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CN030 - Operational Analysis of Train Service Performance

Independent Reporter Findings

24 June 2014
Final Report

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Contents

Introduction

This is the Final Report from the Operational Analysis of Train Service Performance undertaken by Nichols as the Independent Reporter (IR) for mandate CN030. The investigations were undertaken between 6 May and 23 May 2014 and were constrained to the limited time and data available.

Remit

The scope of the remit for mandate CN030 was:

"*For delivery in Quarter 4 2013/14 of the Long Distance and London and South East and Regional sector performance recovery plans and Scotland further improvement plan, we require the Reporter to address the following objectives:*

1. Confirm that the milestones committed to in the Base+ and Base++ plans were delivered.

2. Confirm that the plans were adjusted as required to reflect changing circumstances such that Network Rail continued to do everything reasonably practicable to achieve its regulatory performance outputs.

3. Investigate the amount of planned maintenance vs. maintenance delivered in order to demonstrate the capability for NR to manage the railway including, but not limited to, understanding of the impact of the recent storms and floods on delivery of maintenance."

Methodology

A draft methodology was developed by the IR and reviewed at the kick-off meeting on 6 May 2014, attended by representatives of the ORR, NR and the IR, and it was subsequently amended in consultation with the ORR and NR to reflect the availability of data and the short timescales to carry out analysis work.

Objectives 1 & 2 - Delivery of Base+ and Base++ and adjustments of plans

Carry out a range of related analyses as summarised below:

1. Compare the MAA PPM pattern by sector throughout CP4, with particular focus on 2013/14, of:

    a. Inputs delivered (i.e. plans and milestones delivered and expenditure incurred)

    b. Outputs achieved (i.e. MAA PPM, delay minutes, incidents, dpi).

2. Review the delivery of each Base + and Base++ workstream to establish the extent and rate at which schemes were validated and accepted by Routes into Base plans.

3. Review the overall size of the iPAT database and the rate at which new schemes were introduced and the total number of schemes was amended.

4. Informally compare the findings from the analyses above with the experience of one or two Route teams and TOC teams in the field in order to validate emerging conclusions.

Objective 3 – Planned maintenance v maintenance delivered

1. Compare the pattern, for the last 2 years of CP4, of planned maintenance v maintenance delivered using some of the following input and output measures (v plan where applicable):

    a. Inputs delivered (i.e. maintenance expenditure, maintenance tasks completed, levels of backlog, maintenance possessions delivered)

    b. Outputs achieved (i.e. asset related delay minutes, incident counts and dpi).

2. Review and compare with findings from above with the experience and evidence gathered in the field from at least one maintenance depot.

Approach

A number of face-to-face discussions with key NR personnel were held and a range of data already held by the ORR or supplied by NR were examined and further analysed by the IR as summarised below:

Objectives 1 & 2 - Delivery of Base+ and Base++ and adjustments of plans

1. The emerging MAA PPM was plotted for CP4 against Regulatory Outputs and initial recovery plan forecasts for LD, LSE and Regional sectors in order to establish the points in 2012/13 and 2013/14 at which the gap between forecast and emerging MAA PPM began to widen significantly.

2. The numbers of Base and Base+ schemes logged in iPAT as 'live' and producing, or forecast to produce, benefits at the end of each quarter of 2012/13 and 2013/14 were plotted in order to establish the extent to which more improvement schemes were planned in response to the gap between forecast and emerging MAA PPM.

3. The suite of NR Sector Recovery Plans and subsequent Quarterly Progress Reports were reviewed in detail in order to establish a general overview of progress from early 2012/13 to the end of 2013/14 and, in particular the extent to which milestones were reported each quarter as having been missed or delivered. Also, the suite of Independent Reporter 'field-test' reports were reviewed to establish which relevant assessments had already been placed on file and accepted by ORR and NR.

4. A small number of informal discussions were held with Route-based performance teams and TOC personnel in order to establish consistency between the overview emerging from the NR Quarterly Progress Reports and the experiences of those managing performance of the operating railway on a day-to-day basis.

Objective 3 – Planned maintenance v maintenance delivered

1. The count of asset-related failures causing attributed delay (i.e. causing >3m delay), the delay attributed and the delay per incident were plotted for CP4 in order to establish any apparent correlation in 2013/14 between increasing numbers of asset failures and the gap between forecast and emerging MAA PPM.

2. The amount of maintenance work delivered v the annual plan for 2012/13 and 2013/14 was examined in order to establish whether any significant shortfall existed. This was done by selecting the 54 (of 110) maintenance activities most critical to asset performance and combining them into 10 groups associated with similar asset types and then plotting maintenance planned v delivered for each of the 10 groups.

3. The amount of outstanding maintenance work and the rate of re-prioritisation of maintenance work during CP4 were examined in order to establish whether any significant shifts in the norms occurred during 2013/14.

4. The number of possessions taken during CP4 was examined in order to establish any significant reduction in 2013/14 which may have been an indication of a reduction in maintenance work carried out, although of course without understanding the split of CapEx, maintenance and shared possessions this was only an indicative assessment.

5. An informal review was undertaken in a key Delivery Maintenance Unit in order to establish consistency between the general levels of work outstanding and reprioritisation reported nationally and the experiences and processes described by those managing front line maintenance work.

6. Note that it was not possible to review actual v planned maintenance spend in 2013/14 because the financial data is apparently not yet available. It would in any case have been difficult to establish from purely financial data whether there had been an under or over-delivery of maintenance because to do so would have required far greater analysis of maintenance efficiency than was possible as part of CN030 mandate.

Findings

Objectives 1 & 2 - Delivery of Base+ and Base++ and adjustments of plans

The findings, based on the approach set out above, were as follows:

1. The most significant widening of the gaps between forecast ('planned') and emerging ('actual') MAA PPM occurred (see analysis in Annex A);
    a. In the Long Distance sector (Figure 1) after p8 of 2012/13,
    b. In the London & South East sector (Figure 2) after p7 of 2012/13
    c. In the Regional sector (Figure 3) after p8 of 2012/13.
2. It would be reasonable to expect to see an increase in the number of performance improvement schemes reported in iPAT around one or two quarters after these periods, as evidence that NR was adjusting its plans to reflect changing circumstances.
3. The numbers of future Base and Base+ schemes reported in iPAT increased most significantly around the end of 2012/13, in Q2 of 2013/14 and again in Q3 of 2013/14 (see Figures 6, 7 and supporting commentary in Annex B). This is taken as being indicative of NR adjusting its performance plans to reflect changing circumstances through identification of further performance initiatives.
4. However, by the start of 2013/14 the MAA PPM forecasts for the end of CP4 were being reported in the NR Quarterly Progress Reports as likely to miss the Regulatory Outputs by a significant and growing margin. The adjustment to performance plans by NR during 2013/2014 was however considerably less than that required to close the widening gap between emerging MAA PPM and Regulatory Outputs; this was as a consequence of the Actual performance in 2012/13 and that it was now too late for new initiatives to close the gap. 2013/14 could be described as a year of 'performance damage limitation'.
5. The delivery of milestones within the Base and Base+ programmes was routinely reported in the NR Quarterly Progress Reports from Q3 2012/13 onwards, see analysis in Annex G. Each quarter there were a significant number of milestones reported as missed against plan. The number of milestones

missed is not consistent with a well-controlled major infrastructure programme. However, the disparate nature of the Base and Base+ programmes and the pressure on Route teams to plan and deliver schemes both combined to create a culture of over-optimism and constant re-planning for slippage.

6. The approach to forecasting of PPM improvements and delay minute savings was consistent throughout 2012/13 and 2013/14. However, it was based on the assumptions (1) that delay minute savings forecasts associated with individual schemes chould be regarded as reasonably robust, could safely be aggregated and translated into PPM improvements and (2) that when an improvement scheme was reported as complete, the forecast savings could be considered to have been delivered in full, the savings would be sustained and that the PPM benefits would materialise. These assumptions are inherently risky as delay minute forecasts are often based on unavoidably subjective judgements (not linked to a deep understanding of where PPM is being lost) and scheme benefits are often not fully materialised (or lost if improved processes are not sustained and revert back). This led to false comfort that the Base and Base+ programmes would largely 'close the gap'. In fact they did not.

7. Discussions with two Route Performance teams and two TOC Director level managers confirmed that belief in the initial forecast benefits for the Base+ and Base++ programmes was slow to build in the Routes. Many of the schemes offered to the Routes for validation and implementation were eventually accepted on the basis that, whilst they were undeniably good things to do, they came with over-optimistic delay minute forecasts.

Objective 3 – Planned maintenance v maintenance delivered

1. The number of asset-related incidents fell considerable throughout CP4 until 2013/14 when it showed an unwelcome increase (see Figures 9 and 11 in Attachments C & D). NR attributes this increase to a large occurrence of GSM-R 'infant mortality' failures and the increased number of TSRs caused by wet weather. This would be of particular concern if there was any evidence of non-delivery of planned maintenance during late 2012/13 or during 2013/14.

2. Taking an 'overall' view of all work types for England & Wales, the amount of maintenance work delivered in 2012/13 and 2013/14 largely appears to have exceeded the plan (see Figure 14 in Attachment E). Figure 14 also illustrates there were major downturns in the amount of work delivered, in both absolute terms and against plan, in Q3 of 2012/13 and particularly in Q3 of 2013/14 as a result of the extreme weather experienced. This is to be expected. The rate of work delivered appears to have recovered well by the end of 2013/14.

3. Although this analysis is based on the graphs contained in Attachment E, it should be regarded as a qualitative macro level conclusion because the 'overall' view is based on a simple mix of the units of maintenance work from within the data provided for the 10 groupings plotted separately in Figures 15 to 24 (e.g. within the grouping for Track Geometry & Formation, units of Track Mile have been mixed

with Track Yard, Rail Yard and Point End to create a notional 'unit of maintenance work') and only in 6 of the 10 groupings did the amount of work delivered exceed the planned work. In the other 4 groupings, the amount of work delivered was lower than planned.

4. There was a significant peak in the Total Work Outstanding (i.e. work beyond its 'do by' date) in Q3 of 2013/14 (see Figure 26 in Annex F). This is consistent with Finding 2 above. Figure 26 also shows there was also a flattening in 2013/2014 of the trend of an increase in the MAA of Total Work Outstanding; the trend of increase in the MAA of Total Work Outstanding which occurred between 2011/12 and 2012/13 appears to have flattened in 2013/14.

5. In Figures 27 and 28 in Annex F there does not appear to have been any increase in the levels of work reprioritisation taking place during 2013/14 which suggests that work was not simply reprioritised to avoid a backlog of Outstanding Work building up.

6. Discussions with the management team at Croydon Maintenance Delivery Unit (see Annex J) confirmed that the findings above were consistent with the experiences and processes reported on the ground. Whilst clearly a very small sample, the depot team at Croydon were confident and optimistic about their ability to deliver the maintenance workload as planned and to continue improving their assets.

Conclusions

Objectives 1 & 2 - Delivery of Base+ and Base++ and adjustments of plans

Mandate questions & IR responses

The questions posed in the mandate and the IR's response are set out below.

1. *Confirm that the milestones committed to in the Base+ and Base++ plans were delivered.*

   The IR's conclusion is that NR was unable to deliver all of the milestones committed to, or subsequently proposed, in the Base+ and Base++ programmes. Significant milestone slippage was reported in most NR Quarterly Progress Reports throughout 2012/13 and 2013/14. See Annex G for supporting analysis.

2. *Confirm that the plans were adjusted as required to reflect changing circumstances such that Network Rail continued to do everything reasonably practicable to achieve its regulatory performance outputs.*

   The IR's conclusion is that performance recovery plans (Base, Base +, Base ++) were adjusted to reflect changing circumstances. See Annex B for the analysis of performance recovery plans and a supporting commentary. For example, in response to the above slippage, NR continued to seek more tactical performance improvement initiatives as the emerging MAA PPM reduced sharply after period 7 and period 8 of 2012/13.

