Independent Reporter: Audit of Network Rail's Roll Out of Cost Analysis Frameworks and Maintenance Unit Cost Measures

Final Report

January 2006

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Contents Amendment Record

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Issue	Revision	Description	Date	Initial
0	1	Drafting copy	10/11/05	DJM
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0	3	Draft incl. NR & ORR comments	12/12/05	DJM
1	0	Final Report	17/01/06	DJM

Contents

0 Executive Summary

0.1 Background and remit

0.1.1 Network Rail has developed a Cost Analysis Framework (CAF) process for monitoring renewals unit costs and a Maintenance Unit Cost (MUC) processes for monitoring maintenance unit costs. At the time of writing, both are in the process of being rolled-out and bedding-in.

0.1.2 ORR asked Halcrow, as Independent Reporter, to undertake a review of Network Rail's progress in rolling out the unit cost measures (CAFs and MUCs). The purpose of this review was to provide ORR with a good understanding of the coverage and quality of unit cost data that is likely to be generated for 2005/06 and reported in the 2006 Annual Return.

0.2 Existing Renewals Unit Cost Measures

Introduction

0.2.1 Network Rail currently measures unit costs for renewal of track, signalling and structures. The unit costs measures are well established, having been in use within Network Rail for several years; baseline unit costs for 2003/04 are available. We have discussed these unit cost measures in a previous report (*Monitoring Efficiency: Establishing a Framework*, April 2005).

0.2.2 These existing unit costs cover around 90% of track, 50% of civils and 20% of signalling renewals expenditure each year.

0.2.3 We assess that these unit costs are broadly fit for purpose, but make a number of recommendations for their improvement in the interim.

0.2.4 A firm date for migrating from this existing process to the new Cost Analysis Framework process (for measuring renewals unit costs) has not been set.

Regulatory reporting

0.2.5 Network Rail expects that unit costs for Track and Civils will be presented in similar formats in Annual Return 2006, representing:

(a) £665m (95%) of total Track investment in 2005/06; and

(b) £175m (60%) of total Civils investment in 2005/06.

0.2.6 Subject to agreement, detailed data for these existing unit cost measures will be available directly to ORR,supporting the data published in the Annual Return 2006.

0.3 Cost Analysis Frameworks (CAF)

Introduction

0.3.1 Network Rail has developed a process for monitoring renewals and enhancement unit costs and is implementing a commercial-off-the-shelf (COTS) information system to support cost recording and analysis. The definitions are recorded in six 'CAF Design' documents (civils, electrification & plant, estates, signalling, track, telecoms). The process itself is described in a Standard Operating Procedure.

Roll out

0.3.2 At the time of our review, progress was behind the implementation programme. A few Actual Cost Reports had been delivered as part of a pilot exercise but none have been generated as part of the roll-out.

0.3.3 Network Rail noted that the original implementation programme had not reflected the degree of change management necessary to roll-out the CAFs and that significant effort was now being made to align the planning and reporting process with the CAF programme. The roll-out is now substantively back on programme.

Coverage

0.3.4 We have reviewed the 'CAF Design' documentation. In general, we would note that the CAFs appear to be comprehensive, apart from:

(a) Track drainage RWI (402), which is still to be developed.

(b) Work Types in the Telecoms CAFs, which we recommend should be reviewed.

0.3.5 Notwithstanding this, the other CAFs are clearly documented and cover much of the work items we would have expected. More detailed comments are provided in Appendix A.

Data quality

0.3.6 No CAF data was available for audit or assessment of data quality.

Regulatory reporting

0.3.7 In its CAF implementation plan (issued to us 12/12/05), Network Rail forecasts that there will be varying amounts of data available for E&P, Estates, Signalling and Telecoms CAFs for 2005/06:

(a) £9m (17%) of total Electrification investment in 2005/06;

(b) £56m (41%) of total Estates investment in 2005/06;

(c) £32m (11%) of Signalling and Telecoms investment in 2005/06 (only combined data is available for this forecast).

0.3.8 Detailed information on these unit costs will be available to ORR, supporting the data published in the Annual Return 2006.

0.4 Maintenance Unit Costs (MUC)

Introduction

0.4.1 Network Rail has developed a process for monitoring maintenance unit costs and a bespoke information system to source data from the maintenance work management system (MIMS) and financial system (BMIS).

Roll-out

0.4.2 The process has currently been rolled-out for eighteen work activities (fifteen track MUCs and three signalling MUCs) but is still bedding-in. Network Rail stated that the data is not currently of sufficient quality to support an audit. Work is underway to improve this data quality.

0.4.3 Notwithstanding this, we have not been able to source a programme or plan which identifies (a) the expected actions and milestones for improving data quality to a sufficient for regulatory reporting/audit or (b) the expected extension of the MUCs to cover other maintenance work activities.

Coverage

0.4.4 The definition of the MUCs is clear, in terms of costs and MIMS work activities ('Level 3 Items') however, these activities are not defined in detail and are open to local interpretation, which may affect the stability of the resulting unit costs.

0.4.5 The eighteen MUCs are restricted to track and signalling maintenance, covering 60.2% of track spend and 37.2% of signalling spend (in Period 6 2005). The MUC portfolio will need to be expanded to maintenance of other assets and to cover a greater proportion of the track and signalling spend.

Data quality

0.4.6 Network Rail is making progress. The level of completion of data fields in MIMS has increased since initial roll-out, with 90% and 89% improvements in completion of MIMS Work Orders for staff hours and work units respectively.

Regulatory reporting

0.4.7 Network Rail does not yet have clear view as to how many of these MUCs – and in how many Areas – will be sufficiently robust and stable through the last quarter of 2005/06 to form benchmarks for subsequent trend analysis; however, it is clear that it will not be all MUCs in all Areas. Subject to agreement, the full MUC dataset will be available directly to ORR in support of the Annual Return 2006.

0.5 Conclusion

Existing unit cost measures

0.5.1 The existing unit cost measures for Track, Civils and Signalling were reported in Annual Return 2005; we fully expect them to be produced for Annual Return 2006.

Cost Analysis Framework

0.5.2 Network Rail has made considerable progress in delivering comprehensive renewals unit cost measures. In discussion with Network Rail, we would expect some renewals unit costs to be available to support the Annual Return 2006. This will be dependent on the volume and stability of data available in this first year of implementation.

Maintenance Unit Costs

0.5.3 Network Rail has made considerable progress in delivering comprehensive maintenance unit cost measures. Network Rail has stated that data for MUCs is not likely to be published in the Annual Return 2006. However, subject to agreement, the full MUC dataset will be available directly to ORR, with supporting commentary and caveats as appropriate.

1 Introduction

1.1 Background

1.1.1 In December 2004, Network Rail provided ORR with proposals for the monitoring of its progress against the ACR2003 efficiency assumptions and the measurement of maintenance and renewal unit costs. Different approaches were proposed to monitor operating costs, maintenance and renewals expenditure, each combining empirical measures of efficiency and commentary.

