiency Analyst	17.0d	10.0d	13-Jan-10 A	05-Feb-10 A	100%	Robin Hamilton
A2010	Develop Draft KPI Report	10.0d	10.0d	08-Mar-10	19-Mar-10	0%	Rob Oswald
A2070	Issue 1st Period Report	0.0d	0.0d		19-Mar-10	0%	Robin Hamilton
A2180	Issue Draft KPI Report	0.0d	0.0d		22-Mar-10	0%	Rob Oswald
A2190	Customers Review Draft KPI Report	10.0d	10.0d	22-Mar-10	07-Apr-10	0%	
Process		80.0d	80.0d	09-Nov-09 A	03-Mar-10		
A1980	Develop P3-XLS Tracker Report	24.0d	10.0d	09-Nov-09 A	11-Dec-09 A	100%	Robin Hamilton
A2090	Complete Develop P3-XLS Tracker Report	0.0d	0.0d		14-Dec-09 A	100%	Robin Hamilton
A2260	Change Control Of P3e Field For Tracker	45.0d	10.0d	14-Dec-09 A	17-Feb-10	50%	Robin Hamilton
A2030	Issue Plan To Update SOPs	0.0d	0.0d		24-Feb-10	0%	Robin Hamilton
A2050	Develop User Guide Tool	5.0d	5.0d	18-Feb-10	24-Feb-10	0%	Robin Hamilton
A2060	Issue UCM Guidance For Tool	0.0d	0.0d	25-Feb-10		0%	Robin Hamilton
A2040	Review SOPs & Define Update	10.0d	10.0d	18-Feb-10	03-Mar-10	0%	Robin Hamilton
Training		100.0d	100.0d	09-Nov-09 A	31-Mar-10		
A1900	Send Email To IM 'Go Live' Connect	0.0d	0.0d	25-Nov-09 A		100%	Robin Hamilton
A1610	Rollout New CAF Sheets	0.0d	0.0d	27-Nov-09 A		100%	Robin Hamilton
A1890	Issue Training Plan	0.0d	0.0d		12-Feb-10	0%	Rob Oswald
A1910	Develop Training Plan	67.0d	5.0d	09-Nov-09 A	12-Feb-10	60%	Rob Oswald
A1790	Start Training (1st Wave)	10.0d	10.0d	18-Feb-10	03-Mar-10	0%	Robin Hamilton
A1780	Complete Training	0.0d	0.0d		31-Mar-10	0%	Robin Hamilton
Change Management		77.0d	77.0d	08-Feb-10	28-May-10		
A1860	Issue Stakeholder Plan	0.0d	0.0d		12-Feb-10	0%	Candi Smith
A1870	Develop Stakeholder Plan	5.0d	5.0d	08-Feb-10	12-Feb-10	0%	Candi Smith
A2100	Change Plan To Get People To Use UCM	10.0d	10.0d	08-Feb-10	19-Feb-10	0%	Candi Smith
A1820	Issue Comms Plan	0.0d	0.0d		26-Feb-10	0%	Candi Smith
A1850	Develop Comms Plan	10.0d	10.0d	15-Feb-10	26-Feb-10	0%	Candi Smith
A1800	Complete Comms To Core Users	0.0d	0.0d		12-Mar-10	0%	Candi Smith
A1810	Initial Comms To Core Uses	5.0d	5.0d	08-Mar-10	12-Mar-10	0%	Candi Smith
A2230	Initial Comms To General Uses	52.0d	52.0d	15-Mar-10	28-May-10	0%	Candi Smith



Summary | Actual Work | Critical Remaining Work

Milestone | Remaining Work

Checked By RH Issued Week 4

Approved By SC Period 11

Appendix I

Arup Audit Methodology

Network Rail, Office of Rail Regulation

Part A Reporter Mandate AO/005: Audit of Network Rail's unit cost framework

Issue Paper 1: Audit methodology - FINAL

5 March 2010

ARUP

Network Rail, Office of Rail Regulation

Part A Reporter Mandate AO/005: Audit of Network Rail's unit cost framework

Issue Paper 1: Audit Methodology - FINAL

5 March 2010

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This report takes into account the particular instructions and requirements of our client.
It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

Job number 209830-005

Contents

1 Introduction

As "Part A" reporter to the Office of Rail Regulation, Arup is undertaking an audit of Network Rail's unit cost framework (under Mandate AO/005). Arup has gained a comprehensive understanding of the drivers and rationale behind the cost measures Network Rail has adopted, alongside the processes and programmes put in place to "embed" them in the organisation. (In some cases measures/cost capture processes have existed for some time but require further management action in order to increase their usefulness.)

The next stage of Arup's assignment requires us to undertake a more detailed assessment of the measures, to allow us to report on the risks, uncertainties and issues that exist in using the measures in question. This short paper provides the approach Arup intends to take to this stage of the assignment. We would welcome any observations from ORR on this paper prior to rolling out the audit programme.

The framework suggested follows established audit practice principles and involves the application of robust audit techniques that are responsive to the assessment of factors that we consider need to be covered. Our approach is consistent with the standard approach to audit reviews applied internationally in the delivery of statutory financial audits and other Public Sector assurance engagements conducted by professional services firms and public audit institutions such as the National Audit Office and Audit Commission.

2 A risk-based approach

2.1 Outline

Our approach to undertaking our audit of Network Rail's unit cost framework is made up of three stages:

- Planning and understanding the business (understanding the controls environment – this has been substantially completed in earlier stages of our work);
- Test of controls (compliance testing);
- Detailed testing of reported results of unit cost measures (substantive testing) and/or
- Other detailed testing (compensating testing). These compensating tests will be developed when required to supplement the substantive testing when this alone would provide insufficient evidence, or will replace the substantive tests where there is such a high level of uncertainty as to make detailed sample testing unreliable.

The underlying premise is that the challenge and review of Network Rail's unit cost framework should be conducted in such a way as to properly assess inherent and control risks and that this should be a repeatable exercise over time, to allow for measurements and judgements about progress (or otherwise) to be made.