   The IR's view is that in 2013/2014 Network Rail undertook reasonable endeavours to recover performance against its regulatory outputs. In forming this view, the IR considered the following factors:

   1. that the reducing time available to achieve a performance recovery before the end of 2013/14 made the task of delivering the original plan forecasts unachievable and subsequent forecasts were dramatically reduced, especially after the extreme weather of Q3 2013/14. Therefore, the IR's view is that recovery back to regulated outputs is not a reasonable measure of everything practical for

2013/2014 and that effectively delivery of the Base+ and Base++ plans from mid-2012 were all that NR could reasonably have attempted in the time available

2. that there is plenty of evidence that Network Rail continued to be taking action during 2013/2014 to identify and initiate further performance improvement schemes

3. that performance initiatives had over-optimistic benefit forecasts and unattainable assumptions about implementation timescales such that the improvement programmes did not achieve the forecast improvement in performance generally i.e. actions taken did not deliver the anticipated improvement in performance.

Chronological summary of the NR Performance Recovery Programme

1. During mid-2012, NR put in place sensible tactical recovery arrangements to address emerging shortfall in Regulated Outputs. The Base+ and Base++ programmes were key parts of the recovery arrangements and were designed to give "added confidence to JPIP targets and scope for higher achievement at Sector Level".

2. The workstreams within Base+ and Base++ were largely derived from the NTF supported 8-Point Plan (which was developed in late 2011 to improve performance nationally) and further analysis carried out as part of each sector plan. The 8-Point Plan was a largely tactical initiative to inject more improvement schemes which could be jointly developed by NR and TOCs and delivered before the end of CP4. It would not have been appropriate for NR to propose an alternative suite of tactical plans, nor would there have been time to develop and deliver anything more strategic in nature before the end of CP4

3. With good management, resourcing, commitment and leadership from the newly created Performance Board, it was reasonable to assume that the Base+ and Base++ programmes could have largely closed the gap. It is difficult to see how NR could have attempted more.

4. Throughout 2012 and 2013 there was some lack of clarity about exactly which workstreams were part of Base+ and Base++. However, with an emerging suite of essentially R&D type workstreams this was, to a certain extent, inevitable.

5. Although the Base+ and Base++ programmes were based on sound programme management principles and leadership, it took until early 2013, or very much later in some cases, for most of the workstreams to reach the point at which new schemes were ready for validation in the Routes.

6. During the latter half of 2012, the Base+ and Base++ programmes suffered from mixed reception in the Routes. In some Routes, project delivery resource shortages and a lack of enthusiastic commitment to the national Base+ programme (whilst attempting to deliver local JPIPs) was reported, and in other

Routes a clear commitment to innovation with very good project management processes was in evidence

7. In most NR Quarterly Reports of 2012 and early 2013 there was a significant churn in the number of schemes reported in iPAT and a large number of Base+ and Base++ milestones reported by NR as having been missed. This tendency decreased during 2013 as project management disciplines improved and the Base and Base+ programmes stabilised.

8. In 2012 and 2013 NR continued to inject additional funding into performance related schemes. It does not appear that funding was an issue which significantly prevented delivery of schemes.

9. The effect of the conversion from PAT to iPAT (which was part of a wider programme of process improvements) preoccupied Route-based performance teams during late 2012 and early 2013 and led to an unprecedented level of churn in the schemes contained in iPAT. The new iPAT system, whilst demanding and complex as a management tool (and capable of being much improved in subsequent versions), appears to be reasonably fit for purpose (notwithstanding the comments below).

10. Throughout the life of Base+ and Base++ the assumption made that (a) DM benefit forecasts were reasonably robust and (b) that 'a scheme delivered is a DM benefit that is, or will be, banked with certainty' was inherently risky. This led to false comfort that the Base+ and Base++ programmes would largely close the gap.

11. By mid-2013 significant benefits were being reported as a result of Base+ and Base++ in year 5 of CP4, and even more are forecast in year 1 of CP5. However, the late arrival of the Base+ and Base++ schemes, shortfalls in JPIP delivery and some extreme weather and other external events meant that a large and widening gap was opening up.

12. Apart from Base+ and Base++, NR implemented special asset improvement programmes on the West Coast (South) and in LSE and continued to make great progress with severe weather resilience (without which the effect of Q3 2013/2014 extreme weather would have been greater) and funded a number of wider improvement schemes across most Routes.

13. By mid-2013 it became clear that the Regulated Outputs would be missed by a wide and growing margin. The Base+ programme was working reasonably well and the process of development, validation and delivery was properly established. However, by then, there was little else that NR could have reasonably done to close the gap in the short time available

Objective 3 – Planned maintenance v maintenance delivered

Mandate requirement & IR response

The question posed in the mandate and the IR's response is:

3. *"Investigate the amount of planned maintenance vs. maintenance delivered in order to demonstrate the capability for NR to manage the railway including, but not limited to, understanding of the impact of the recent storms and floods on delivery of maintenance."*

After analysing several different factors, the IR's overall view is that NR is generally capable of managing the railway but evidence suggests there are also areas of weakness. The following factors were considered in forming this view:

1. Taking an 'overall' macro level view (see Figure 14 in Annex E), the total amount of maintenance units of work delivered in 2013/14 generally exceeded the total amount of maintenance planned in England & Wales. For six out of the ten categories of maintenance work the 'Actual' number of work units delivered was greater than 'Planned' e.g. see Figure 17 in Annex E. For the other four categories the 'Actual' number of work items delivered was less than 'Planned' e.g. see Figure 16 in Annex E.

   It should be noted that this is a coarse analysis of maintenance work units planned and delivered; there was neither sufficient time or data available to undertake a more thorough and meaningful analysis, which would have typically used number of man hours or cost information.

2. The amount of Total Outstanding Work items has grown throughout years 2, 3 & 4 of CP4, although it has flattened-off in year 5 i.e. 2013/2014. This could indicate that the planned number of maintenance work items is not sufficient to clear the backlog.

3. Taking an 'overall' view for Scotland (see Figure 25 in Annex E), the Actual number of maintenance work units delivered in 2013/2014 was less than the amount of planned units of maintenance work.

4. The trend of a falling asset-related incident count in England & Wales (except for the upturn reported in 2013/14, attributed by NR to GSM-R 'infant mortality' failures and the effect of wet weather on Temporary Speed Restrictions), see Figure 11 in Annex D.

5. The evidence of swift recovery from the temporary adverse effects of Q3 extreme weather on the delivery of maintenance.

Related observations

1. Delay per incident (DPIs for asset-related incidents) has been rising since year 1 of CP4 more sharply than incidents have fallen, and therefore Delay Minutes have risen throughout CP4. NR has concluded that some, but by no means all, of the increase in DMs is caused by growth in traffic above plan. Also, there is evidence that the 'low-hanging fruit' of small delay incidents has understandably been tackled first, before the biggest DPI incidents.

2. The amount of work re-prioritised as a result of which work has avoided becoming (or has been reclassified from) Outstanding has remained steady and relatively low in years 4 & 5 of CP4, although it was significantly higher in years 2 & 3 of CP4.

3. During Q3 of CP4 year 5, there were significant increases in the level of Total Work Outstanding and a significant reduction in the work delivered. This was certainly due to the extreme weather suffered in Q3. However, these significant changes were quickly reversed after the passing of Q3.