1.1.2 The proposals can be split into two distinct elements:

(a) Proposals for 2004/05 which were based on Network Rail's existing data collection processes; and

(b) Longer-term proposals for future years to develop a more robust monitoring framework.

1.1.3 In addition to variance analysis, Network Rail's proposals for measuring opex, and maintenance and renewal unit cost improvement for 2004/05 and future years are summarised in the table below.

	Measurement method	
	2004/05	**Longer-term**
Opex	Total controllable opex supported by commentary on significant variations	
Maintenance	Aggregate maintenance expenditure per equated track mile supported by commentary informed by existing measures of maintenance unit costs	Aggregate maintenance expenditure per equated track mile supported by commentary informed by extended range of maintenance unit costs
Renewals	Measure of 'activity' efficiency derived from the variance between actual and budgeted renewals expenditure supported by existing unit cost measures	Development of a Cost Analysis Framework (CAF) which will provide unit cost measures for 80% of renewals expenditure within each asset type

1.1.4 Network Rail has now developed a Cost Analysis Framework (CAF) process for monitoring renewals unit costs and has developed a Maintenance Unit Cost (MUC) process for monitoring the unit costs of maintenance activities. At the time of writing, both are in the process of being rolled-out and bedding-in.

1.2 Project remit

1.2.1 ORR asked Halcrow, as Independent Reporter, to undertake a review of Network Rail's progress in rolling out the unit cost measures (CAFs and MUCs). The purpose of this review was to provide ORR with a good understanding of the

coverage and quality of unit cost data that is likely to be generated for 2005/06 and reported in the 2006 Annual Return.

1.2.2 This project comprised of the following steps:

(a) Review of the development of individual unit cost measures, in terms of their structure, definition and coverage;

(b) Review of the progress in rolling out these unit cost measures, in terms of people (organisation and competence), processes and information systems;

(c) Review and/or audit of the data being produced (if any), in terms of quality and volume of data produced.

1.2.3 These reviews were undertaken using an interview process with Network Rail employees, inspection of information systems at Network Rail's premises and analysis of data provided by Network Rail.

1.2.4 In agreement with ORR and Network Rail, this project did not include a detailed audit of the data as the processes were still bedding-in. For CAFs, insufficient data had been produced to undertake an audit; for MUCs, the level of data quality was assessed centrally and was clearly not sufficient to merit a detailed audit at this stage.

1.3 Report structure

1.3.1 The remainder of this report is structured as follows:

(a) Section 2: Existing Renewals Unit Cost Measures.

(b) Section 3: Cost Analysis Frameworks.

(c) Section 4: Maintenance Unit Costs.

(d) Section 5: Conclusion.

1.3.2 An appendix is provided, listing meetings and requests for information in connection with this work. Other appendices are referenced in the text.

2 Proposals for an efficiency framework

2.1 Introduction

2.1.1 This section sets out Network Rail's propsals to ORR in respect of an efficiency monitoring framework, focussing on the provisions for monitoring maintenance and renewals unit costs.

2.2 Renewals

2.2.1 In October 2004, Network Rail set out its proposals to ORR for monitoring renewals efficiency (*Efficiency Framework: Renewals*, Network Rail, ORR reference doc#196313.01). This set out Network Rail's plans to develop a unit cost framework for monitoring renewals efficiency.

2.2.2 Network Rail's proposal was to:

(a) Develop unit cost measures for renewals activities in each asset area, to be progressively extended to cover 80% of renewals expenditure. Existing frameworks were in place for Track and Civils, others were to be developed such that full volume reporting for all assets could take place from the commencement of the 2005/06 financial year.

(b) Finalise all definitions by end of 2004.

(c) Commence data collection from December 2004, but no later than April 2005.

(d) In Q2 2005, to review the data collected for 2004/05 projects against the benchmark criteria to values identify benchmarks where appropriate.

(e) Complete data collection in 2005/06 with indices and benchmarks set for all identified activities for the Annual Return 2006.

2.3 Maintenance

2.3.1 In October 2004, Network Rail set out its draft proposals to ORR for monitoring maintenance efficiency (*Efficiency Framework: Maintenance*, Network Rail, ORR reference doc#196315.01). This set out Network Rail's plans to develop a unit cost framework for monitoring maintenance efficiency.

2.3.2 Network Rail's draft proposal was to:

(a) Develop unit cost measures for the fifteen most significant repeatable track activities.

(b) Complete pilot analysis by the end of 2004.

(c) Establish the process nationally such that the framework was complete by the end of March 2005.

(d) Establish consistent definitions and processes such that information would be reported nationally from the end of 2004/05. This was subsequently not taken forward into the final proposal dated 22 December 2004.

(e) Review the robustness of unit cost data with a view to establishing a meaningful set of benchmarks for 2005/06 for monitoring efficiency trends.

3 Existing Renewals Unit Cost Measures

3.1 Introduction

3.1.1 Network Rail will continue to use the existing unit cost data collection processes for track, civils and signalling; these cover around 90% of track, 50% of civils and 20% of signalling renewals expenditure. A firm date for migrating from this existing process to the new Cost Analysis Framework process, for measuring renewals unit costs, has not been set.

3.1.2 We have discussed these unit cost measures in a previous report (*Monitoring Efficiency: Establishing a Framework*, April 2005); the text in this section is based on those findings.

3.2 Track

3.2.1 Network Rail measures unit costs for renewal of plain line and switches & crossings. The unit costs measures are well established, having been in use within Network Rail for several years; baseline unit costs for 2003/04 are available.

3.2.2 The table below summarises the plain line renewals activities for which Network Rail currently collects unit costs.

Activity	Measure of volume
Major Items	
Re-rail both rails	metres
Steel sleeper relay and re-rail	metres
Re-ballast ABC	metres
Re-rail, re-sleeper, re-ballast ABC (all sleeper types)	metres
Re-rail, re-sleeper, re-ballast trax (all sleeper types)	metres
Re-rail, re-sleeper, re-ballast, formation trax (all sleeper types)	metres
Drainage only	metres
Other - GCC Only	
Re-rail one rail	metres
Other Items	
Steel sleeper only	metres
Re-rail, re-ballast trax	metres
Re-ballast trax	metres
Re-sleeper, re-ballast ABC (all sleeper types)	metres
Re-sleeper, re-ballast trax (all sleeper types)	metres
Re-ballast, formation trax	metres
Re-sleeper, re-ballast, formation trax (all sleeper types)	metres
Miscellaneous	metres

3.2.3 In general, we would note that the plain line unit costs appear to be comprehensive; our key comments are:

(a) Resleepering is only differentiated for steel sleepers; we would also expect data to be collected for timber and concrete sleepers.