Substantive testing – involving very detailed review of reported results - is time consuming and comparatively resource intensive. However, it may be that it is considered necessary – beyond this assignment – if the results of our control and compliance audit indicate material uncertainties in the robustness and validity of data. Compensating testing also falls into this category.[1]

The approach Arup had adopted to this audit exercise is compatible with the annual return methodology applied by the Network Rail, ORR reporter used in previous years. It should provide a structured and transparent set of inputs into the "robustness" and "accuracy" based system that is in placed for annual return reporting at present.

2.2 Methodology

The audit approach detailed in this paper will be applied for a selection of asset measures for operations, maintenance, support and renewals activities, as listed below:

- Financial Value Added (FVA) (FVA components driven by maintenance and renewals)
- Cost Efficiency Measure (including its constituent components)
- maintenance costs (including those that form part of the FVA/CEM)_
- renewal costs (including those that form part of the FVA/CEM)
- if possible, those elements of Enhancements where ORR has identified the opportunity for unit cost efficiencies[2]

The specific activity to be selected will be determined according to importance to the business. Factors such as:

[1] It is recognised that a considerable part of ORR's PR08 analysis and work being undertaken by Network Rail at present involves forms of testing that fall into this category (for example, benchmarking with third parties and regression analysis).

[2] Enhancements do not form part of the scope for this unit cost review. However, there are clearly elements of Enhancements where the methodology associated with Renewals is relevant and would provide a useful insight to how Network Rail is measuring and attempting to control repeatable elements of its Enhancement costs.

- how advanced cost efficiency measurement is in a defined area (to be determined between Network Rail and Arup);
- the "gross level of risk" associated with poor quality reporting (eg under or over reporting efficiencies);
- the proportion of total expenditure an activity represents;
- the proportion of savings associated with an area's efficient delivery (as reflected in PR08 and the CP4 delivery plan); and
- ensuring coverage of territory/line based and centrally driven efficiencies (with potential relevance to the Scottish/England & Wales split)

Arup's mandate is focused on efficiency measures (and KPIs that are dependent on these same measures of efficiency). Our focus is therefore on risk around efficiencies being over (or under) stated. Where a Key Performance Indicator comprises a number of inputs (such as Income, Schedule 4, Schedule 8 revenue items or Interest) we will not review those elements that are subject to audit by for example, Network Rail's auditors (and which are therefore considered to be low risk factors).

Figure 2.1 overleaf summarises the generic methodology underpinning our audit approach whilst Figure 2.2 describes the specific questions to be applied to our Network Rail audit. Figure 2.3 provides an illustrative *pro-forma* of an audit in the form of a "score card."