Annex A - Analysis of MAA PPM target, planned and actual trajectory by sector

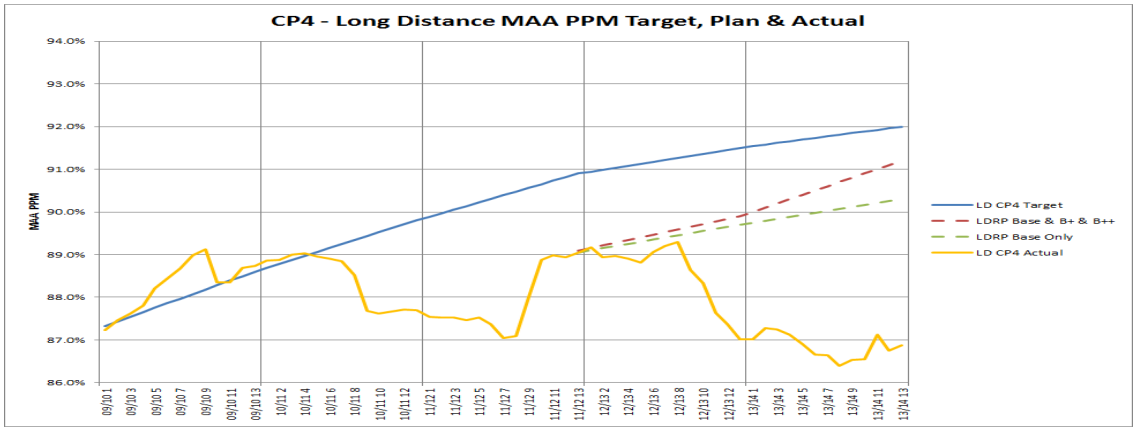

Figure 1 – Analysis of Long Distance Sector over CP4 period

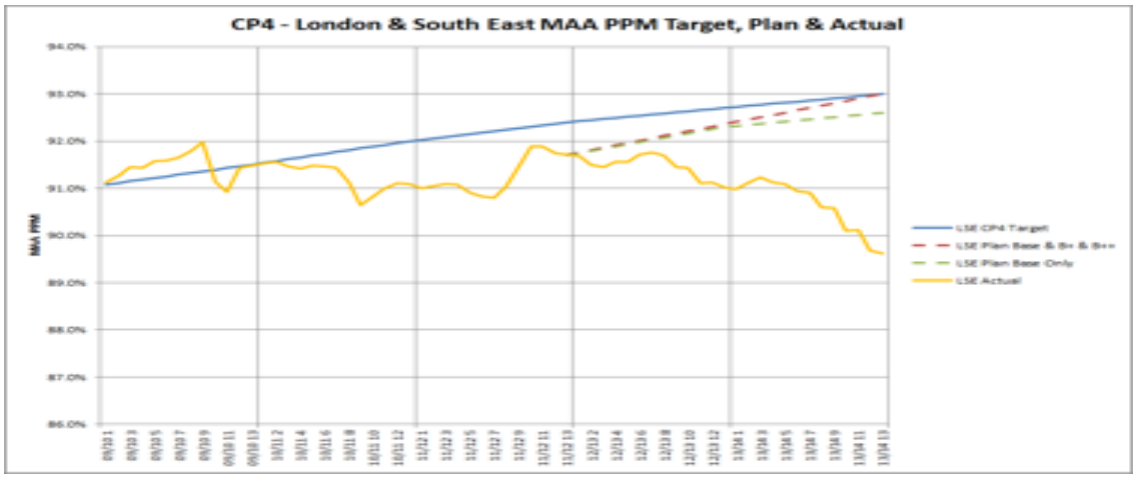

Figure 2 – Analysis of London & South East Sector over CP4 period

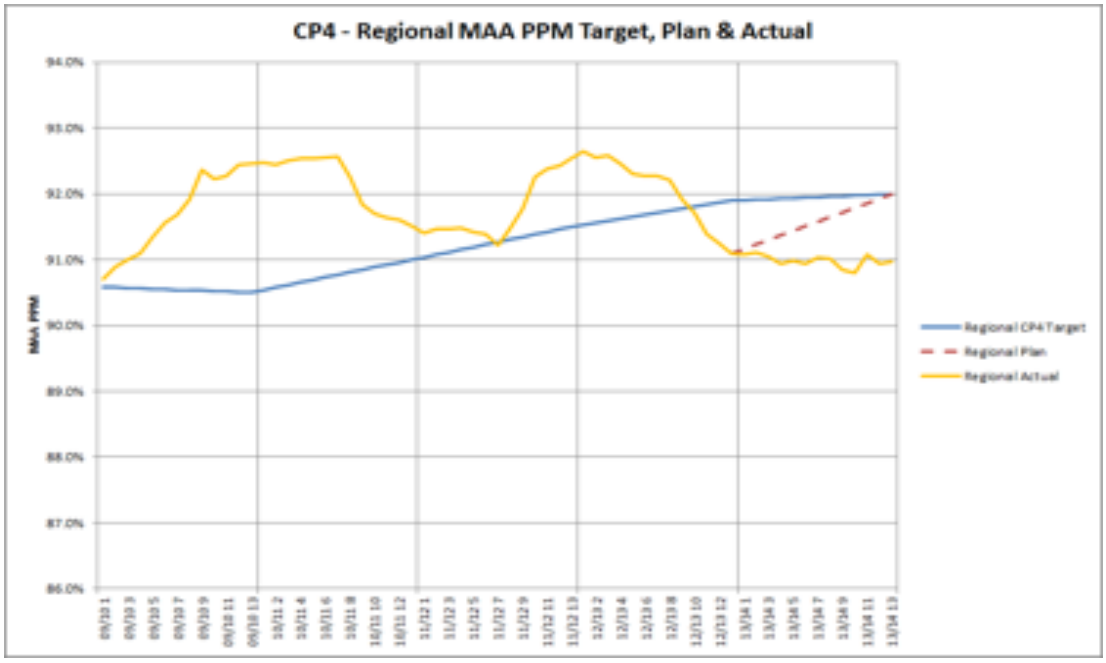

Figure 3 – Analysis of Regional Sector over CP4 period

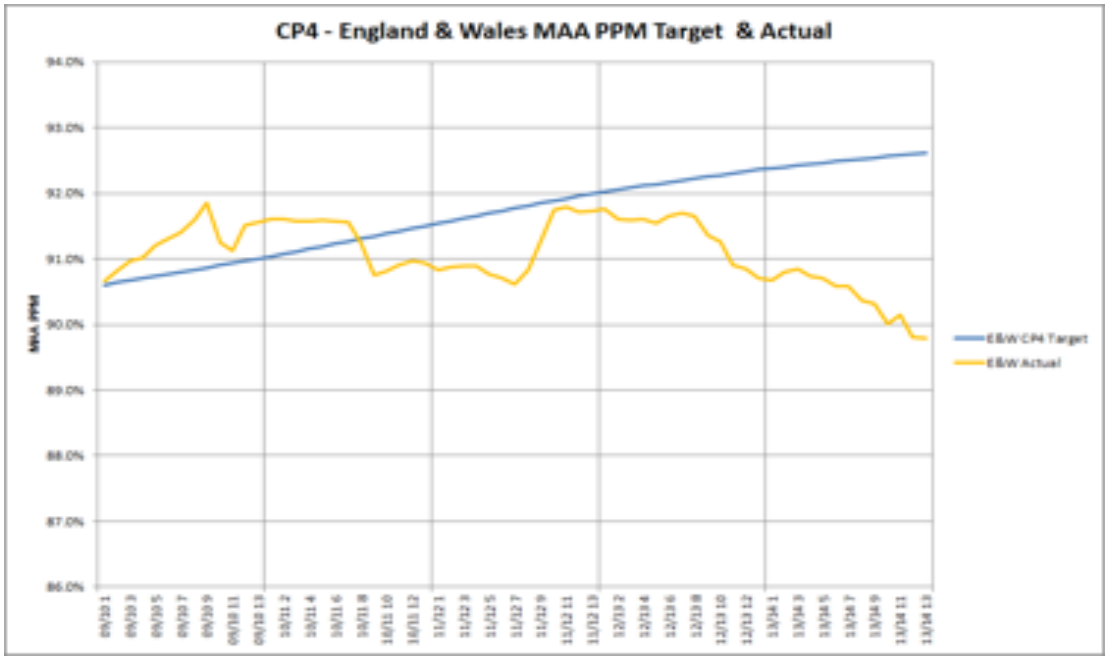

Figure 4 – Analysis of England & Wales overall over CP4 period

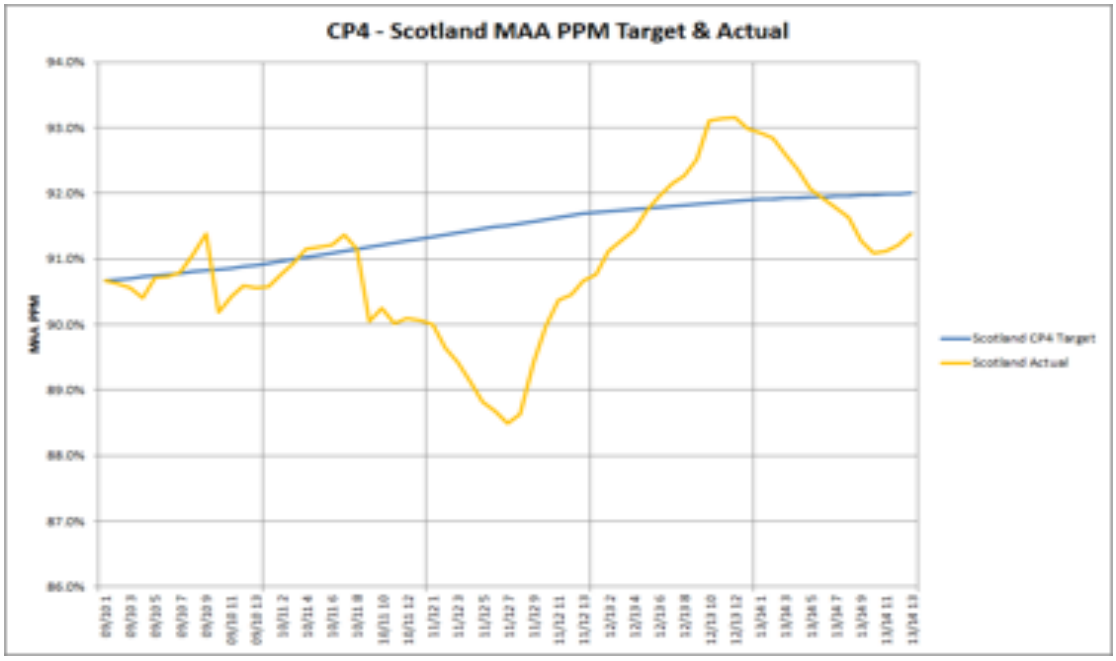

Figure 5 – Analysis of Scotland over CP4 period

Commentary

1. Note the significant widening of the gaps between 'Planned' (red dotted line) and 'Actual' MAA PPM (yellow line) after period 7 & period 8 of 2012/13 in Figures 1 and 2 for Long Distance and LSE sectors in particular

2. Note that this is also then reflected in a similar widening of the gap between the 'CP4 target' (blue line) and 'Actual' MAA PPM (yellow line) for England & Wales in Figure 4.

3. Note in Figure 5 that for Scotland the 'Actual' MAA PPM (yellow line) starts a downward trend after period 11 of 2012/13. No information on 'planned' was available to the IR and historically the IR has not investigated Scotland region.

Annex B - Analysis of changes to improvement plans

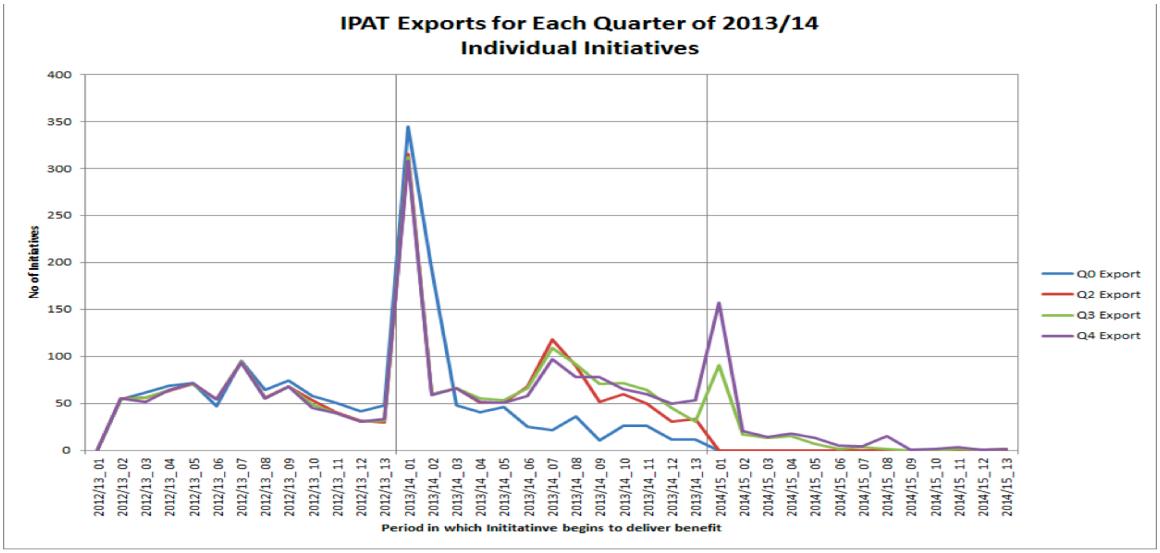

Figure 6 – Analysis of changes to improvement plans in IPAT

Commentary

Figures 6 and 7 illustrate changes to improvement plans as recorded in IPAT. The two graphs use four extracts taken from IPAT at the following points during the year 2013 / 2014:

1. Extract 1 taken in Period 1 (blue line), source date NR "Schemes List p00 1314"
2. Extract 2 taken in Period 7 (red line), source data NR "Schemes List p07 1314"
3. Extract 3 taken in Period 10 (green line), source data "Schemes List p10 1314"
4. Extract 4 taken in Period 13 (purple line), source data "Schemes List p13 1314"

Figure 6 shows for each period the number of initiatives, which are planned in future to start, or did in the past start, delivering benefits.

Figure 6 shows that adjustments to improvement plans were taking place throughout year 2013/2014; making a comparison of changes to the planned benefits at three points evidences this:

1. Comparing the red line with the blue line at the time of Extract 2 (period 7) shows that more initiatives had been planned to deliver benefits
2. Comparing the green line with the red line at the time of Extract 3 (period 10)
3. Comparing the purple line with the green line at the time of Extract 4 (period 13)

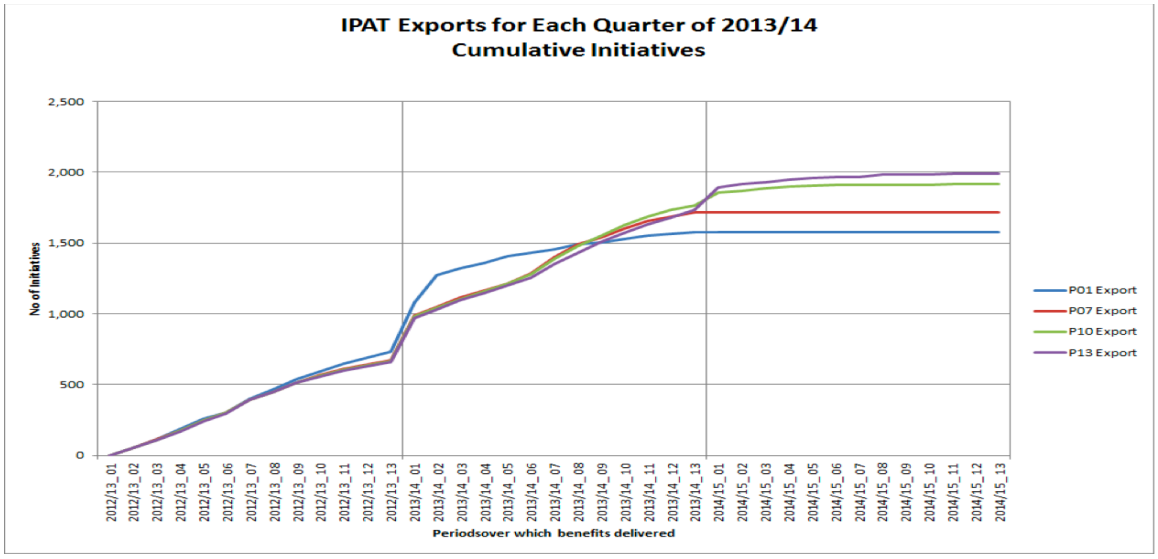

Figure 7 – Analysis of Cumulative numbers of Initiatives in IPAT

Figure 7 also shows that adjustments to improvement plans were taking place throughout year 2013/2014; this is evidenced by the changes in when the benefits were planned against the cumulative number of initiatives.