(b) We believe that there is scope to improve the cost allocation so that Network Rail project and possession management costs are based on actual costs incurred rather than a percentage mark-up being applied.

3.2.4 Network Rail also collects unit costs for the renewals of switches and crossings. Unit costs are calculated for the five measures shown in the table below.

Activity	Description
Complete renewal	Like for like replacement with modern equivalent form including ballast replacement or cleaning
Remodelling	Provision of new facilities and/or upgrading of operational functionality and/or capacity and/or major alterations to the principal disciplines
Ballast renewal	Replacement of ballast by traxcavator or automated ballast cleaner (only carried out in exceptional circumstances)
Ironwork or component renewal	Replacement of selected track components
Abandonment	Replacement with plain line

3.2.5 The table below shows the units of volume that are applied to each asset type renewed.

Asset	Number of units
Turnout	1
Trap	1
Crossover or tandem	2
Double junction	3
Scissors crossover	5

3.2.6 As with the plain line measures, we believe that the unit cost data is broadly fit for purpose. While the activities are aggregated into just five categories of work we believe that this is a reasonable approach due to the (relatively low) number of S&C renewed each year; attempting to disaggregate work any further may result in insufficient data to generate meaningful time series.

3.2.7 Notwithstanding this we make the following comments on these measures.

(a) We are concerned that some the costs associated with activities that are driven by S&C renewals are classified as track renewal. For example the definition of complete renewal of S&C says 'work away from trackside in signal control centres, associated with renewals that is not remodelling, shall be classified as signal remodelling and reported separately'. This hides some of the costs associated with S&C renewals.

(b) In some cases a trap could be considered as half a unit.

(c) Some of the measures are specific to steel sleepers and no equivalent measures are in place for concrete and timber sleepers.

3.3 Structures

3.3.1 Network Rail monitors the unit costs of four distinct structures renewals activities:

(a) Preventative maintenance is undertaken as a result of condition determined during routine examination. Preventative maintenance reduces rate of deterioration and subsequent repair and replacement expenditure. For example: painting, pointing, waterproofing, the application of preservatives and surface coatings.

(b) Strengthening is defined as work required to bring existing structures up to the load bearing standards for which Network Rail has a liability (i.e. those already found to be sub-standard, or anticipated to be sub-standard during the current 18 year programme of strength assessment).

(c) Repair is defined as work arising as a consequence of deterioration (this excludes existing deterioration if it contributes to sub-standard load capacity, and is consequently defined as strengthening).

(d) Replacement of major element, such as bridge decks or retaining walls, will be separately identified because these are readily measured items of work.

3.3.2 As with the track measures these have been in use for several years and baseline unit costs for 2003/04 are available.

3.3.3 We are concerned that the renewals unit cost measures include maintenance activities such as painting and pointing. We note however that this classification of structures expenditure is consistent with the ACR2003 Final Conclusions.

3.3.4 The table on the next page shows the activities for which structures renewals unit costs are currently collected by Network Rail.

3.3.5 In general, these measures cover the majority of maintenance and renewals activities that we would expect Network Rail to be undertaking. In light of this we are surprised that only 50% of structures renewals expenditure is covered by these measures (2003/04 figures). We understand that this may be because the unit cost measures only cover schemes that have a cost in excess of £50k or £100k.

3.3.6 We recommend that Network Rail separately reports the same unit cost measures for projects that fall below the expenditure thresholds. Due to economies of scale the average unit costs for these activities are likely to be higher than for the larger projects.

3.3.7 Our primary concern is the lack of a clear definition of which expenditure is classified as major projects as these costs are recorded separately and are not reported within the unit cost measures.

Structure Type	Work Type	Measure of Volume
Underbridges (>£100k)	Preventative	m2
	Repair	m2
	Strengthen	m2
	Replace	m2
Overbridges, excluding BG3 (>£100k)	Preventative	m2
	Repair	m2
	Strengthen	m2
	Replace	m2
Overbridges BG3 (>£100k)	Strengthen	m2
	Replace	m2
Footbridge (>£100k)	Preventative	m2
	Repair/strengthen	m2
	Replace	m2
Earthworks (>£100k)	Preventative	m2
	Repair	m2
Coastal and estuarial defence (>£100k)	Preventative	Linear metre
	Repair	Linear metre
Culverts (>£50k)	Preventative	m2
	Repair	Linear metre
	Replace	Linear metre
Retaining walls	Preventative	m2
	Repair	m2
	Replace	m2
Tunnels	Preventative	m2
	Repair	m2
Other		Number of projects

3.4 Signalling

3.4.1 Signalling unit costs are measured using Signalling Equivalent Units (SEUs). An SEU is defined as each output function controlled by an interlocking. It does not include input functions such as axle counters and track circuits. Output functions are:

(a) Every signal, including ground position light/shunt signals and subsidiary signals but not banner repeaters since they do not require a separate control function within the interlocking.

(b) Shunter's plungers, TRTS plungers, ground frames, and any other attributes that require a particular control function within the interlocking.

(c) Each controlled point end (i.e. every point motor, and including controlled trap points and derailers).

(d) Level crossings.

3.4.2 In 2003 Halcrow undertook a review of the robustness of the Signalling Equivalent Unit (SEU) costs used to develop Network Rail's Business Plan. This concluded that the collection of data was accurate, although it was done on an *ad hoc* basis rather systematically. This approach worked reasonably well due to the limited

number of schemes (around 10 to 15) which are included within that analysis. We recommend a more systematic approach is required for the identification and reporting of SEUs, which would generate sufficient justification of the SEUs to form an audit trail.

3.4.3 As with the track and structures measures, the SEU concept has been in use within Network Rail for several years and baseline unit costs for 2003/04 exist, however it should be noted that establishing a baseline unit cost is not straightforward because:

(a) Re-signalling schemes often cover more than one financial year; and

(b) Few re-signalling schemes are undertaken in any year.

3.4.4 Network Rail will need to take care to ensure that the signalling unit costs are representative of re-signalling costs incurred in each year.

3.5 Data quality

3.5.1 The key concern is the robustness of the process used to collect the existing renewals unit cost information. The procedural documentation that has been provided by Network Rail lists the unit cost definitions for which information is currently collected.

3.5.2 It is not clear what systems are used to collect this information but we would expect that they would be collated using a similar process to that used to populate the renewals volumes in the Annual Return. These are less than robust as evidenced by Network Rail's comments in the 2004 Annual Return regarding M20 (track renewal activities): "systems are not as robust as we would like (but we are developing them) and there are uncertainties for example in the amount of work undertaken by IMCs and as part of larger projects".

3.6 Regulatory reporting

3.6.1 Track and Civils unit costs were presented by Network Rail in the Annual Return 2005 as an index baselined against 2003/04 and as composite rates. Signalling unit costs were not included in Annual Return 2004/05 as no SSI schemes were delivered in 2004/05.