Figure 2.1 – Audit flowchart

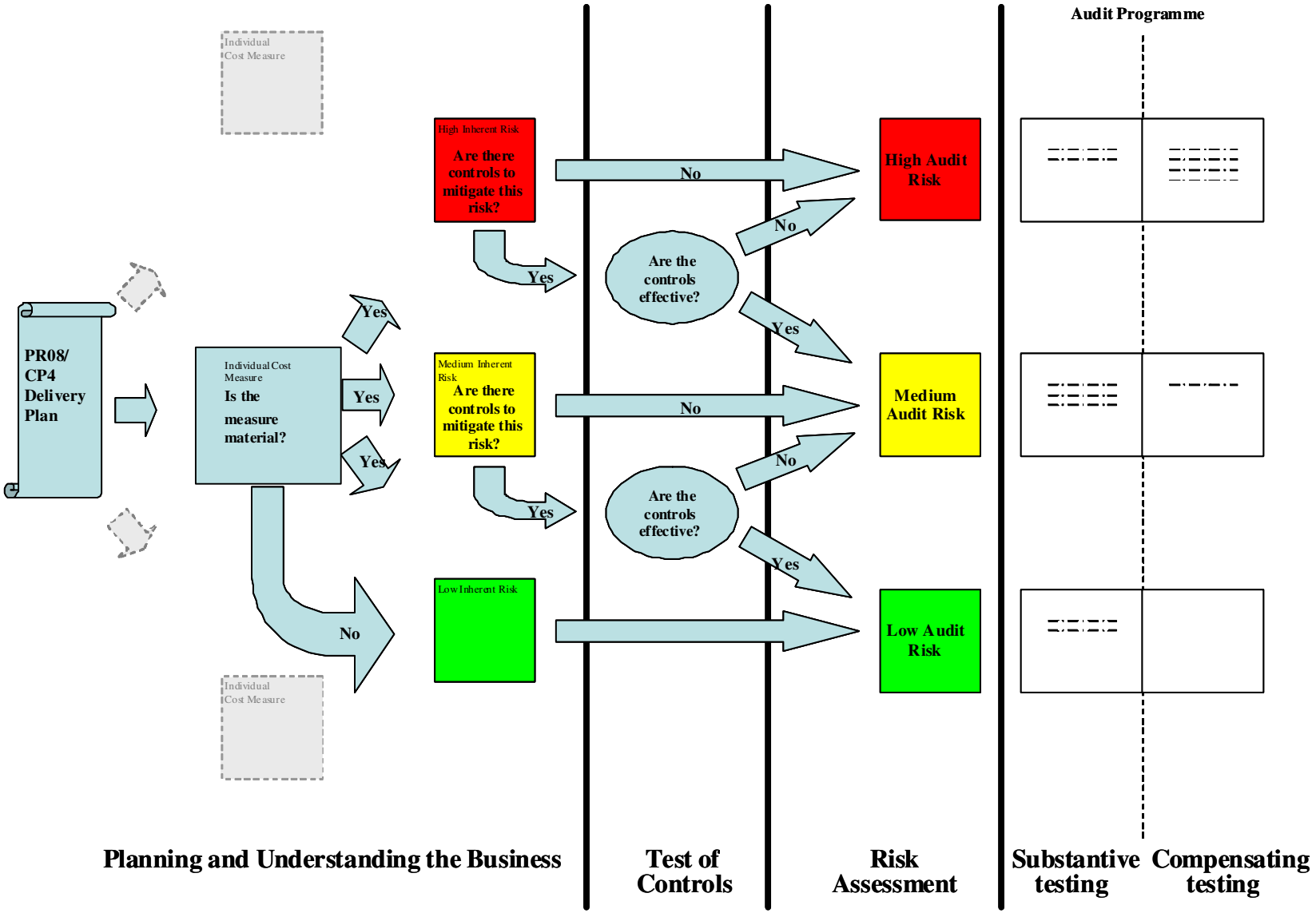


Figure 2.2 Network Rail Unit Cost audit process

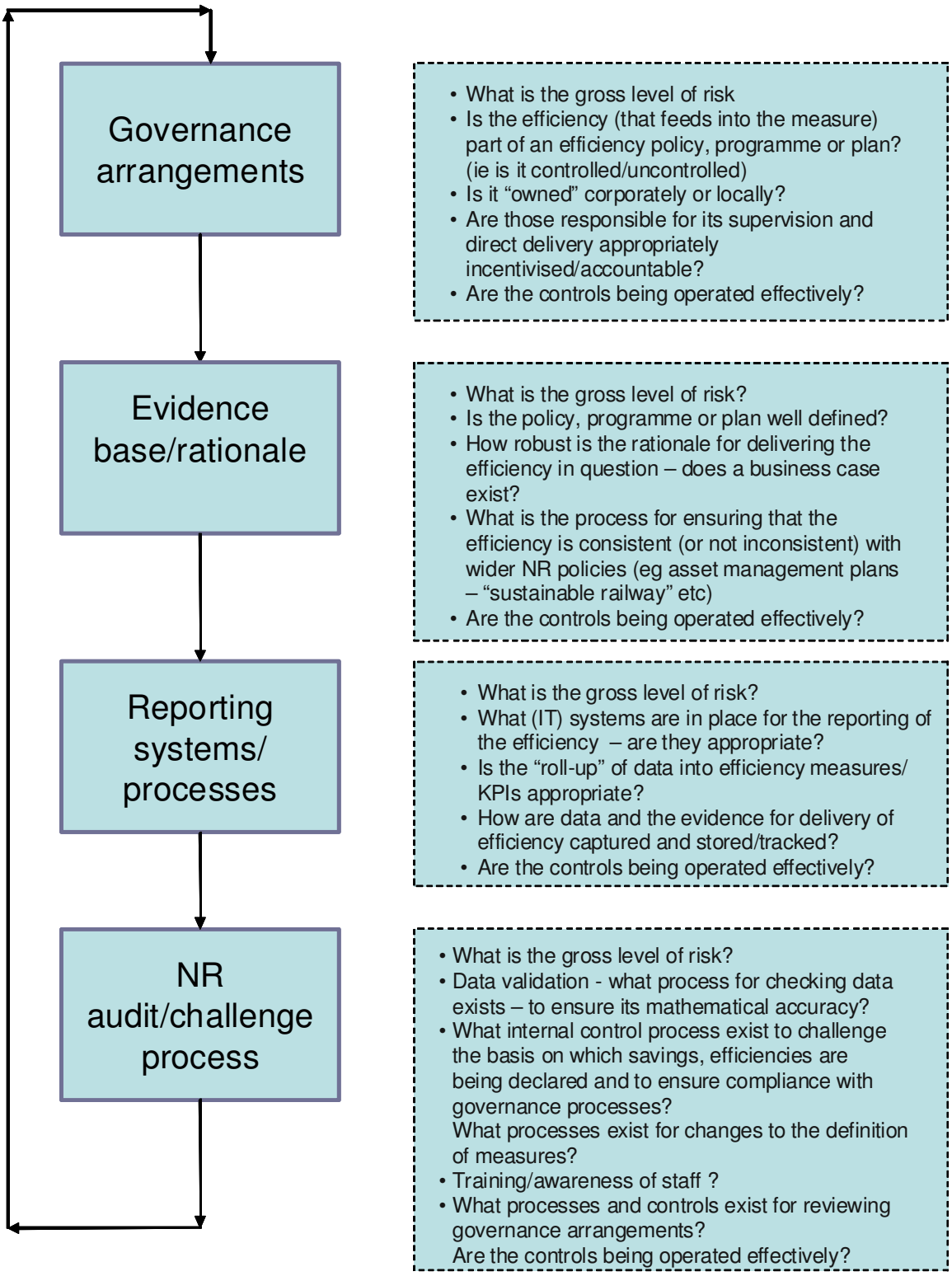


Figure 2.3 – Compliance testing pro-forma

Network Rail

Network Rail Unit Cost Measure audit programme

ARUP

Compliance Test Work Programme

ID	Area	Tests	Findings	Conclusions	Score (1-5)	Overall Risk
	Governance Arrangements					
	What is the gross level of risk?	Proportion of NR total efficiency gain (and within the O,M,S,R cost) does the measure cover?	High proportion of NR reported efficiency dependent on measure		5	
	Is the efficiency (that feeds into the measure) part of an efficiency policy/programme or plan? (ie is it controlled/uncontrolled)	Evidence of corporate guidelines, processes and programmes etc in place; investment approvals	No evidence of guidelines		5	
	Is it owned corporately or locally?	Evidence of formal allocation of delivery plans etc	No evidence of formal ownership - some indication of awareness at local level	Low reliance - unable to rely on substantive testing	4	VH
	Are those responsible for its supervision and direct delivery appropriately incentivised/accountable?	Bonuses, remuneration plans, team based incentives, incentive programmes	No linkage between management incentives and delivery on measures		5	
	Are the controls in question being operated effectively?	Evidence of external benchmarking/comparative exercises, routine management reviews and monitoring/positive management actions	No benchmarking or evidence of peer review/positive management action		5	
	Evidence base/rationale					
	What is the gross level of risk?	Risk assessment/evidence of evaluation of impact of delivering efficiencies on wider business objectives (positive/negative tests)	Little understanding of whether the actions required to deliver "desired" results through the measure in question are consistent (or inconsistent) with other NR core objectives		5	
	Is the policy/programme or plan well defined?	Quality of documentation supporting measures underpinning the measure	Poorly defined		4	
	How robust is the rationale for delivering the efficiency/actvity saving in question?	Has the programme been systematically checked back to drainage studies	Poorly evidenced	Low reliance - unable to rely on substantive testing	4	
	What is the process for ensuring that the efficiency is consistent (or not inconsistent) with wider NR policies (eg asset management plans - sustainable railway etc)	Quality of documentation supporting measures underpinning the measure	Process exists but is considered poor		4	VH
	Are the controls in question being operated effectively?	Evidence of management review and positive management actions	Little/no evidence of management reviews or corrective management actions		4	
	Reporting systems/processes					
	What is the gross level of risk?	If the systems/processes for reporting were sub-optimal for the measure in question, how material would the impact be on the overall outcome	Medium level of impact		4	
	What systems are in place for the reporting of the efficiency - are they appropriate?	Are the systems recognised as fit for purpose, used elsewhere, Good Industry Practice, supported on an ongoing basis, auditable	Some evidence of suitability demonstrated		4	
	Is the "roll-up" of data into efficiency measures/KPIs appropriate	Rationale supporting selection of data sets	Not demonstrated	Medium reliance - partial reliance on substantive testing possible	4	H
	How are data and evidence for delivery of efficiency captured/stored and tracked?	Review of systems, practices and processes in place to underpin these activities	Evidence of acceptable systems and timely reviews in place		2	
	Are the controls in question being operated effectively?	Evidence of management review and positive management actions	Some evidence of reviews demonstrated		2	
	NR audit/challenge process					
	What is the gross level of risk?	If the audit/challenge processes were sub-optimal for the measure in question, how material would the impact be?	Impact would be medium		3	
	Data validation - what process for checking data exists - to ensure its mathematical accuracy?	Suitability of processes for checking data	Processes are broadly in line with regulated industry standards		2	
	What internal control process exists to ensure compliance with reporting requirements	Existence and knowledge of internal control processes	Some evidence of understanding provided	Medium reliance - partial reliance on substantive testing possible	3	H
	Are the controls in question being operated effectively?	Evidence of regular application/enforcement	Limited evidence provided		4	