Annex C - Analysis of asset related incidents, delay minutes and delay minutes per incident (annual measures)

The graphs in this Annex are derived from data provided in the NR spreadsheet "Infrastructure count delay DPI for IR 130514".

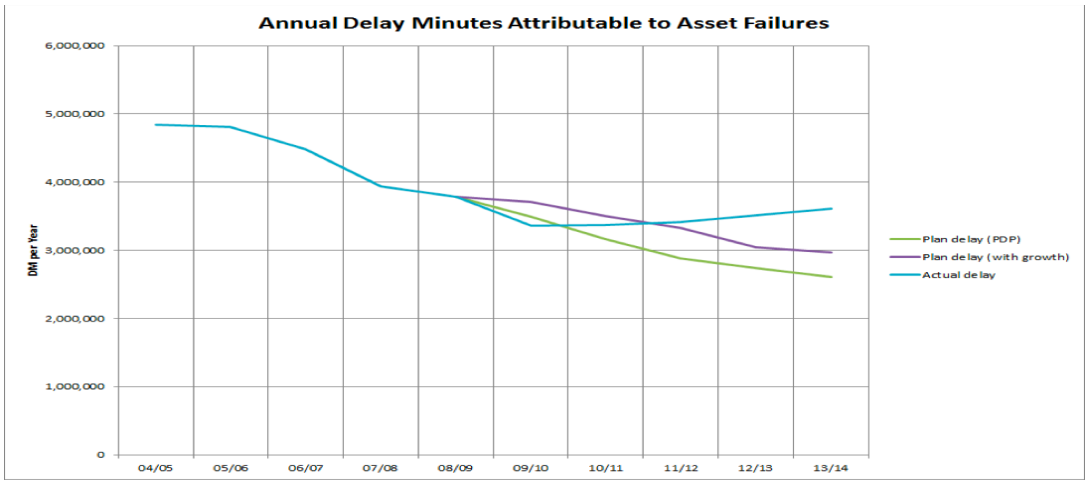

Figure 8 – Comparison of Planned Asset Failure Annual Delay Minutes v Actual

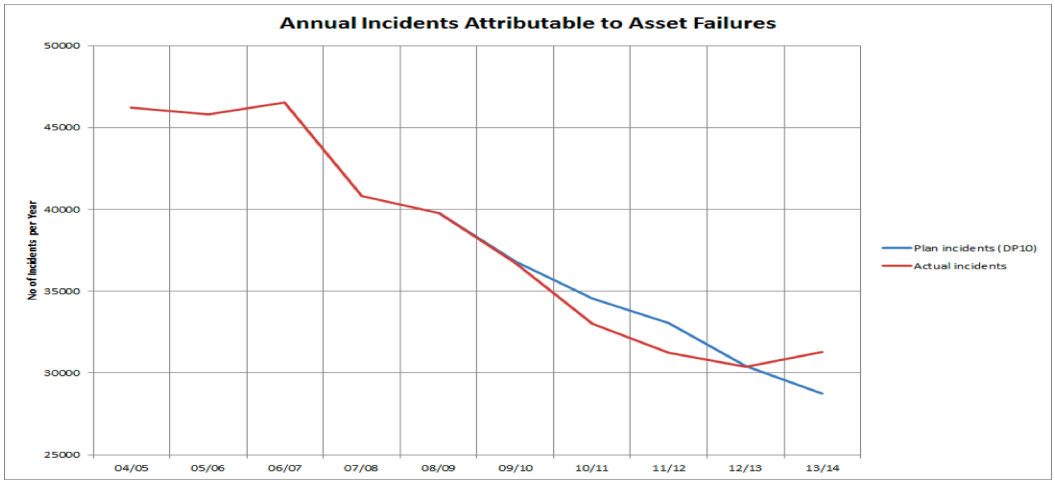

Figure 9 – Comparison of Planned Asset Incident Failures Annual v Actual

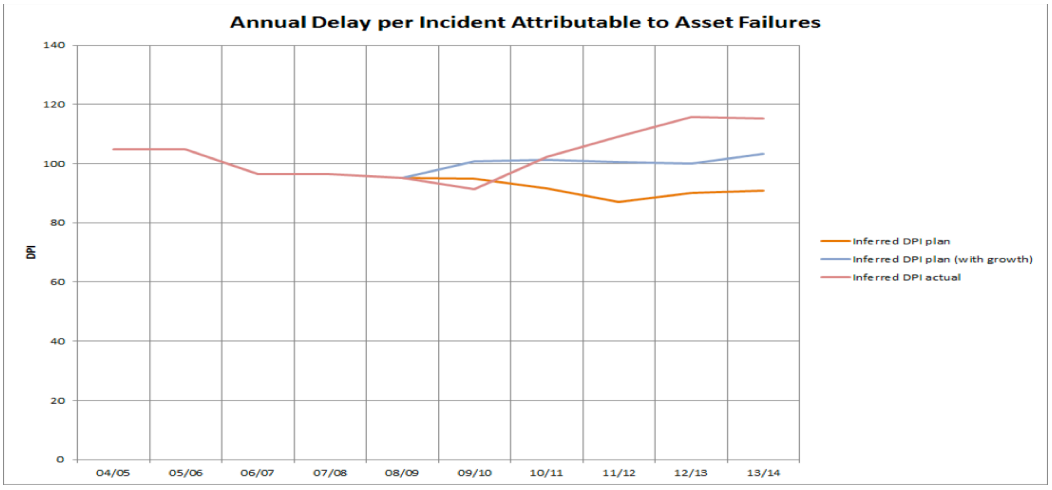

Figure 10 – Comparison of Planned DPI (delay mins per incident) Annual v Actual

Commentary

1. Note in Figure 10 the steady increase in 'actual' dpi (pink line) compared with 'inferred' planned since 2009/10

2. Note in Figure 9 the decrease in 'actual' (red line) incident numbers compared with planned throughout most of CP4, which is then reversed in 2013/14.

3. In Figures 8 and 10 note also the NR calculation of the 'growth effect' shown above as an increase in the number of Plan delays and dpi.

Annex D - Analysis of asset related incidents, delay minutes and delay minutes per incident (quarterly measures)

The graphs in this Annex are derived from data provided in the NR spreadsheet “Infrastructure count delay DPI for IR 130514”.