3.6.2 Network Rail expects that unit costs for Track and Civils will be presented in similar formats in Annual Return 2006, representing:

(a) £665m (95%) of total Track investment in 2005/06; and

(b) £175m (60%) of total Civils investment in 2005/06.

3.6.3 Subject to agreement between Network Rail and ORR, more detailed and commercially sensitive data is likely be available directly to ORR supporting the data published in the Annual Return 2006.

4 Cost Analysis Frameworks

4.1 Introduction

4.1.1 Network Rail has developed a new process for monitoring renewals and enhancement unit costs in order to (a) improve the accuracy and consistency of its business planning and estimating and (b) to drive efficiency improvement.

4.1.2 In order to achieve this, the costs of planned or actual work – along with the relevant technical and contextual attributes of the work – need to be collected and stored in a consistent and repeatable way in sufficient volumes and detail so that they might be used for analysis and reporting.

4.1.3 The CAF process and RIB, the associated information system, are designed to deliver this unit cost monitoring function.

4.2 Data structure

4.2.1 The data structure of the Cost Analysis Framework includes:

(a) Standard cost breakdown structure (CBS). This is a hierarchical breakdown of all types of cost incurred in railway investment projects with associated units and methods of measurement for each cost item. The CBS defines the inputs to projects. It has the potential to evolve into a standard method of measurement (SMM) for railway engineering.

(b) Repeatable work items (RWI). These are the highest level of distinct and repeatable work activities which are performed in railway investment projects. The RWI defines the outputs of projects at a high level; the relatively large volumes of data generated for an RWI means it has the potential to be useful for reporting unit cost data.

(c) Definition of standard cost elements (SCE). Each RWI is broken down further into constituent repeatable work activities, called SCE. The SCEs define the outputs of projects at a lower level which means, whilst there are lower volumes of data, it is useful for providing cost insight. There are also 'generic cost elements' which capture indirect costs and the direct costs that form the balance of the cost of the work on the project not captured in the SCEs.

(d) Technical parameters (TP) are used to profile the key characteristics of each RWI, and are also used in the calculation of project metrics.

(e) Metrics are defined for each RWI for project performance comparisons and data for cost modelling in the early stages of project development.

(f) Project characteristics (PC) describe the overall context in which the work was performed, such as the accessibility of the work site or traffic patterns. Some of these characteristics are likely to be significant cost drivers (i.e. factors that have a significant influence on the productivity of the work) and will be therefore be useful for explaining inconsistent unit cost data or development of cost models.

4.2.2 The definition of each CAF is recorded in one of six 'CAF Design' documents, one document for each renewals asset class (civils, electrification & plant, estates, signalling, track, telecoms).

4.3 People, Processes and Information Systems

Collection

4.3.1 The CAF process itself is described in a Standard Operating Procedure issued by the MP&I Estimating and Cost Analysis team.

4.3.2 The key steps of the collection process are:

(a) Level of cost reporting. Projects are reported at RWI level (high-level cost reporting), SCE level (low-level cost reporting) or no cost reporting at all (for one off projects with little prospect of repeatability). The criteria for deciding if cost reporting is to be at RWI or SCE level is not in the standard operating procedure, but Category A projects are expected to be reported at the more detailed SCE level.

(b) Baseline Report. A project cost analysis template, implemented in Microsoft Excel, is available for each CAF. At GRIP stage 4 or 5, an 'as designed' unit cost report is generated for each project. The Estimator, in consultation with the project team, completes the appropriate CAF template(s) using the project estimate, technical work scope, specification and remit. The Baseline Report is submitted to the HQ Senior Cost Analyst for review. The data on the CAF template(s) is hand keyed into the cost database, called RIB (see section 2.4).

(c) Project Profiling. Using the Baseline Report, the HQ Senior Cost Analyst identifies if the project is suitable for inclusion in the unit cost benchmark for regulatory reporting. The criteria for deciding if the project is to be included are not specifically defined, but involves judgement as to whether the project is typical of the repeatable work item and does not represent an 'unusual case' which would distort the unit cost benchmark. This decision, though necessary if the benchmark is to be used to monitor trends, will directly influence the level of unit costs reported to ORR. We recommend that the basis for this decision is clearly documented to provide an audit trail.

(d) Actual Cost Report. At completion of the project, the Quantity Surveyor completes a further CAF template to create an 'as built' unit cost report. This is submitted to the HQ Senior Cost Analyst for hand keying into RIB.

Storage

4.3.3 RIB Software AG is a German-based company which produces the RIB Construction Suite, an enterprise resource planning (ERP) system for construction projects. Over 10,000 organisations use RIB software including global engineering firms such as Fluor, Kajima, Hochtief, Foster Wheeler and Bilfinger Berger. In the UK, RIB is used by firms such as Westinghouse, Birse Rail and WS Atkins. The RIB Construction Suite comprises of Planning, Estimating, Controlling and Reporting modules to support the construction project lifecycle including cost planning, value engineering, bill of quantities, estimating, procurement and contract cost management.

4.3.4 Network Rail is implementing parts of the RIB Construction Suite to support the particular needs of the CAF project; Network Rail is also investigating the use of RIB for post-contract cost management.

4.3.5 Our review of the system suggests that:

(a) Hand keying data into RIB from the Excel CAF template is obviously inefficient. Network Rail noted future development work might include electronic upload of this data.

(b) Whilst the user interface is not so intuitive that it is usable without training, very limited training will enable engineers and others to interrogate the system for cost data. Ultimately, this will become less of a problem, as the unit cost data will be used to support cost models, which engineers will be able to use directly in the early development of projects prior to the involvement of Estimators; thus RIB will have fewer direct users anyway.

(c) The current implementation of RIB does not support reporting functions – data is manually exported. This is not a problem whilst there is little data in RIB nor cause to report the data for analysis, but using manual export of data is likely to be inefficient and possibly prone to error once the full suite of RWIs and CEs is to be reported for the Annual Return. Network Rail noted future development work might include implementation of RIB reporting functionality.

Reporting

4.3.6 The unit cost benchmark will be based on the RIB data sourced from Actual Cost Reports ('as built') not the Baseline Reports ('as designed'). It should be noted that the unit cost benchmark, quite sensibly, will not contain costs from projects where

the work is assessed as unrepresentative of a particular RWI for the purpose of monitoring unit cost trends (para 3.2.2(c) above).

4.4 Roll-out

4.4.1 The roll-out process is being managed by the MP&I Estimating and Cost Analysis team using:

(a) A standard operating procedure describing the CAF process for projects in the current portfolio, i.e. for projects which have started prior to CAF roll-out.

(b) A CAF implementation programme showing the key dates for complying with the standard operating procedure.

(c) Individual implementation plans for each asset class/ portfolio which will – once completed and agreed with MP&I programme managers – show the level of cost reporting expected and due dates for the baseline report and actual cost report for every project in the current portfolio.