Test of controls

Where a measure is deemed material, we undertake tests of controls (compliance testing). This exercise is designed to help establish if the controls are effective and therefore capable of reducing the risk of Network Rail making a material misstatement in for example, the volume efficiencies it is declaring.

The test of controls includes a review of high level controls such as evidence of a clear audit trail up to senior management when considering significant decisions required to deliver a saving (eg substantive investment in new technology, changes to working practices, a move to risk based asset maintenance). Alternatively, "low level" sample testing may be required – for example covering awareness and compliance with corporate guidance on benchmarking, for example.

Where we have tested and determined that we can rely on Network Rail's internal controls, limited substantive and compensating testing would normally be required. Where we determine we cannot rely on internal controls, the detection risk is deemed to be increased. In this instance, we can report back on when Network Rail believes improvements will have been made (and internal controls can be relied on and re-tested). Substantive and compensating testing may be recommended. We envisage this could be undertaken as part of our ongoing reporter role and - along with the framework set out here – could be used to inform and substantiate our judgement on Network Rail's cost performance measures on an ongoing basis.

2.3 Substantive testing

Where a risk assessment concludes that there is low risk of material misstatement it is possible to undertake limited confirmatory testing (substantive testing). Again, this can be planned for on an ongoing basis.

2.4 Compensating analysis

Where an efficiency measure covers an area deemed to have a high detection risk, because of materiality, inherent risk or lack of suitable controls, sample testing or high level analytical reviews are unlikely to provide adequate assurance for the following reasons:

- results from sample testing cannot be accurately or confidently extrapolated across an investment/activity area;
- the results of such limited testing are open to challenge; and
- it is more difficult to identify management bias.

In these instances more robust and sophisticated tests are needed to provide the appropriate level of assurance. The aim being to look at as much of the area "population", in as much detail as is necessary to provide the required assurance.

Compensating approaches might include:

- assessment against best practice and established standards (e.g. other railways' approaches to measuring and delivering efficiencies);
- benchmarking against other companies (e.g. against other regulated industries in the United Kingdom); and
- detailed review of financial models and assumptions.

It can be noted that much of the PR08 work (and indeed on going NR work - for example in the area of benchmarking) took this form.

2.5 Mixed substantive testing/ compensating analysis

Where an area is identified as having a medium detection risk, substantive testing with limited compensating testing could be used to provide the required level of assurance.

As has been noted earlier, for this assignment, our main focus for the audit of cost efficiency measures is around testing controls and risk assessment. A discussion around the value of additional compensating testing (much of which has been undertaken as part of PR08) would need to take place before investing further time and effort into such an activity.