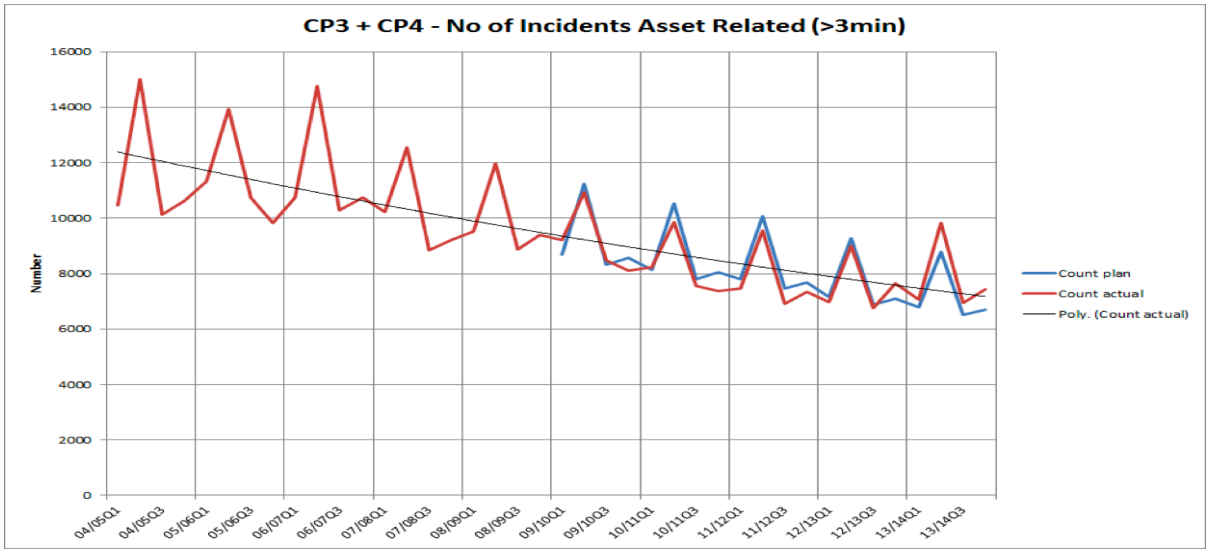

Figure 11 – Comparison of No of incidents (Asset Related) Planned v Actual

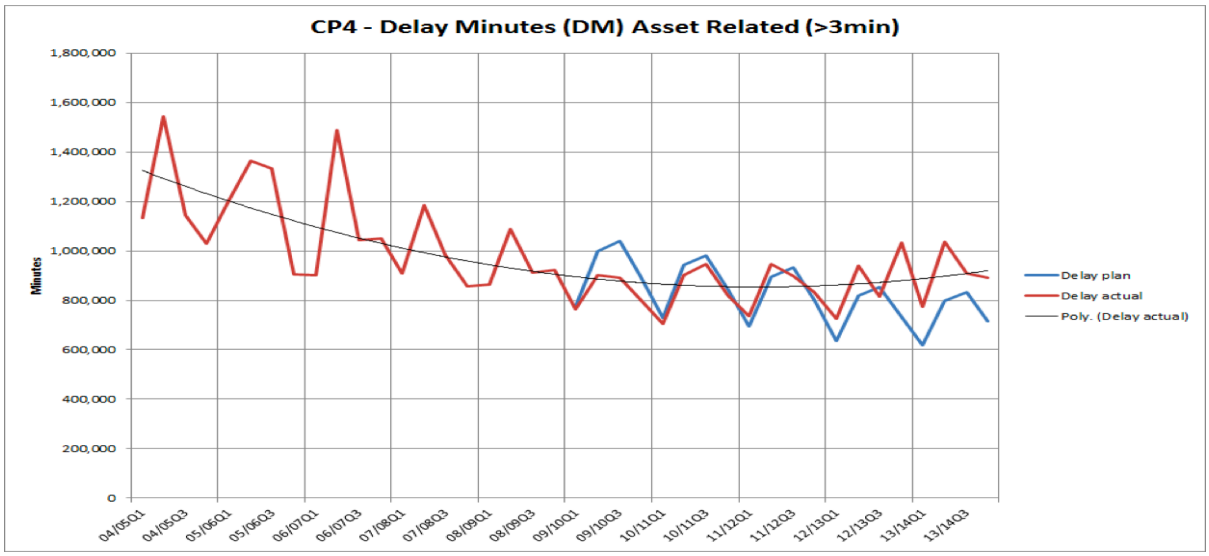

Figure 12 – Comparison of No of Delay Minutes (Asset Related) Planned v Actual

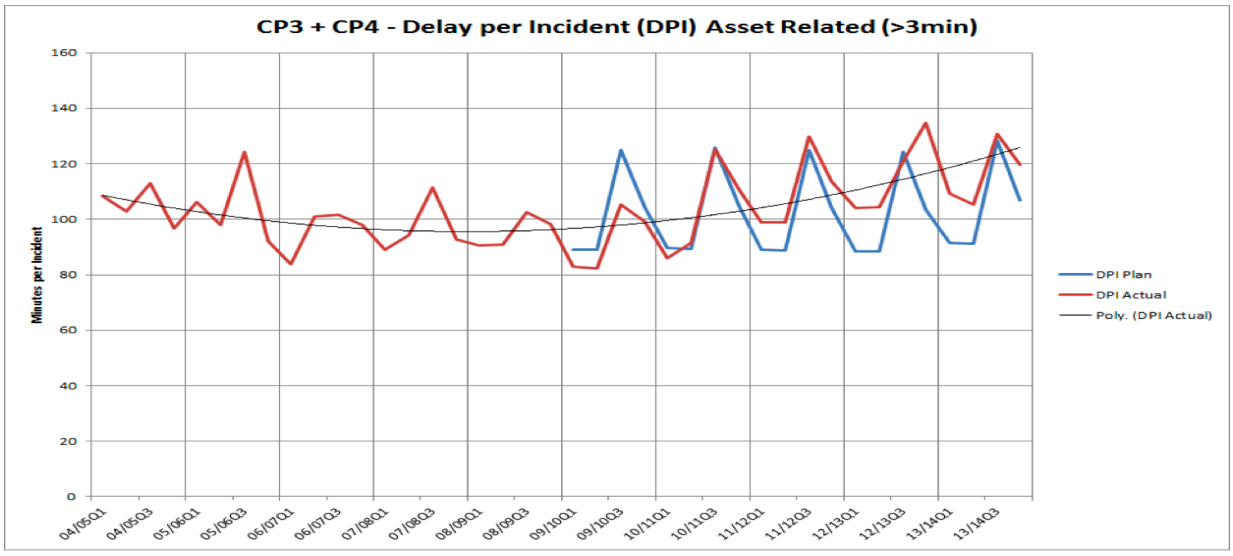

Figure 13 – Comparison of DPI (Asset Related) Planned v Actual

Annex E - Analysis of planned v delivered maintenance

England & Wales

Figures 14 to 25 show comparisons of the numbers of maintenance work items between Planned (blue line) and Delivered 'Actual' (red line) for England and Wales. The graphs have been derived from data in the NR spreadsheet "Actual_vs_Annual_Plan_(On_Demand) MNT summary", extracted from Ellipse. To enable a high level comparison, a relevant subset of 54 of the 110 detailed MNT codes were grouped into ten categories as set out in Table 1 below. This grouping of codes into ten categories was suggested by Barney Daley, NR Head of Infrastructure Reliability.

Ref	Category Title	Includes 'MNT' code	Reference
1	Rail	015, 016, 044, 045, 046, 047, 048	Figure 15
2	Sleepers & Bearers	009, 010, 029, 030, 039, 040	Figure 16
3	Track Geometry & Formation	004, 005, 006, 007, 012, 017, 019, 020, 036, 037	Figure 17
4	Other Signalling	051, 053, 150, 152, 153, 154, 157, 158, 159, 160, 161, 165, 167, 168	Figure 18
5	Hot Weather	032, 033	Figure 19
6	Points	050, 155, 156	Figure 20
7	Train Detection	162, 163, 164	Figure 21
8	Traction Power	202, 203, 204, 209	Figure 22
9	Non Traction Power	210, 213	Figure 23
10	Vegetation	170, 171, 172,	Figure 24

Table 1: Maintenance Activity Grouping Categories

Figure 14 includes the total number of maintenance items for all 10 work group categories and shows at a summary level that maintenance delivered (Actual) exceeded maintenance planned for all of 2013/14, with the exception of the period of extreme weather in Q3 of 2013/14, and that the rate of maintenance delivery recovered quickly after the passing of the extreme weather.

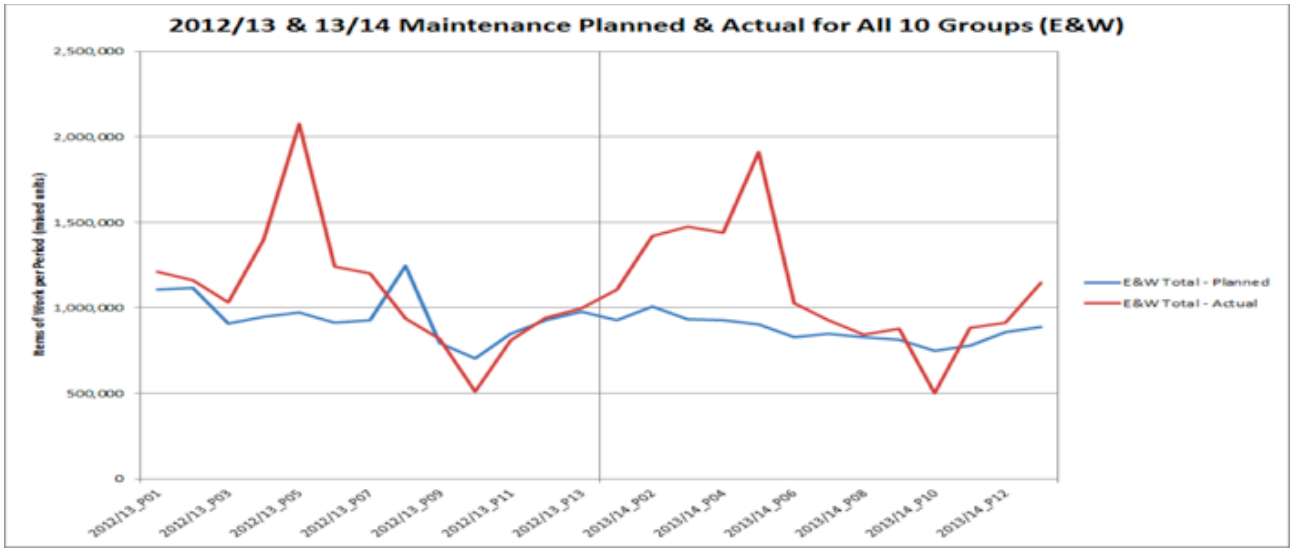

Figure 14 – Comparison of 'Overall' (totals across all 1-10 categories) Maintenance Work items

Figures 15 to 24 show comparisons for each of the 10 groups of maintenance work categories. In six of the ten work categories, the maintenance delivered exceeds planned, whereas in four work categories the maintenance delivered is less than planned.

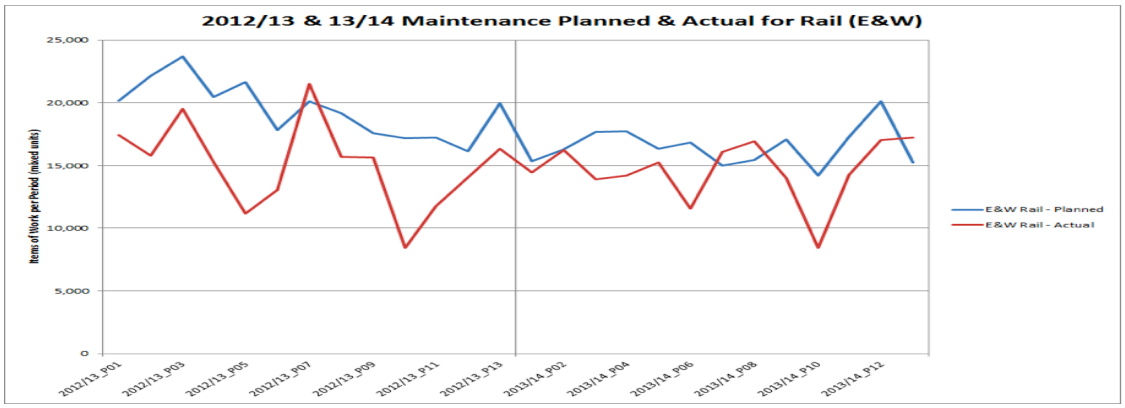

Figure 15 – Comparison of 'Rail' (Category 1) Maintenance Work items

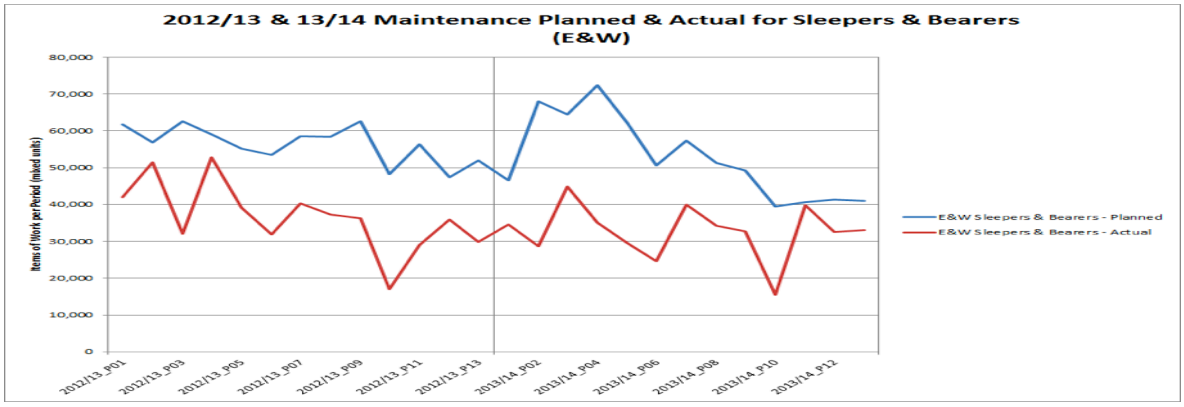

Figure 16 – Comparison of 'Sleepers & Bearers' (Category 2) Maintenance Work items

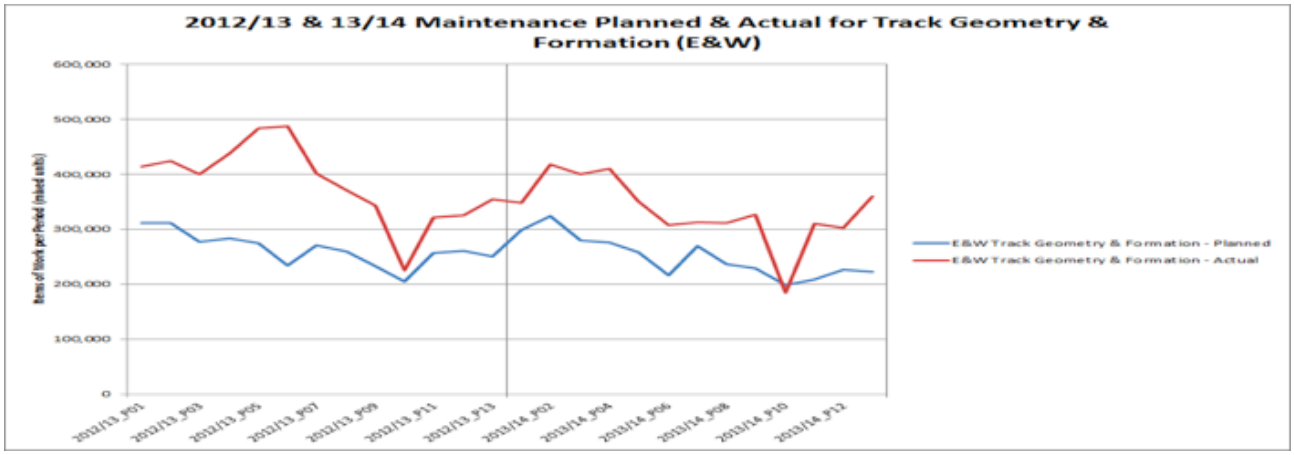

Figure 17 – Comparison of 'Track Geometry & Formation' (Category 3) Maintenance Work items