(d) A computer-based training package, taking 1-2 hours, to brief employees of the concepts, structure, tools, processes and roll-out of CAF.

4.4.2 At the time of our review, progress was behind the implementation programme. A few Actual Cost Reports had been delivered as part of a pilot exercise but none have been generated as part of the roll-out.

4.4.3 Network Rail noted that the original implementation programme had not reflected the degree of change management necessary to roll-out the CAFs and that significant effort was now being made to align the planning and reporting process with the CAF programme. The roll-out is now substantively back on programme.

4.5 Coverage

4.5.1 We have reviewed the 'CAF Design' documentation. In general, we would note that the CAFs appear to be comprehensive, apart from:

(a) Track drainage RWI (402), which is still to be developed.

(b) Work Types in the Telecoms CAFs, which we recommend should be reviewed. Presently, 'Renewal' is the only Work Type available to categorise Telecoms renewals, whereas we believe Telecoms investment has the potential to have considerably differing unit costs; for example, refurbishment or complete renewal of a cable route would have significantly different underlying costs.

4.5.2 Notwithstanding the exceptions in the paragraph above, the other repeatable work items, cost elements, technical parameters, metrics and project characteristics are

clearly documented and cover much of the work items we would have expected. Individual comments on the 'CAF Design' documents are shown in Appendix A.

4.5.3 In its CAF implementation plan (issued to us 12/12/05), Network Rail forecasted that the CAFs would cover a significant proportion of total expenditure in the project implementation portfolio, as detailed in the table below.

Asset/CAF	Network Rail forecasts of project spend to be reported through CAF as a % of total planned project AFC (all years)
Civils	60%
E&P	91%
Estates	80%
Signalling & Telecoms (note 1)	90%
Track	95%

Note 1: only combined data is available for this forecast

4.5.4 This forecast represents an estimate of the fullest extent of CAF coverage in future years using the current CAF definitions and procedures; estimates for 2005/06 are shown in section 4.7 below. This would meet Network Rail's aspiration to report greater than 80% of its spend within the CAF unit cost framework.

4.6 Data quality

4.6.1 As noted in section 2.4, no CAF data was available for audit.

4.7 Regulatory reporting

4.7.1 In discussion with Network Rail, we would expect some renewals unit costs at RWI level to be available to support the Annual Return 2006. This will be dependent on the volume and stability of data available in this first year of implementation.

4.7.2 In its CAF implementation plan (issued to us 12/12/05), Network Rail forecasts that there will be varying amounts of data available for E&P, Estates, Signalling and Telecoms CAFs for 2005/06:

(a) £9m (17%) of total Electrification investment in 2005/06;

(b) £56m (41%) of total Estates investment in 2005/06;

(c) £32m (11%) of Signalling and Telecoms investment in 2005/06 (only combined data is available for this forecast).

4.7.3 However, there will not be sufficient stable data for all RWIs, as some activities will not have been carried out at all in 2005/06 and others will not have sufficient sample sizes.

4.7.4 Information on unit costs for each RWI will be available to ORR, supporting any data published in the Annual Return 2006.

5 Maintenance Unit Costs

5.1 Introduction

5.1.1 Network Rail has developed a process for monitoring maintenance unit costs in order to (a) improve business planning and (b) to drive efficiency improvement.

5.1.2 In order to achieve this, the maintenance unit cost (MUC) process has been developed, along with a bespoke information system to source data from the maintenance work management system (MIMS) and financial system (BMIS).

5.1.3 This process has currently been rolled-out for eighteen work activities (fifteen track MUCs and three signalling MUCs). The direct maintenance costs managed by track (P'way) and signalling (S&T) teams in the Maintenance Delivery Units are therefore allocated to either a specific MUC or to 'Other Track' and 'Other Signalling' categories.

5.1.4 The process is expected to be expanded to cover further maintenance unit costs in 2006/07.

5.2 Data structure

5.2.1 The data structure of the Cost Analysis Framework includes:

(a) A MIMS Code to identify each MUC, which is mapped against a defined list of more detailed maintenance activities, called "MIMS Level 3 Items". The MIMS Code is used to identify the type of work done, the hours of direct labour used for the work (Category A1 staff and labour subcontractors only) and the units of work delivered.

(b) A BMIS Project Code to identify each MUC, to which costs can be allocated using requisition and invoicing processes; this includes materials drawn from central stores/ minor stocking points and bulk materials delivered by National Delivery Services (NDS). These are the inputs to the maintenance activity. The costs of Category A staff and labour subcontractors, however, are not allocated to the Project Code for each MUC, but are aggregated separately (as payroll costs and in a further Project Code, respectively) so that they can be later allocated directly to each MUC in accordance with the proportion of time spent on each maintenance unit cost, using the data from MIMS.

(c) A BMIS Cost Centre to identify the team responsible for the cost; there are Cost Centres for the P'way and S&T teams in each Maintenance Delivery

[1] Direct maintenance labour employed directly by Network Rail.

Unit for direct costs; an overhead code for each maintenance delivery unit is used to identify indirect costs.

5.2.2 The definition of the MIMS Level 3 Items, Project Codes and Cost Codes are in the maintenance instructions (for MIMS) and the financial regulations (for BMIS). Network Rail Company Specification FRM702 *Reporting of Maintenance Unit Costs* defines (a) the MIMS Codes for each MUC in terms of work units, activity description and the constituent MIMS Level 3 Items and (b) the cost allocation and reporting rules.

5.3 People, Processes and Information Systems

5.3.1 Maintenance Delivery Unit accountants are responsible for ensuring the correct attribution of costs to BMIS Project Codes and Account Codes. This often involves the process of running journals in BMIS to re-allocate costs, as:

(a) The form of some contracts (e.g. national, term or bulk contracts) mean that invoices cannot allocate the proportion of cost to each MUC; this is particularly an issue for hired on-track machines and road rail vehicles. Network Rail noted that changes to requisitioning and contracting practices are being investigated to reduce this problem.

(b) Bulk materials delivered by NDS, often in advance of works, are currently charged as a single cost per period per Area. NROL, an information system on the Oracle platform, is currently being rolled-out by NDS to better manage the materials ordering process. NROL does not currently support requisitioning by Project Codes to support the MUC process, but Network Rail noted that further development of the NROL system may be undertaken to better support the MUC process.

(c) Materials are requisitioned by maintenance teams from central stores at Worcester or minor stocking points, which are managed by contractors Exel and URL, using an on-line form to attribute the withdrawn materials to Project Codes. There are a few minor stocking points which are not currently cabled/ networked; a paper-based process is used at these locations.

5.3.2 Team supervisors in the Maintenance Delivery Units are responsible for reporting work progress in MIMS, including the type of work done, the hours of direct labour used for the work (Category A staff and labour subcontractors only) and the units of work delivered.