2.6 Where this approach has been used

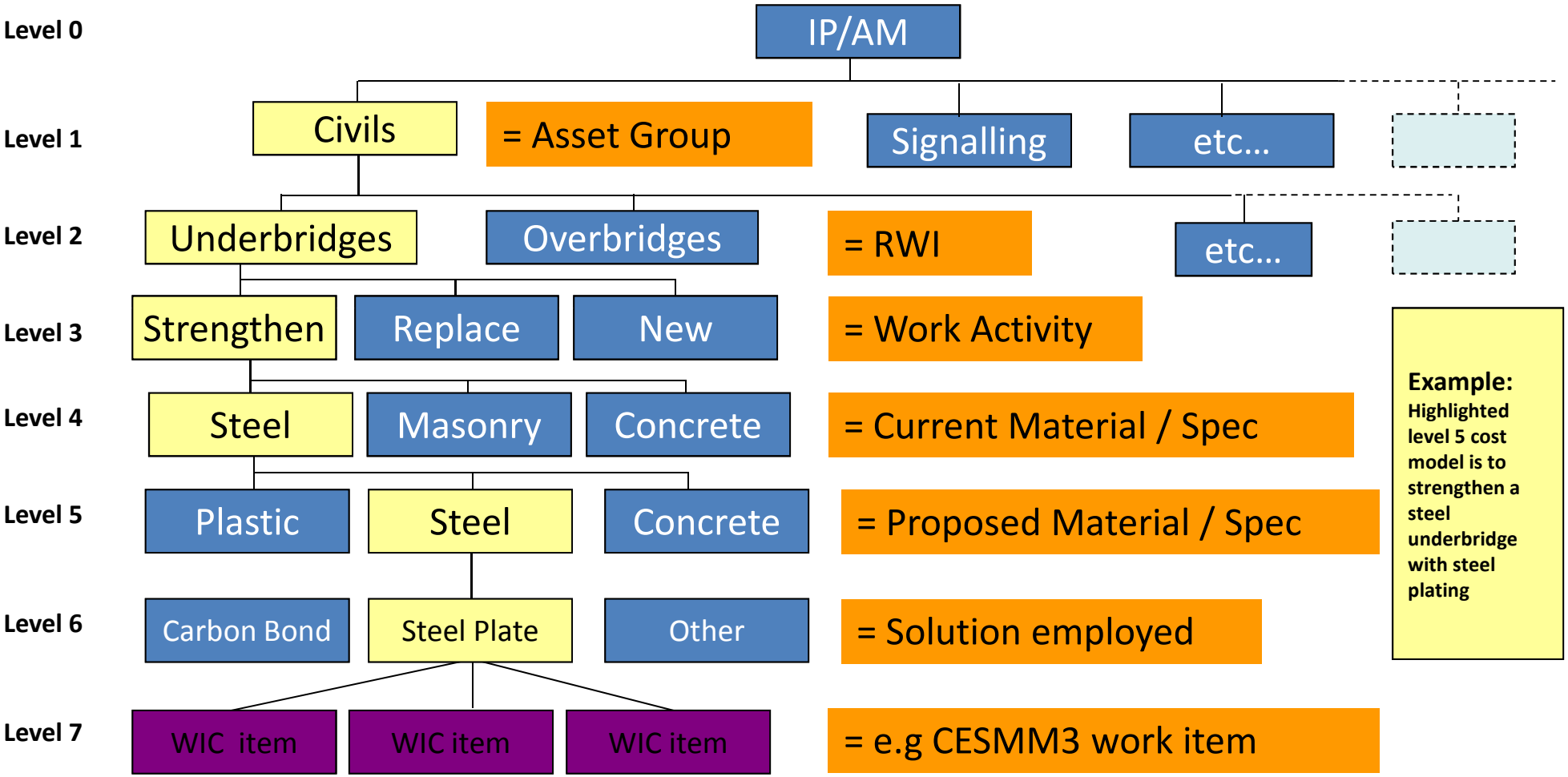
Our proposal is based on general audit principles as set out by the International Standard on Auditing 200 which states that "The auditor should plan and perform the audit to reduce the audit risk to an acceptably low level consistent with the objective of an audit." This is the standard approach used in internal and external audits within the public and private sectors.

The inherent risk areas identified in our audit programme are based on work undertaken by Arup in other regulated industries combined with our understanding of specific issues relevant to Network Rail and the questions that need to be addressed under our mandate. The overall approach adopted has been checked against a number of best practice examples such as IAM PAS55 and the Ofwat CFCMP framework.

Appendix J

Unit Cost Modelling Hierarchy

Unit Cost Modelling – Hierarchy



Appendix K

CAF Template

NATIONAL CAF TEMPLATE v1.23

When you have checked this report and are ready to submit it, please send it to "CAF Reports" mailbox on Connect

Select Function Template: Enhancements

Data Quality Check BEFORE SUBMISSION

Reset Whole Template

1.1 Analysis Details

Analysis Completed by :	Enter Author's Name	Project Manager:	Enter PM's Name	Issued Date :	Enter Date
GRIP Stage :	Select GRIP Stage	Drawing Reference:	Drawing Ref for Volume Take Off		

1.2 Project Factors

Territory :	Select Territory	Area :	Select Area	Route :	Select Route
Project Name :	Enter Project Title from Bplan	GRIP 4 Designer:	Enter GRIP 4 Designer	Complexity of location:	Select Complexity
OP Number:	Enter Implementation OP No.	GRIP 5 Designer:	Enter GRIP 5 Designer	Access:	Select Access Type
Business Plan UID :	Enter UID from Business Plan	GRIP 6 Contractor:	Enter GRIP 6 Main Contractor	Type of route:	Select route type
Site Locations:	Enter specific site locations			Seasonal factor:	Select Seasonal Factor
Engineer's Line Ref :	Enter ELR	Optioneering Start Date:	Enter GRIP Stage 3 Start	Main Expenditure Year:	Select Year
Start Mileage:	?m ??ch			Contract Type:	Select Contract Type
End Mileage:	?m ??ch	Construction Start Date:	Enter GRIP Stage 6 Start	Pricing Mechanism:	Select Pricing Mechanism
		Construction End Date:	Enter GRIP Stage 6 End	Traffic pattern:	Select traffic Pattern
				Predominant Shift Type:	Select Shift Type
		Standard Design & Details Used:	Enter Drawing Reference Nr(s)	Electrification:	Select Electrification Type
				Were materials free-issued:	Select Y/N

1.3 Work Description & Volume

	Hierarchy 1	Hierarchy 2	Hierarchy 3	Hierarchy 4	RWI Qty	Hierarchy 5	Hierarchy 6	Solution Qty
1								
2								
3								
4								

1.4 Structural Factors

Overall job length:	Enter track length linear metres	Maximum Line Speed:	Max Speed line SHOULD operate at	Number of Tracks:	Enter no of tracks
		RA Rating Before:	RA Rating Pre Project	RA Rating After:	RA Rating Post Project
				Cranage required:	Additonal cranage required?

Posession Type 1:	Enter Posession Type 1	Enter Number of Possessions 1	Enter Posession Length 1
Posession Type 2:	Enter Posession Type 2	Enter Number of Possessions 2	Enter Posession Length 2
Posession Type 3:	Enter Posession Type 3	Enter Number of Possessions 3	Enter Posession Length 3
Posession Type 4:	Enter Posession Type 4	Enter Number of Possessions 4	Enter Posession Length 4
Posession Type 5:	Enter Posession Type 5	Enter Number of Possessions 5	Enter Posession Length 5
Posession Type 6:	Enter Posession Type 6	Enter Number of Possessions 6	Enter Posession Length 6

1.6 Project Notes

A brief outline of the scope of the project, any events that had a significant impact on the project & any other comments that may be relevant to historical analysis including authority references and dates

Click to Insert Picture(s)