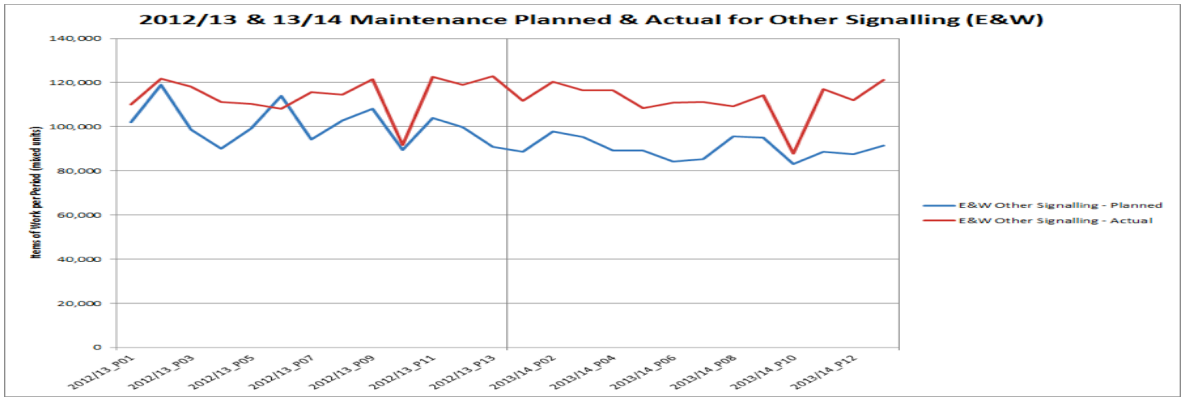

Figure 18 – Comparison of 'Other Signalling' (Category 4) Maintenance Work items

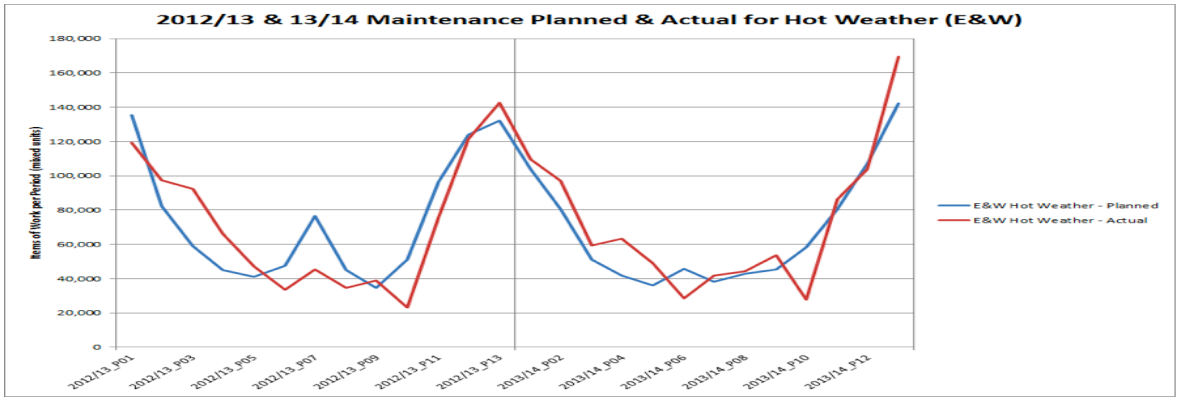

Figure 19 – Comparison of 'Hot Weather' (Category 5) Maintenance Work items

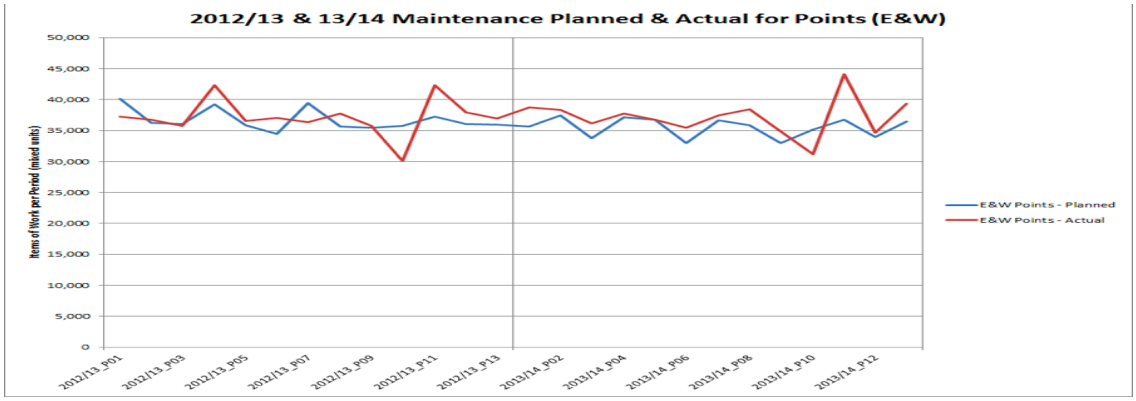

Figure 20 – Comparison of 'Points' (Category 6) Maintenance Work items

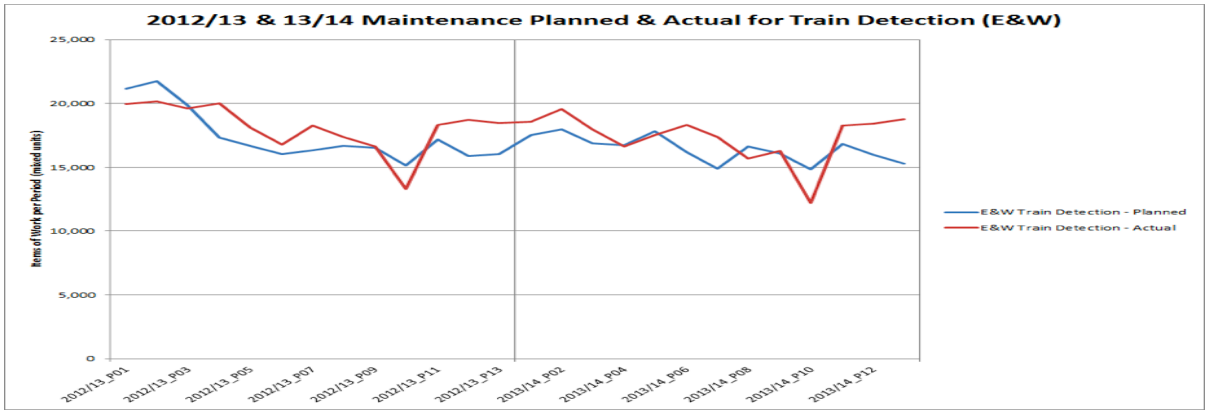

Figure 21 – Comparison of 'Train Detection' (Category 7) Maintenance Work items

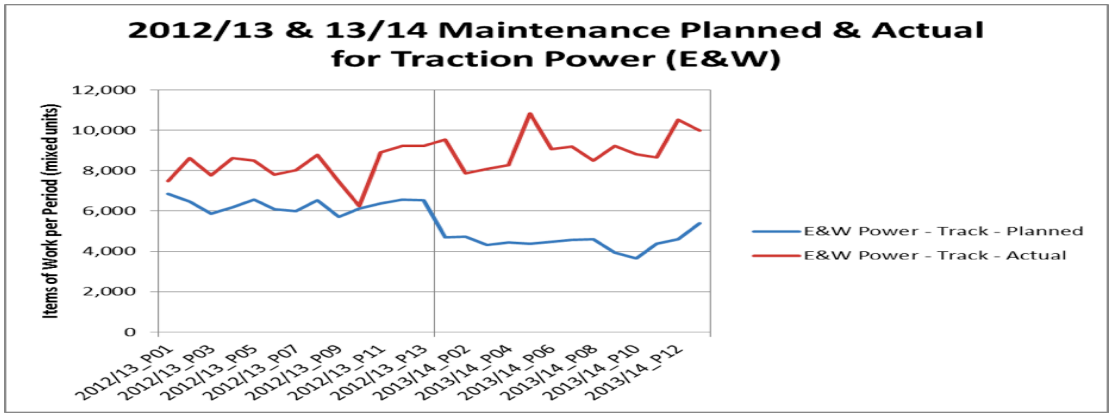

Figure 22 – Comparison of 'Traction Power' (Category 8) Maintenance Work items

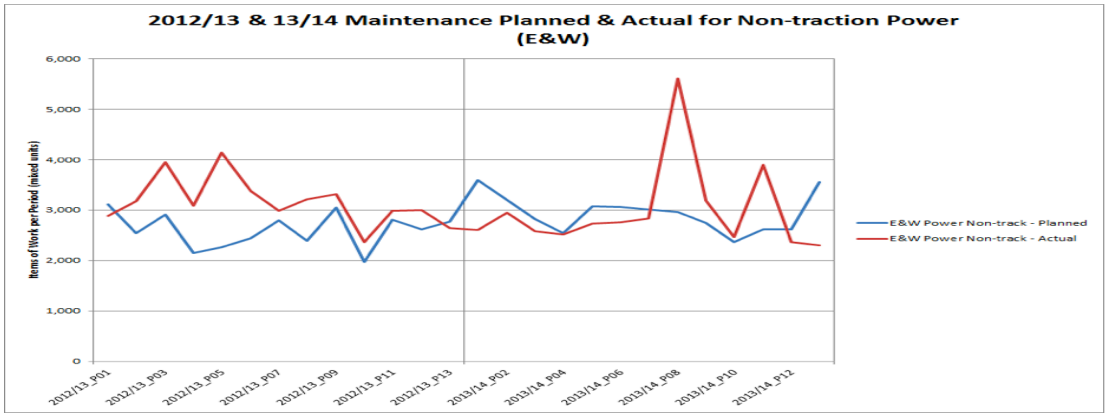

Figure 23 – Comparison of 'Non Traction Power' (Category 9) Maintenance Work items

Figure 24 show comparisons for Category 10 Vegetation. The 'red' peak in activity between Periods 2 and 6 in 2013/2014 is understood to be reactive work items arising from inspections.

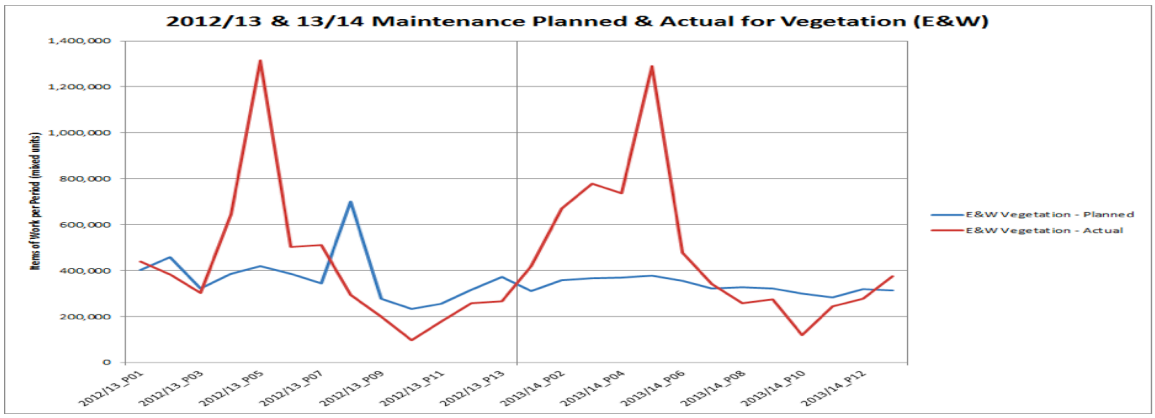

Figure 24 – Comparison of 'Vegetation' (Category 10) Maintenance Work items

Scotland

Figure 25 includes 'overall' number of maintenance items for all 10 categories for Scotland and shows maintenance delivered is lower than maintenance planned for 2013/2014.