5.3.3 HQ staff run year-to-date reports from MIMS two weeks in arrears for each period so that standardised reports are available on Monday of week 3 in each period. This process is necessary to ensure standardised data is used across the business, as MIMS does not have the facility to terminate data input sessions for each period. HQ staff also run BMIS reports to source cost data each period.

5.3.4 A bespoke Visual Basic macro, developed by the Finance Shared Services team in Microsoft Excel, is used each period by HQ staff to merge the BMIS and MIMS reports to produce unit cost data. This data is sent to each Maintenance Delivery Unit for confirmation.

5.3.5 The results are reported in tabular and graphical formats by the Visual Basic macro; a rolling selection of six MUCs is reported in the MBR (Monthly Business Review) pack which is subsequently reviewed at Board-level.

5.4 Roll-out

5.4.1 The MUC process has been rolled out for eighteen unit costs and data is being collected. However, Network Rail states that the data is not currently of sufficient quality to support an audit.

5.4.2 The Maintenance NST (national specialist team) is currently managing a MIMS Improvement Project to provide a framework for improving and monitoring data quality in MIMS. A BMIS/MUC User Group is currently addressing the challenges of cost allocation in BMIS.

5.4.3 Notwithstanding this, we have not been able to source a programme or plan which identifies (a) the expected actions and milestones for improving data quality to a sufficient for regulatory reporting/audit or (b) the expected extension of the MUCs to cover other maintenance work activities.

5.5 Coverage

5.5.1 We have reviewed the Network Rail Company Specification FRM702 *Reporting of Maintenance Unit Costs*. In general, we would note that:

(a) The definition of the MUCs is clear, in terms of costs and work activities (MIMS Level 3 Items). The MIMS Level 3 Items appear to cover the activities we would expect in each of the eighteen MUCs but are open to local interpretation, which may affect the stability of the resulting unit costs. We recommend that consideration should be given to further description of these activities to reduce the opportunity for local interpretation. Individual comments are provided in Appendix B.

(b) The eighteen MUCs are restricted to track and S&T maintenance, covering 60.2% of track spend and 37.2% of S&T spend (in Period 6 2005). The MUC portfolio will need to be expanded to maintenance of other assets and to cover a great proportion of the track and S&T spend. For example, we recommend that consideration should be given to adding level crossings as a further unit cost as they are significant assets of a modular nature which are subject to regular and systematic maintenance, making them amenable to unit cost monitoring.

5.6 Data quality

5.6.1 As noted in section 3.4, Network Rail has stated that the data generated is currently not of sufficient quality to support regulatory reporting or auditing.

5.6.2 However, Network Rail is making progress. The level of completion of data fields in MIMS has increased since initial roll-out, with 90% and 89% improvements in completion of MIMS Work Orders for staff hours and work units respectively.

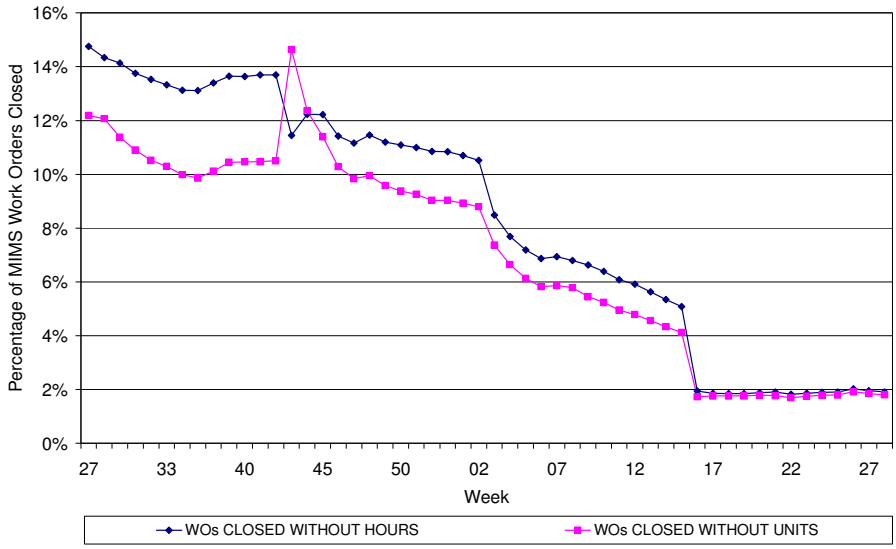

Figure 3.1: Percentage of MIMS Work Orders closed without hours or units

5.6.3 Completion of the data fields, however, exposes clear disparities in reporting between areas and territories in terms of volumes, costs and hours. Network Rail noted these are largely driven by (a) differences in interpretation/ misallocation of time to the MIMS Level 3 Items driven by local work practices and (b) difficulties in completing the task of cost allocation, particularly for NDS, materials and plant.

5.6.4 The items under point '(a)' above are likely to be solved by systemic changes, such as implementing NROL and different requisitioning/ invoicing practices. The items under point '(b)' above are likely to be solved by standardising work activities across the maintenance teams which may prove more challenging.

5.7 Regulatory reporting

5.7.1 The suite of eighteen MUCs is in place and Network Rail is working on improving data quality. Network Rail does not yet have clear view as to how many of these MUCs – and in how many Areas – will be sufficiently robust and stable through the last quarter of 2005/06 to form benchmarks for subsequent trend analysis; however, it is clear that it will not be all MUCs in all Areas.

5.7.2 Network Rail does not propose to publish individual unit cost rates in the Annual Return, which will contain Network Rail's commentary on progress towards its implementation of a unit cost monitoring process for maintenance expenditure. However, subject to agreement between Network Rail and ORR, the full MUC dataset will be available directly to ORR, with supporting commentary and caveats as appropriate.

6 Conclusions

6.1 Background and remit

6.1.1 In December 2004, Network Rail provided ORR with proposals for the monitoring of its progress against the ACR2003 efficiency assumptions.

6.1.2 Network Rail has now developed a Cost Analysis Framework (CAF) process for monitoring renewals unit costs and has developed a Maintenance Unit Cost (MUC) process for monitoring the unit costs of maintenance activities. At the time of writing, both are in the process of being rolled-out and bedding-in.

6.1.3 ORR asked Halcrow, as Independent Reporter, to undertake a review of Network Rail's progress in rolling out the unit cost measures (CAFs and MUCs). The purpose of this review was to provide ORR with a good understanding of the coverage and quality of unit cost data that is likely to be generated for 2005/06 and reported in the 2006 Annual Return.

6.2 Renewals

Existing unit cost measures – Track, Civils and Signalling data in Annual Return 2006

6.2.1 The existing unit cost measures for Track, Civils and Signalling were reported in Annual Return 2005; we fully expect them to be produced for Annual Return 2006.