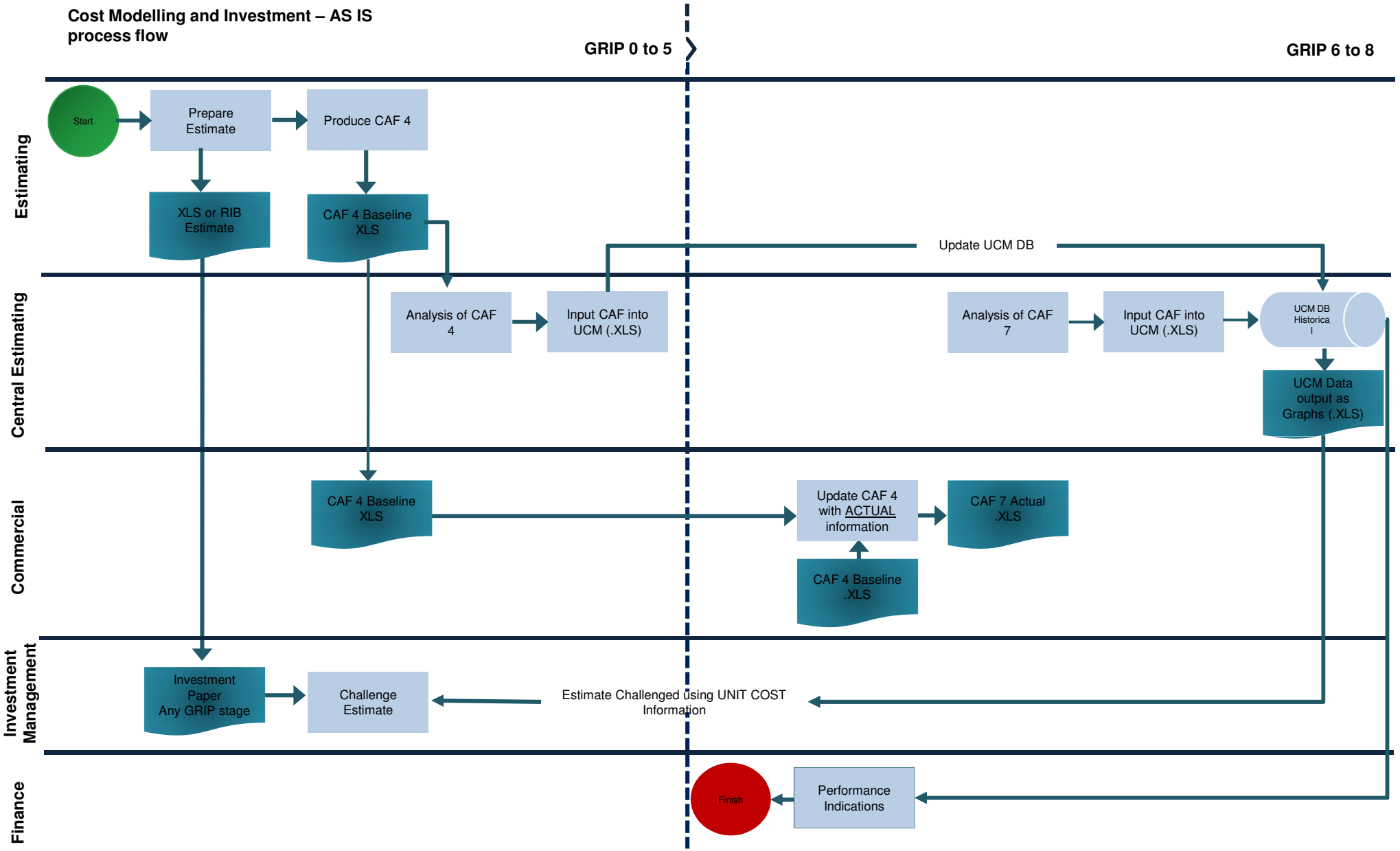
1.5 Technical Parameters

2.1 Cost Details

	TOTAL	Building	Civils	Power	Signalling	Telecoms	Track	Enhancements	Framework	Competitive	Cost Notes (optional)
Feasibility GRIP 1- 3											
Feasibility Contractor Works:	£0								✓	✓	
Feasibility Contractor Core Team:	£0								✓	✓	
Feasibility Contractotr OH&P:	£0								✓	✓	
Feasibility NR Project / Programme Cost:	£0								✓	✓	
Feasibility TOTAL	£0	£0	£0	£0	£0	£0	£0	£0	✓	✓	
Design GRIP 4- 5											
Design Contractor Works:	£0								✓	✓	
Design Contractor Core Team:	£0								✓	✓	
Design Contractor OH&P:	£0								✓	✓	
Design NR Project / Programme Cost:	£0								✓	✓	
Design TOTAL:	£0	£0	£0	£0	£0	£0	£0	£0	✓	✓	
Implementation GRIP 6- 8											
Work Type 1:	£0								✓	✓	
Work Type 2:	£0								✓	✓	
Work Type 3:	£0								✓	✓	
Work Type 4:	£0								✓	✓	
Other Direct Costs:	£0								✓	✓	
Site Prelims (ex Scaffolding):	£0								✓	✓	
Scaffolding:	£0								✓	✓	
Site Works - Supervision:	£0								✓	✓	
Free Issue Materials:	£0								✓	✓	
Utilities / Service Diversions:	£0								✓	✓	
Environmental Costs:	£0								✓	✓	
3rd Party Access / Land Purchase:	£0								✓	✓	
Haul Road(s):	£0								✓	✓	
Possessions:	£0								✓	✓	
Isolations:	£0								✓	✓	
Access Condition G / Schedule 4:	£0								✓	✓	
Implementation TOTAL:	£0	£0	£0	£0	£0	£0	£0	£0			
Management GRIP 6- 8											
NR Project / Programme Cost:	£0								✓	✓	
Contractor Core Team:	£0								✓	✓	
Contractor Profit:	£0								✓	✓	
Contractor Overhead:	£0								✓	✗	
Consultant Costs:	£0								✓	✓	
Insurance:	£0								✓	✓	
Risk:	£0								✓	✓	
Claims:	£0								✓	✓	
LAD's & Train Delay Costs:	£0								✓	✓	
Pain/Gain Share:	£0								✓	✓	
Management TOTAL:	£0	£0	£0	£0	£0	£0	£0	£0			
TOTAL COST:	£0	£0	£0	£0	£0	£0	£0	£0			