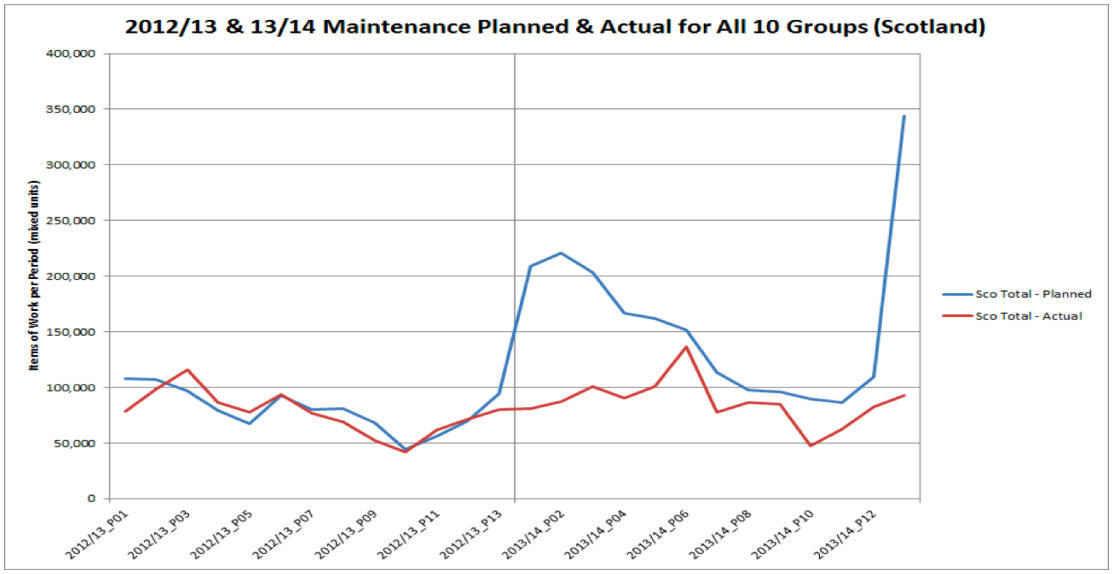

Figure 25 – Comparison of overall total of Maintenance Work items for Scotland

Annex F - Analysis of maintenance outstanding & re-prioritisation

Graphs in this Annex are derived from data in the NR spreadsheet "Period 1 - 2014 Backlog Charts".

MAA (Moving Annual Average) is used in this Annex to illustrate trends over the last four years.

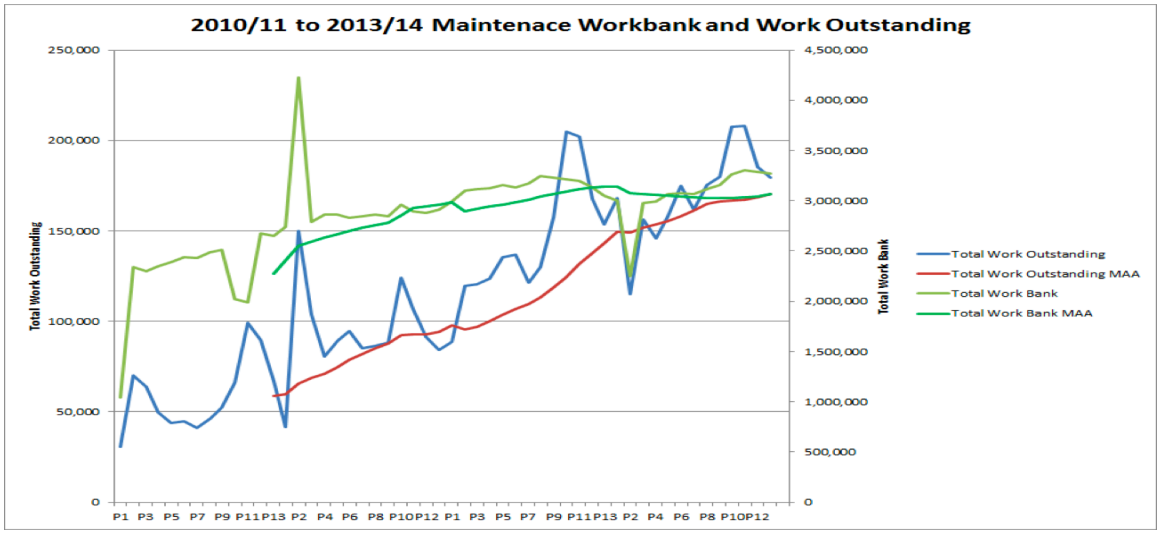

Figure 26 – Totals and Trends (MAA) of Work Outstanding and Size of Work Bank

Commentary

In Figure 26, note that there are significant peaks in the Total Work Outstanding (blue line) around the periods of extreme weather but that the MAA of Total Work Outstanding (red line) has remained relatively flat throughout 2013/14.

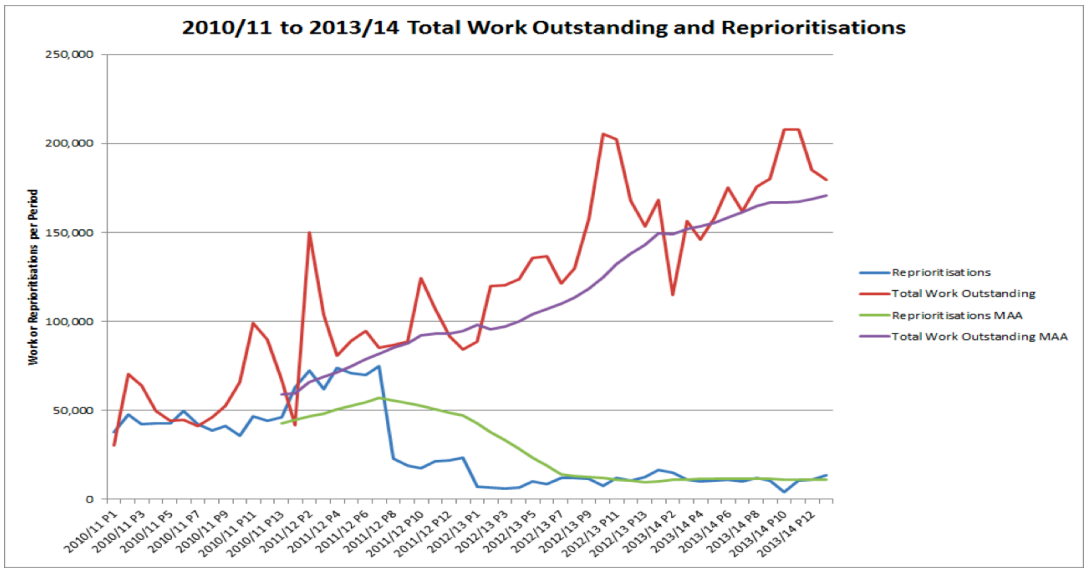

Figure 27 – Totals and Trends (MAA) – Comparison of Work Outstanding and Re-prioritisations

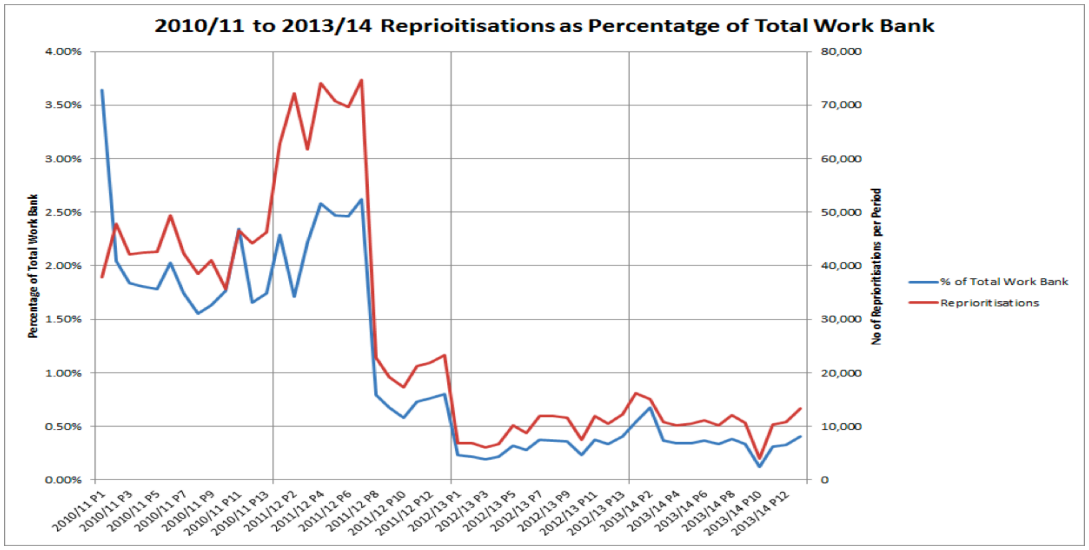

Figure 28 – Totals number of Re-prioritisations and relative % of Total Work Bank

Commentary

Note that the amount of reprioritisation has remained steady and low.

Annex G - Analysis of NR Quarterly Reports and associated IR Field Tests Reports

Month	*Document*	*By*	*Dated*	*Notes*
Mar	LDRP first draft	NR	30/03/12	First draft of LDRP submitted
2012/13 – CP4 Year 4				
Apr	LDRP Modified first draft	NR	09/04/12	Modified first draft of LDRP submitted
May	Nil			
Jun	Nil			
Jul	LDRP final	NR	31/07/12	B+ & B++ life cycle explained, B+ & B++ plan to bridge gap between JPIPs and RO, ref to B+ based on 8-pt NTF plan (which included RCM, Fleet and Modelling as well as 5 B+ workstreams), NR Perf board introduced B+ = 5 workstreams (Freight prog, TT for P, Control centre actions, Rules, IRT) B+ to deliver 50k DM in 12/13 and 360k DM in 13/14 (later recognised as an over-ambitious claim) B++ = 5 workstreams (Regulation trial, Timetables, Red routes, Freight, Possessions) B+ & B++ to deliver 2.64% MAA PPM by y/e 13/14 LD forecast MAA PPM 90.6% by y/e 13/14 (@90% confidence)
Aug	Q1 LDRP Progress Report	NR	23/08/12	Ref to C. Gibb work on WCML (S) B+ & B++ 140 initiatives, progress in line with expectation B+ = 6 workstreams (Control centres, Freight, IRT, Rules, TT for P, RCM) B++ = 2 initiatives (LNE regulation trial, GW red route)
Sep	Q1 Review of LDRP	IR	13/09/12	Recs - Insufficient quantification of B+ & B++ progress considering forecast of over 50% of MAA PPM improvement
Sep	LSE Plan	NR	28/09/12	B+ = 13 pt plan (Operators – Perf campaigns, Pass interfaces, Fleet + NR – Freight, TT for P, Control, Rules (inc red bridge cameras), IRT, Vegetation, Possessions, Externals), tho RCM