Development of new unit cost measures (CAF)

6.2.2 We have reviewed the 'CAF Design' documentation, which cover all asset classes. In general, we would note that the CAFs appear to be comprehensive. With a few exceptions, the repeatable work items, cost elements, technical parameters, metrics and project characteristics are clearly documented and cover much of the work items we would have expected. We have made individual comments on the 'CAF Design' documents are shown in Appendix A comments.

6.2.3 Network Rail has made considerable progress in delivering comprehensive renewals unit cost measures but does not expect to meet its planned timescales to "complete data collection in 2005/06 with indices and benchmarks set for all identified activities for the Annual Return 2006".

CAF data in Annual Return 2006

6.2.4 In discussion with Network Rail, we would expect some renewals unit costs at RWI level to be available to support the Annual Return 2006. This will be dependent on the volume and stability of data available in this first year of implementation.

6.2.5 In its CAF implementation plan (issued to us 12/12/05), Network Rail forecasts that there will be varying amounts of data available for E&P, Estates, Signalling and Telecoms CAFs for 2005/06:

(a) £9m (17%) of total Electrification investment in 2005/06;

(b) £56m (41%) of total Estates investment in 2005/06;

(c) £32m (11%) of total Signalling and Telecoms investment in 2005/06 (only combined data is available for this forecast).

6.2.6 However, there will not be sufficient stable data for all RWIs, as some activities will not have been carried out at all in 2005/06 and others will not have sufficient sample sizes.

6.2.7 Subject to agreement between Network Rail and ORR, the CAF data will be available directly to ORR, supporting any data published in the Annual Return 2006.

6.3 Maintenance

Development of new unit cost measures (MUC)

6.3.1 We have reviewed the Network Rail Company Specification FRM702 *Reporting of Maintenance Unit Costs*. In general, the definition of the MUCs is clear, in terms of costs and work activities (MIMS Level 3 Items) but the MIMS Level 3 Items themselves are open to local interpretation, which may affect the stability of the resulting unit costs. Individual comments are provided in Appendix B.

6.3.2 Network Rail has made considerable progress in delivering comprehensive maintenance unit cost measures.

MUC data in Annual Return 2006

6.3.3 The suite of eighteen MUCs is in place and Network Rail is working on improving data quality. Network Rail does not yet have clear view as to how many of these MUCs – and in how many Areas – will be sufficiently robust and stable through the last quarter of 2005/06 to form benchmarks for subsequent trend analysis; however, it is clear that it will not be all MUCs in all Areas.

6.3.4 Network Rail has stated that data for MUCs is not likely to be published in the Annual Return 2006, which will contain Network Rail's commentary on progress towards its implementation of a unit cost monitoring process for maintenance expenditure. However, subject to agreement between Network Rail and ORR, the full MUC dataset will be available directly to ORR, with supporting commentary and caveats as appropriate.

7 Appendix A: Comments on CAF documentation

Reference	CAF Element	Comment
101 Signalling System	Metrics; Number of RWI (SEU)	Guidance will be required if the number of SEUs is to be correctly measured for a signalling system – clearly weighting is required as a level crossing is not comparable to a point end in cost terms but is a single controllable unit.
101-108 Signalling	Work Type	Some of the examples of enhancement works appear to be renewal in modern equivalent form. For example, a geographical route relay interlocking could not be directly replaced by a similar interlocking – it would be replaced by a CBI or SSI which is categorised as an enhancement. Similarly an LED signal head is the modern equivalent of a filament lamp signal head yet it is mentioned as an example of enhancement. Perhaps further guidelines are required.
108 Level Crossings	Work Type	Level crossings are subject to reassessment when works are carried out. There may be a need to include a further Work Type for level crossings "Renewal to meet current legislation and /or HMRI requirements".
204 Transformer Rectifiers	Metric	This item requires more definition in order to get a consistent metric. Where a transformer only is replaced this clearly counts as 1 unit. But if a Transformer/Rectifier is replaced, does this count as 1 or 2 units? If a Rectifier is replaced but its associated Transformer is not, is this 1 or ½ unit?
202 25kV Switchgear	Standard Cost Element	Consideration should be given to identifying Earthing as a separate cost element.
208 HV Switchgear (3 Phase) – Electrification	Standard Cost Element	Consideration should be given to identifying Earthing as a separate cost element.
303 HV Switchgear (3 Phase) – Fixed Plant	Standard Cost Element	Consideration should be given to identifying Earthing as a separate cost element.
202 25kV Switchgear	Technical Parameter	Technical Parameters should include Modularised as in 204 Transformer/rectifier.
208 HV Switchgear (3 Phase) – Electrification	Technical Parameter	Technical Parameters should include Modularised as in 204 Transformer/rectifier.
303 HV Switchgear (3 Phase) – Fixed Plant	Technical Parameter	Technical Parameters should include Modularised as in 204 Transformer/rectifier.
205 HV Cables	Technical Parameter	In the Technical Parameters 'cable type' list Cu/Al/XLP are not mutually exclusive, it is recommended that XLP is deleted.
205 HV Cables	Technical Parameter	In the Technical Parameters 'recovery method type' should include a Permissible value of 'No Recovery for situations when the cable is left in situ.
401-403 Track	All	Non-ballasted track is not mentioned. Appropriate items should be included for this type of track.
401 Plan Line	Spacing of Sleepers	The spacing of sleepers is defined as a number per 60ft length of rail. Consideration should be given to using metric units of the actual spacing, preferably in accordance with spacings defined in RT/CE/S/102.
402 Drainage	All	The drainage RWI has not been developed yet.
501-509 Telecoms	Work Type	It appears that although the basic framework for telecoms has been agreed, the breakdown of work types has yet to be finalised. This would have significant impact on some RWIs, eg 508 Route Works & Cable Renewals as a renewal *versus* refurbishment. The telecoms CAFs are not yet complete.
Generic: Complexity of Location	Project Characteristic	These do not appear to be mutually exclusive, eg how is a complex junction on high speed line categorised? It might be clearer to split the attributes: • High Speed Line or Conventional Line; • Plain Line or Simple Junction or Complex Junction; • High Density Traffic or Light Traffic.
Generic: Work Activity	Project Characteristic	Strengthen is not a valid option for all assets, eg signalling systems.