Appendix L

CAF Process


Cost Modelling and Investment – AS IS process flow
GRIP 0 to 5
GRIP 6 to 8
Estimating
Central Estimating
Commercial
Investment Management
Finance
Start
Prepare Estimate
Produce CAF 4
XLS or RIB Estimate
CAF 4 Baseline XLS
Update UCM DB
Analysis of CAF 4
Input CAF into UCM (.XLS)
Analysis of CAF 7
Input CAF into UCM (.XLS)
UCM DB Historica l
UCM Data output as Graphs (.XLS)
CAF 4 Baseline XLS
Update CAF 4 with ACTUAL information
CAF 7 Actual .XLS
CAF 4 Baseline .XLS
Investment Paper Any GRIP stage
Challenge Estimate
Estimate Challenged using UNIT COST Information
Finish
Performance Indications

Appendix M

Unit Cost Modelling Tool

Unit Cost Modelling Tool v0.8c

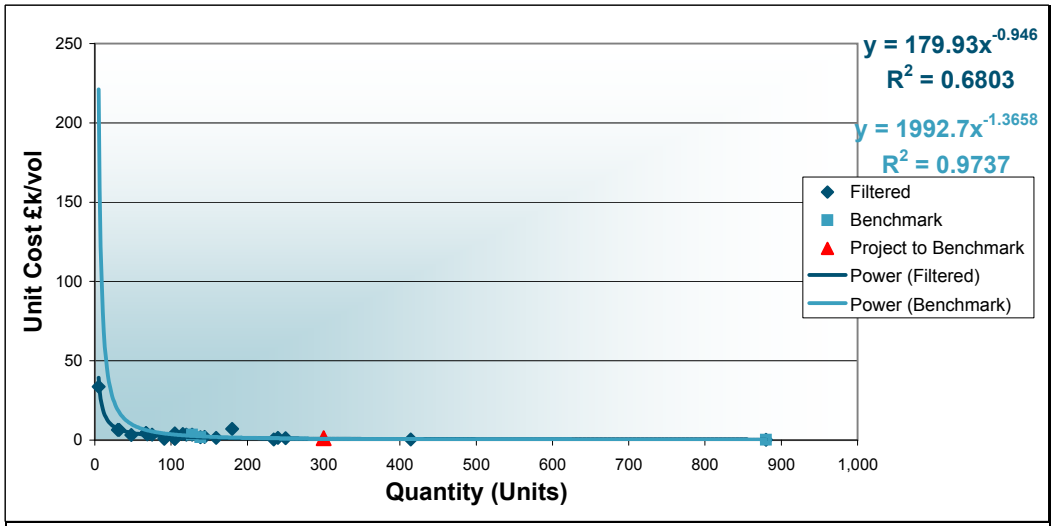
Click here for guidance on using this tool

1. **Enter Project Name**

Select All / Reset Filters

		Total Records		Records Selected	
		Nr	£k	Nr	£k
2. Function Template:	Civils	1,697	1,014,642	1,697	1,014,642
Asset:	Civils	1,697	1,014,642	1,697	1,014,642
Repeatable Work Item:	Overbridge	1,697	1,014,642	166	111,441
Work Activity:	Strengthen	166	111,441	26	8,369
Type1:	All	26	8,369	26	8,369
Type2:	All	26	8,369	26	8,369
Solution:	All	26	8,369	26	8,369
Territory :	All	26	8,369	26	8,369
Main Expenditure Year:	All	26	8,369	26	8,369
Contract Type:	All	26	8,369	26	8,369
Pricing Mechanism:	All	26	8,369	26	8,369
Electrification:	All	26	8,369	26	8,369
Posession Type 1:	All	26	8,369	26	8,369
Posession Length 1:	All	26	8,369	26	8,369
Total Records Selected by Filters				26	8,369

Click to confirm filter choice



HISTORIC DATA IS BASED ON THE FOLLOWING SELECTED FILTERS:

Asset: Civils,
Repeatable Work Item: Overbridge,
Work Activity: Strengthen,
Type1: All ; Type2: All ; Solution: All ; Territory : All ; Main Expenditure Year: All ; Contract Type: All ; Pricing Mechanism: All ; Electrification: All ; Posession Type 1: All ;

	Pre CP4	CP4 - 2009/10	CP4 - 2010/11	CP4 - 2011/12	CP4 - 2012/13	CP4 - 2013/14	CP5 - 2015/16	CP5 - 2016/17	CP5 - 2017/18	CP5 - 2018/19	CP5 - 2019/20	TOTAL
3. Enter RWI Quantity			300									300
4. Enter Authority Requested (Cash Prices) £k			375									375
Benchmark Price @ 2008/09 prices £k		Benchmark based on central benchmark unit cost projects only										
Benchmark Price Inflation Adjusted NO Efficiency (Cash Price) £k	0	0	0	0	0	0	0	0	0	0	0	0
Target Price; Efficiency & Inflation Adjusted (Cash Prices) £k	0	0	0	0	0	0	0	0	0	0	0	0
Variance to Benchmark %												
Filtered Price @ 2008/09 prices £k		Benchmark based on filtered selections from section 2.										
Filtered Price Inflation Adjusted NO Efficiency (Cash Price) £k	0	0	0	0	0	0	0	0	0	0	0	0
Target Price; Efficiency & Inflation Adjusted (Cash Prices) £k	0	0	0	0	0	0	0	0	0	0	0	0
Variance to Benchmark %												