				and Fleet already in Base plans B++ = 4 workstreams (Red routes, Peak TT, Regulation, Measurement) B+ & B++ to deliver 0.57% MAA PPM (by y/e 13/14?) LSE forecast MAA PPM 92.8% by y/e 13/14 (at 90% confidence)
Oct	Q1 Field-test	IR	31/10/12	Recs - Influence of Investment Delivery Directorate at Perf Board to be encouraged, B+ programme management well structured and will require strong leadership to deliver implementable schemes to Routes
Nov	Q2 LDRP Progress Report	NR	09/11/12	Perf Recovery Fund established B+ 56 deliverables planned, 82 delivered B++ progressing well LD forecast MAA PPM 89.7% by y/e 13/14
Dec	LSE Plan Review	IR	04/12/12	Recs – Forecast of trajectory for Base, B+ and B++ programmes needed as baseline for comparison purposes and to identify any emerging shortfall as soon as possible
Dec	Q2 LDRP Report Review	IR	14/12/14	Recs - Clear template needed for Quarterly Progress Reports
Jan	Nil			
Feb	Q3 LDRP & LSE Progress Report	NR	01/02/13	B+ & B++ on track, B+ projected DM benefits increased, JPIPs under-delivering, B+ increased scope B+ = 7 workstreams B++ = 5 initiatives (LNE regulation trial, GW red route, Thameslink red route, Purley red route, Targeted TT improvements) B+ LD – 147 milestones, 2 missed, LSE – 164 milestones, 41 missed LD forecast MAA PPM 90.0% by y/e 13/14 LSE forecast MAA PPM 91.9% by y/e 13/14
Feb	Q2 Field-test	IR	12/02/13	NR making serious effort to improve project management skills Recs - GW Red route trail needs management intervention if CP4 benefits are to be achieved, iPAT guidance required to prevent it becoming 'over-stuffed wish list'
Mar	Q3 LDRP & LSE Report Review	IR	18/03/13	Hi churn rate continuing in Base B+ milestones missed but initiatives and forecast DM benefits growing Benefits of WCML (S) reliability programme, LSE asset management project and Perf Planning Reform yet to be included Rec – Waterfall charts and accuracy of DM benefits forecast and accrued to be scrutinised
2013/14 – CP4 Year 5				
Apr	Q3 LDRP & LSE Field-test Report	IR	24/04/13	IRT excellent example of joint working by national and Route teams in B+ programme Rec – ORR should revisit to check embedding in 9 months time
Apr	Regional Plan	NR	26/04/13	Ref to B+ Steering Group B+ = 5 workstreams (Freight, TT for P, Control centres, Rules, IRT) + possibly Management of sub-threshold delay, Management of ill passengers, Right-time railway approach to dispatch
Apr	CN020 Wash-up Report	IR	19/04/14	Q4 Quarterly report will be vital with iPAT churn stopped and winter over Recs – too many initiatives reported, insufficient prioritisation,

				too much churn, improve PM skills, enhance Perf Board, focus more on Right-time railway, reassess assumption that scheme delivered = forecast benefits realised
Apr	Q4 LDRP & LSE Progress Report	NR	26/04/13	B+ & B++ on course, more benefits forecast than originally planned B+ cumulative? 99 initiatives transitioned to Base B+ LD & LSE - 216 milestones planned, 170 delivered Base – LD & LSE – 884 milestones, 340 missed LD forecast MAA PPM 89.1% by y/e 13/14 LSE forecast MAA PPM 91.7% by y/e 13/14
May	Nil			
Jun	Nil			
Jul	Q1 LDRP & LSE & Reg Progress Report	NR	July 2013?	B+ = 7 workstreams (Rules, Control centres, IRT, Freight, TT for P, Perf campaigns, Pass Interfaces) B++ = 2 workstreams (LNE regulation trial, GW red route) B+ cumulative? 129 initiates transitioned to Base B+ LD & LSE & Reg – 90 milestones planned, 57 delivered Base LD & LSE – 1237 milestones, 108 missed LD forecast MAA PPM 89.0% by y/e 13/14 LSE forecast MAA PPM 91.8% by y/e 13/14
Jul	Q4 LDRP & LSE Field-test Report	IR	08/07/13	B++ LNE regulation trial reviewed, 5 PPM successes per 1 PPM failure claimed, 0.9% PPM improvement (later changed to 0.6%), E Mids trial happening, GW, LNW, Sc Route trials not planned
Aug	Nil			
Sep	Nil			
Oct	Q1 Field-test Report	IR	18/10/13	B+ = 6 workstreams (Rules, Control centres, IRT, TT for P, Perf campaigns, Passenger Info Systems) B+ schemes developed by national team and benefits validated by Routes, quarterly B+ iPAT churn small Recs – Process for reviewing benefits of concern, Routes have robust processes for managing B+ schemes, reporting of B+ in Q1 report could be improved
Nov	Q2 LDRP & LSE & Reg Progress Report	NR	08/11/13	Report format modified B+ & B++ 'both programmes now embedded in Routes' B+ cumulative? 124 initiatives delivered (i.e. transitioned to Base?) B+ 122 milestones planned, 106 delivered B++ Regulation trial now BAU on LNE, Red routes now BAU on Western, Sussex and Kent LD forecast MAA PPM 88.5% by y/e 13/14 LSE forecast MAA PPM 91.6% by y/e 13/14
Nov	Nil			
Dec	Nil			
Jan	Q3 Progress Report	NR	Jan 2014?	B+ programme to close at end of CP4, 64k DM committed to at inception, 75k DM delivered B+ cumulative? 124 initiatives delivered B+ 66 milestones planned, 67 delivered LD forecast MAA PPM 87.5% by y/e 13/14 LSE forecast MAA PPM 90.4% by y/e 13/14 Regional forecast MAA PPM 91.2% by y/e 13/14
Jan	Q2 Field-test	IR	10/01/14	No B+ or B++ reviews carried out

	Report			
Feb	Nil			
Mar	8 Point Plan Programme Closure Report	NR	08/03/14	8 Pt Plan – 6 workstreams (Rules, Control centres, Perf campaigns, Passenger interfaces, IRT, TT for P) 8 Pt Plan CP4 64k DM 'promise', 80k DM delivered Report includes tabulations of each workstream and schemes adopted by Routes and claimed minutes saved
2014/15 – CP5 Year 1				
Apr	Q3 Field-test Report	IR	30/04/14	No B+ or B++ reviews carried out
Apr	CP4 Perf Assessment Report	NR		B+ = 7 workstreams (Freight, TT for P, Control centres, Rules, IRT, Perf campaigns, Passenger interfaces at stations) B+ all 7 workstreams applicable to LSE, 6 to Reg and 5 to LD B+ Plan CP4 64k DM 'promise', 80k DM delivered B++ = 5 workstreams (Vegetation, Regulation trial, Red route, Sub-threshold delay, Weather) LD actual MAA PPM 86.9% at y/e 13/14 (v 92% RO) LSE actual MAA PPM 89.6% at y/e 13/14 (v 93% RO) Regional actual MAA PPM 91.0% by y/e 13/14 (v 92% RO)

Commentary

Note that LD and LSE MAA PPM y/e 13/14 forecasts continued to steadily reduce throughout 12/13 and 13/14 as confidence was eroded by over optimism in delay minute forecasts, missed milestones, late delivery of schemes and other extreme weather and external effects.

Annex H - Analysis of possessions taken during CP4

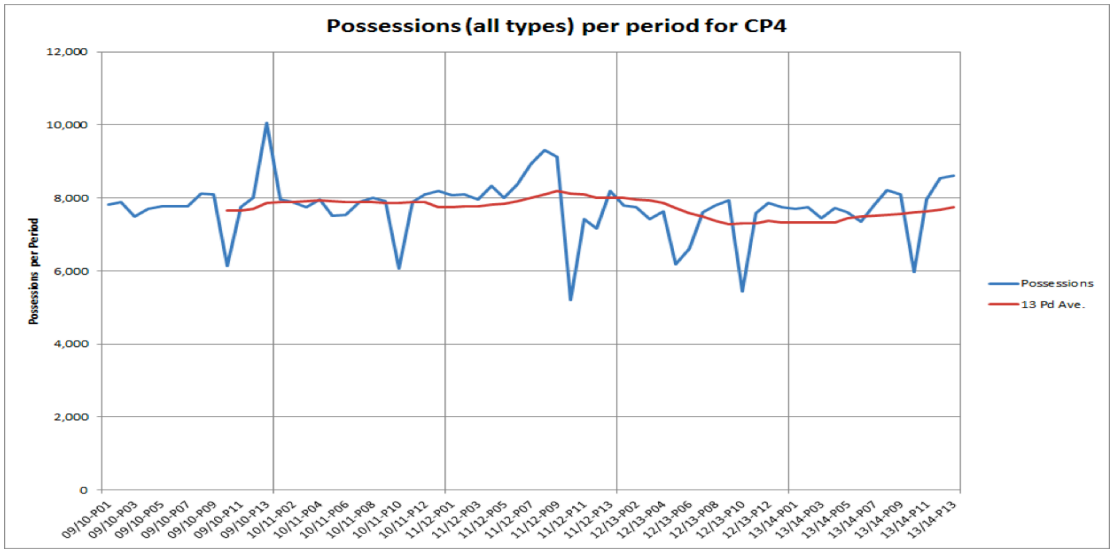

Figure 29 – Totals number of Possessions per period and MAA Trend (over 13 periods)

Annex J - Notes of visit to Croydon Maintenance Delivery Unit (May 20)

Annual Maintenance Budget

- Volume budget provided by Route Asset Manager (RAM) in units of work x unit rates = £ budget proposal
- Resource budget provided by Maintenance Delivery Unit (MDU) Manager (driven largely by Standard Maintenance Activities in Ellipse) in units of manpower, machine shifts & materials x unit rates = £ budget proposal
- Variance between two budget proposals resolved by 3-way negotiation between Delivery Unit (DU), RAM and relevant HQ function
- Final maintenance budget handed down after negotiation by Route Director via Area Director to MDU Manager
- MDU Manager has discretion to bid for additional major items of maintenance (regarded as investment) which is funded from a different source and can take pressure off maintenance budgets

Spending Constraints

- There is very little discretion allowed in areas of Maintenance Scheduled Tasks (MSTs), nor in manpower unit rates.
- Opportunities to improve effectiveness lie in plant shift productivity, packaging and planning of works, efficiency of access (i.e. possessions) arrangements, booking to CapEx items.
- Around 20% of the overall MDU budget has some flexibility

- Annual access arrangements agreed prior to budget as part of Eng Access Statement (currently being agreed for 2016)

Creation of the Work bank

- Jobs automatically added to Ellipse for MSTs
- Inspections by Asset Engs, Section Managers, Patrolmen etc add more work
- Section Managers generally do reprioritisations
- Also, tasks added to Ellipse as soon as assets added or removed by CapEx projects (tho system sometimes fails to register new/removed assets)

Prioritisation of Tasks

- M0 means 'do it now'
- M1 means 'do it within 1 month'
- M99 means 'do it sometime when convenient'
- Every job in Ellipse has a priority number
- Workbank means the total of all jobs in Ellipse
- Backlog (= Overdue = Outstanding) means work past the 'do it by' date
- Work is added to Ellipse by completion of a Work Arising Identification Form (WAIF) which requires description, prioritisation, asset description, location, who (i.e. which group) should do the work and who raised it.
- WAIFs are paper documents which are input via Planning Team to Ellipse

Planning For Delivery

- Work plans generated by Planning Team inc. tasks, safety arrangements and access arrangements
- Work plans based on Ellipse jobs and priorities, possession plans, rosters, etc
- Weekly planning meetings set work plans
- Signalling groups get 2 weeks of work on hand-helds

- Other groups get weekly work in paper form setting out tasks shift by shift
- Day time work restricted to patrolling, IBJ repairs, lifting & packing, ballast regulating, etc
- Work orders are derived from weekly work plans and passed to 'person in charge'

Completed Work Records

- Completed work orders are passed back to Planning Team
- Signalling groups use hand-helds
- Other groups use paper based system
- Completed work entered into Ellipse
- Work not done in time appears on a daily Backlog Report
- Backlog Reports are reviewed weekly by Asset Engs
- Compliance issues are highlighted in Backlog Reports
- Backlog does not necessarily imply non-compliance

Effectiveness of Delivery Unit

- DU effectiveness measured by:
- Backlog as a % of Workbank – was 8% as start of CP4 for Croydon now down to 2%
- Incident counts
- Delay minutes (not favoured because of uncontrollable nature)
- Compliance reports
- Reprioritisation rates
- Track quality measures

Effect of Extreme Events

- Extreme weather of Q3 2013/14 created peak in Overdue work and trough in output – quickly recovered

- Typically workforce will be used as ‘wet weather watchmen’ on earth slips sites, etc
- For major events claim can be made against central ‘insurance fund’ to recover losses and fund catch-up works

Conclusion

The experiences and processes explained by the MDU management team are consistent with the account given by NR national teams about the manner in which work banks and backlogs are managed.