8 Appendix B: Comments on MUC documentation

Reference	Comment
Track: Ultrasonic Inspection of Rail	Ultrasonic Inspection of Rail does not specifically mention the testing of welded joints, although it may well be implied.
Track: Rail Changing	Items include Grinding rails and welds to profile. Grinding of rails to profile could imply grinding using a dedicated on-track machine, which could be considered a maintenance operation in its own right. This needs to be clarified, since there is an order of magnitude difference in cost between grinding with hand tools and re-profiling or maintenance grinding using an on-track machine.
Track: Spot Resleepering	The extent of spot re-sleepering possibly needs to be defined. The work needs to be undertaken such that the stability of CWR is not reduced, which would necessitate Stress Restoration or Re-stressing.
Track: Plain Line Tamping	It may be useful to mention any speed restrictions which would have to be enforced following tamping (if any).
Track: Stoneblowing	There is no distinction between plain line and S&C. A number of equivalent units for various types of S&C need to be defined.
Track: Wet Bed Removal	The work needs to be undertaken such that the stability of CWR is not reduced, otherwise Stress Restoration or Re-stressing would need to be included here.
Track: S&C Tamping	The unit costs involved in tamping a number of separate turnouts and diamonds in close proximity to each other may be vastly different to tamping an isolated crossover. This does not appear to be allowed for in the simple unit allocations. Also, there is no distinction between different switch types, for which the degree of accuracy and overall workload will vary.
Track: Weld Repairs of Defective Rails	The title could be changed to Defective rails in Plain Line, as distinct from S&C.
Track: Manual Correction of Plain Line Track Geometry and Reprofiling of Ballast	No allowance is made for additional ballast to be brought to site and distributed onto the track if required. This may be covered under additional good practice activities, but is not listed. This is equally true of plain line and S&C tamping.
Track: General	Consideration should be given to using consistent (metric) units throughout.
Signalling: General	Level crossings are significant assets of a modular nature which are subject to regular and systematic maintenance, making this amenable to unit cost monitoring; consideration should be given to adding level crossings as a further measurable unit cost.
Signalling: General	The density of equipment varies greatly over the country and a large part of the cost of maintenance is the travelling time to site and between assets on site. The geographical characteristics of a Territory/ Area/ MDU will remain largely constant with time, so unit costs will comparable year-on-year but will not necessarily be comparable between Territories, Areas or MDUs.

9 Appendix C: Recommendations from the text

Reference	Recommendation from the text
Existing Renewals Unit Cost Measures: Para 3.3.6	In general, the structures measures cover the majority of maintenance and renewals activities that we would expect Network Rail to be undertaking. In light of this we are surprised that only 50% of structures renewals expenditure is covered by these measures (2003/04 figures). We understand that this may be because the unit cost measures only cover schemes that have a cost in excess of £50k or £100k. We recommend that Network Rail separately reports the same unit cost measures for projects that fall below the expenditure thresholds. Due to economies of scale the average unit costs for these activities are likely to be higher than for the larger projects.
Existing Renewals Unit Cost Measures: Para 3.4.2	We recommend a more systematic approach is required for the identification and reporting of SEUs, which would generate sufficient justification of the SEUs to form an audit trail.
Cost Analysis Frameworks: Para 4.3.2(c)	Project Profiling. Using the Baseline Report, the HQ Senior Cost Analyst identifies if the project is suitable for inclusion in the unit cost benchmark for regulatory reporting. The criteria for deciding if the project is to be included are not specifically defined, but involves judgement as to whether the project is typical of the repeatable work item and does not represent an 'unusual case' which would distort the unit cost benchmark. This decision, though necessary if the benchmark is to be used to monitor trends, will directly influence the level of unit costs reported to ORR. We recommend that the basis for this decision is clearly documented to provide an audit trail.
Cost Analysis Frameworks: Para 4.5.1(a)	We have reviewed the 'CAF Design' documentation. In general, we would note that the CAFs appear to be comprehensive, apart from Track drainage RWI (402), which is still to be developed.
Cost Analysis Frameworks: Para 4.5.1(b)	We have reviewed the 'CAF Design' documentation. In general, we would note that the CAFs appear to be comprehensive, apart from Work Types in the Telecoms CAFs, which we recommend should be reviewed. Presently, 'Renewal' is the only Work Type available to categorise Telecoms renewals, whereas we believe Telecoms investment has the potential to have considerably differing unit costs; for example, refurbishment or complete renewal of a cable route would have significantly different underlying costs.
Maintenance Unit Costs: Para 5.5.1(a)	We have reviewed the Network Rail Company Specification FRM702 Reporting of Maintenance Unit Costs. In general, we would note that the definition of the MUCs is clear, in terms of costs and work activities (MIMS Level 3 Items). The MIMS Level 3 Items appear to cover the activities we would expect in each of the eighteen MUCs but are open to local interpretation, which may affect the stability of the resulting unit costs. We recommend that consideration should be given to further description of these activities to reduce the opportunity for local interpretation. Individual comments are provided in Appendix B.
Maintenance Unit Costs: Para 5.5.1(b)	We have reviewed the Network Rail Company Specification FRM702 Reporting of Maintenance Unit Costs. In general, we would note that the eighteen MUCs are restricted to track and S&T maintenance, covering 60.2% of track spend and 37.2% of S&T spend (in Period 6 2005). The MUC portfolio will need to be expanded to maintenance of other assets and to cover a great proportion of the track and S&T spend. For example, we recommend that consideration should be given to adding level crossings as a further unit cost as they are significant assets of a modular nature which are subject to regular and systematic maintenance, making them amenable to unit cost monitoring.

10 Appendix D: Meetings and information requests

Meetings and information requests	Date
Meeting: Hannah Nixon (ORR Regulatory Economist), Dan Boyde (Network Rail Strategic Planning Manager), Duncan Mills (Halcrow), Vidhi Mohan (Halcrow)	04/10/05
Meeting: Mark Diviani (Network Rail Head of Estimating), John Stretch (Network Rail Chief Estimator), Paul Wiseman (Network Rail Head of Investment Efficiency), Dan Boyde (Network Rail Strategic Planning Manager), Duncan Mills (Halcrow), Vidhi Mohan (Halcrow)	12/10/05
Meeting: Andy Chappell (Network Rail Territory Maintenance Director), Andy Whitaker (Network Rail Acting Financial Controller, Maintenance), Erwin Klumpers (Network Rail Senior Financial Analyst, Maintenance) , Dan Boyde (Network Rail Strategic Planning Manager), Duncan Mills (Halcrow), Vidhi Mohan (Halcrow)	14/10/05
Meeting: Erwin Klumpers (Network Rail Senior Financial Analyst, Maintenance) , Duncan Mills (Halcrow), Vidhi Mohan (Halcrow)	20/10/05
Meeting: John Stretch (Network Rail Chief Estimator), Robin Hamilton (Network Rail Senior Cost Analyst), Peter Bryans (Network Rail Strategic Planning Analyst), Duncan Mills (Halcrow), Vidhi Mohan (Halcrow)	26/10/05
Info request: Erwin Klumpers (Network Rail Senior Financial Analyst, Maintenance)	08/11/05
Info request: John Stretch (Network Rail Chief Estimator)	09/11/05
Additional information: Paul Wiseman (Network Rail Head of Investment Efficiency) and Erwin Klumpers (Network Rail Senior Financial Analyst, Maintenance) via Dan Boyde (Network Rail Strategic Planning Manager).	09/12/05 & 12/12/05 16/12/05