Appendix N

Local CAF Audits

LOCAL CAF AUDITS

SUMMARY OF RESPONSES AND FINDINGS

Audit categories and questions	LNW - Track	LNE - Track	LNE - Signalling	Western - Civils	Scotland East - Telecomms
NR contacts					
Names and roles	Adrian Bird (Senior Commercial Manager) Mark Griffiths (Financial Controller)	Richard Dooley (Territory Commercial Manager)	Tony Smith (Programme Commercial Manager)	Julian Humphreys (Programme Commercial Manager) Ruby Marwaha (Senior Commercial Manager)	Ross McQueen (Senior Commercial Manager)
Commercial awareness at local level					
Are budgets clearly defined?	Yes - demonstrated during audit	Yes (£160m 09/10 turnover)	Yes (£41m 09/10 turnover)	Yes (£55.3m 09/10 turnover)	
Are unit cost targets defined and understood?	Yes - Plain line and S&C unit costs are measured in terms of "composite kilometres" and "S&C equivalent units". Evidenced that current and target unit rates for both unit cost measures were defined and understood.	Yes - Unit cost are defined based on prior knowledge of track rates with planned efficiencies factored into targets for the financial year. Also demonstrated how resource based estimates are used in the business plan (these estimates are known as T40's).	Yes - Target SEU rates are understood e.g. Reducing cost of SEU's from £267k to £165k in CP4. Contractors also understand the SEU targets as they helped to define them.	Target unit rates are used at business planning stage. Did not witness the same drive to reduce unit cost as in Track and Signalling teams	
Are the number of CAF returns required within the financial year understood?	Yes - The team understood that <10% of track workload was not presently reportable therefore their target was 90%. However, noted at this point that track teams follow the MBR process not CAF	Yes - Identical situation to that in LNW.	Yes - Demonstrated use of the CAF tracker and understanding of when CAF returns were to be returned.	Yes - 76 CAF returns to be produced in the year. 74 of which have been produced to date. 56% of turnover is capable of being reported through the CAF process in 09/10	
Is the CAF data being used to manage performance in any way?	Unit cost data is used to manage performance against target unit costs but this is not undertaken using the CAF process.	Unit cost data is used to manage performance against target unit costs but this is not undertaken using the CAF process.	Only in terms of monitoring performance against SEU targets.	Yes, Western Civils use a Budget Calculator derived from all previous CAF data to inform the business plan at early Grip Stage 1 and when requesting budget at Grip 4.	
Implementation at local level					
Is CAF used at local level?	No - MBR process is used	No - MBR process is used	Yes	Yes	
Awareness of the importance of CAF for Performance Management	CAF not used - However, only a vague understanding of how unit and volume efficiency is used in the CEM and incentive plan	No knowledge of CEM and incentive plan implications	No knowledge of CEM and incentive plan implications	Yes - but only at project level, not in terms of business Performance Management	
Are territories aware of the required level of performance for CAF returns (e.g. 80% NR target)?	Performance levels for the MBR process are understood	Performance levels for the MBR process are understood	Yes - 70% of turnover targeted for reporting through CAF process	No	
Is there an understanding of the low performance areas in terms of CAF returns?	Yes - These relate to drainage and fencing and other items that form <10% of annual workload	Yes - Identical situation to that in LNW.	No issues in LNE (only one CAF in the year required)	Not an issue on Western civils as, whilst performance against turnover is low, performance against the CAF tracker is high.	
What management actions are required to improve coverage?	Include unit cost targets for fencing and drainage. Comparatively low priority	Include unit cost targets for fencing and drainage. Comparatively low priority	None identified for LNE	Western Civils have delegated responsibility for chasing CAF returns. This seems to be effective.	
Local governance					
Are accountabilities and responsibilities clearly defined?	Yes - Commercial Team structure provided	Yes - Commercial Team structure provided	Yes	Yes	
Are adequate resources provided to follow the CAF process?	CAF not used - Noted that only one Senior Commercial Manager was managing North and South sub-sectors until role was filled. Clearly not sustainable.	CAF not used	Yes - Four commercial resources provided in each team within LNE signalling	Yes	
Are management systems in place to ensure compliance with the CAF process?	CAF not used	CAF not used	Driven by Programme Commercial Manager	Yes (D. Hughes responsible for chasing CAF returns)	
Are management actions being taken to improve CAF performance?	CAF not used	CAF not used	Yes at Territory level	Yes	
Systems and processes at local level					
Are the CAF systems and processes followed?	No - MBR process is followed	No - MBR process is followed	Yes	Yes	
What are the drivers of unit and volume efficiency at a local level?	Labour - Key to efficiency in terms of posession management and volume of work being undertaken Plant - Engineering trains are a significant cost and cost is variable on the construction methodology and site constraints Materials - Generally free issue. Removing contaminated material can result in greater expense Preliminaries - As per Labour & Plant	Labour - Key to efficiency in terms of posession management and volume of work being undertaken Plant - Engineering trains are a significant cost and cost is variable on the construction methodology and site constraints Materials - Generally free issue. Removing contaminated material can result in greater expense Preliminaries - As per Labour & Plant	The complexity of SEU's and how they are packaged to form individual projects. Depending on how projects are scoped, the complexity of the project can be increased or decreased (Could this be a perverse incentive?).	Variable depending on the asset in question. Access and project volumes seem to be the main drivers of unit cost efficiency. For instance, why not allocate responsibility for maintaining bridges to a single contractor and tender once rather than repetitively.	

Audit categories and questions	LNW - Track	LNE - Track	LNE - Signalling	Western - Civils	Scotland East - Telecomms
CAF return audits					
What sample size has been taken?	10	6	19	20	
How accurate are the CAF returns sampled compared to Oracle?	N/A	N/A	6 checked during audit	2 checked in detail during audit - Within 5% of Oracle data. Some costs still to be incurred (e.g. Retention) so variance is acceptable	
Is the allocation of direct costs appropriate?	Yes	Yes	Yes - No free issue material. Generally contractors costs. Design included either by consultant or contractor.	Yes	
Is the allocation of indirect costs appropriate?	Yes - programme rather than project based	Yes - programme rather than project based	Yes - Noted that Major Project & Investment costs are allocated by project, not programme. Includes NR management, posession management, access contributions, land and third party costs.	Yes - project based approach rather than programme	
Other comments					
Issues or learning identified	Efficiencies were identified to meet unit cost targets by packaging work together. This may leave a workbank of "difficult" jobs later in the control period. Some pressure may exist to defer more difficult projects in order to meet targets.	Track contracts are cost reimbursable IT20's. The pain gain element of these contracts is not utilised and instead a balanced scorecard is used to measure performance and determine the contractors share of a national track incentive fund.	Noted that PCM believed that a higher volume of projects was required to hit forecast unit cost efficiencies	The CAF's audited represented a very small section of 09/10 turnove due to initial lack of NR preparedness. A larger project sample was provided at a later date. A key question arising from this and other audits is the extent to which cost can be reported through CAF. To date we have seen no reconciliation that shows whether or not the 80% target is achievable. Many projects undertaken in the mid to latter stages of CP4 will not be reported until CP5. To what extent is "project lag" an issue?	

Appendix O

Separation of Costs for England & Wales and Scotland

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