

**Report of ORR's investigation
into engineering overruns**

February 2008



OFFICE OF RAIL REGULATION



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Executive summary

Unacceptable disruption

1. OVERRUNS OF engineering works at Rugby, Liverpool Street and Shields Junction in early 2008 caused serious and unacceptable disruption to rail users and train operators. ORR immediately announced an urgent inquiry into the causes of the disruption, which would incorporate an inquiry already under way into the late (but planned) extension of the engineering possession at Rugby. This is the report of our findings.
2. Most of the disruption experienced should have been avoidable with better planning and management of the projects involved. Urgent steps must be taken to ensure that there is no recurrence of this kind of event.

Rugby

3. In mid December 2007 Network Rail announced that it was extending a planned blockade at Rugby, for engineering work on the West Coast Route Modernisation programme, by an additional day (31 December). Industry processes (and Network Rail's licence) require such a decision to be made at least 12 weeks in advance. Virgin Trains objected to the extension as it had already sold many tickets for travel that day, and asked us to make a provisional order preventing Network Rail from taking this action. After discussions and correspondence with Network Rail and Virgin Trains we concluded that it would not be in the best overall interests of rail users to make such an order, as it would probably lead to higher levels of disruption in total.
4. We have, though, investigated the events which led up to the late extension of the planned possession. These centre on the loss of various preliminary works on three preceding weekends due to a points failure, high winds and a late running engineering train. We do not believe that the sequence of events which led to this work being lost could reasonably have been foreseen at the point when industry processes (and Network Rail's licence) required such a decision to be made, although we do believe that it should have been possible to make the decision about one week earlier than Network Rail did.

5. The possession itself then overran badly, until 4 January 2008. The main reason was a severe shortage of skilled and supervisory overhead line electrification engineers. Although Network Rail had identified this as a critical resource and, in an unusual step, had obtained the names of rostered individuals from its contractors in advance, many named individuals failed to turn up and many of those who did arrive worked fewer hours than planned. Network Rail is still not satisfied that it has had an adequate explanation for this from its contractors.
6. Information provided to Network Rail managers by the contractors during the works was badly inaccurate, partly as a result of the shortage of skilled staff. As a result Network Rail managers did not appreciate that the work was running into serious difficulty until well after this should have been apparent. Under the circumstances it may not have been possible to avoid an overrun entirely, but because of this delay in communication effective actions to mitigate an overrun were taken too late. Train operators were not warned that an overrun was likely until the afternoon of 31 December, and accurate information about the duration was not provided until 2 January 2008. This exacerbated the disruption to rail users.

Liverpool Street

7. The major blockade of Liverpool Street station, primarily taken to demolish a bridge as part of TfL's East London Line extension project, was used as an opportunity to carry out other engineering work which required access to the railway. One such project was to replace overhead line electrification wiring which had become unreliable and was causing delays to services.
8. This possession, which should have finished in the early hours of 2 January 2008, overran and disrupted services for much of that day. A variety of difficulties were experienced during the works, including a 50% shortfall in skilled overhead line electrification staff on the final two days (again Network Rail does not believe that it has yet had an adequate explanation for this from its contractors), problems with availability of materials, and unanticipated difficulties with some aspects of the work itself.
9. As at Rugby, progress information provided to Network Rail managers by the contractors was incorrect and the likelihood of overrun was identified too late. Operators were not warned of the problem until three hours before the work

was due to finish, and were therefore unable to implement any contingency plans.

Shields Junction

10. Shields Junction is on the Glasgow suburban rail network. As part of work for the planned Glasgow Airport Rail Link, the junction was to be relaid. A possession for this work was scheduled for 25 December 2007 to 7 January 2008.
11. Late in the work, critical testing of new signalling for the revised track layout ran into difficulties which caused the possession to overrun until 14 January. The problems were caused by incompatibilities between the newly installed signalling and the existing system with which it interfaced – problems which would have been avoided if they had been correctly identified at the design stage.
12. Because the problems only arose at a very late stage in the possession there was then little scope to recover the position before the overrun began, and little scope to provide advance warning to operators and passengers.

Network issues

13. Network Rail assesses its projects both individually and across the network as a whole, to ensure that critical resources are not over committed. A review in November 2007 led to significant reductions in the total programme of work planned for Christmas/New Year 2007 to reflect such constraints. Major items of work at places including Stevenage and Willesden were deferred and will now have to be rescheduled. However the changes were announced too late for train operators to respond by restoring services which had been curtailed for the expected possessions.
14. The events investigated here demonstrate that Network Rail does not yet have the degree of understanding of its supply chain that it needs to schedule these large programmes robustly. Network Rail has announced that, as one measure to tackle this, it intends to recruit additional overhead line electrification staff to enable it carry out some overhead electrification work in-house.

Conclusions

15. Historically high levels of investment are being made in Network Rail's infrastructure. There are two drivers for this:
- the need to apply sustainable asset management policies which will improve the safety, efficiency and performance of the network over the long term; and
 - the need to enhance the network so that it can meet the growing demand from rail users and offer improved levels of service.

This is a very healthy situation, but it poses a major challenge: to combine delivery of a large volume of engineering work with providing continuity of service to existing rail users.

16. A great deal of this engineering work is completed successfully and services are restored promptly as planned. But when work overruns, the impact on rail users can be severe. The higher the level of engineering work being carried out, the greater the risk that this kind of unplanned disruption could arise. The greater, therefore, is the importance that Network Rail must attach to doing all that it reasonably can to minimise that risk. We have found wide variation in the quality of project and risk management in Network Rail's engineering programmes, based on the examples under investigation.
17. The WCRM Programme has good quality programme and project management procedures in place. These include structured risk review processes which, for Rugby, were followed in practice. Inevitably with the benefit of hindsight it is possible to see where different judgements might have been made which could have led to better outcomes. However this does not show, and we do not believe, that the problems encountered at Rugby over Christmas – whether in needing to seek an extra day for the possession at a late date, or in failing to complete the work on schedule - were caused by any significant failure of project or risk management in the weeks beforehand.
18. The planning for Liverpool Street was altogether less satisfactory. The last time a proper schedule quantified risk assessment was carried out was in August, four months before the work itself. This was despite late design changes and the inclusion of additional work. Many of the problems which

contributed to the overrun at Liverpool Street were, in our view, foreseeable and should have been identified if a proper risk assessment had been carried out. This would, as a minimum, have enabled better control and mitigation actions to have been put in place.

19. For Shields Junction the schedule quantified risk assessments were not used on the grounds that this methodology had not previously been found to be robust. Such a step should only have been contemplated if it was proposed to replace schedule quantified risk assessments with an equally or more thorough risk assessment process. Based on the information supplied to us, the assessment of risks to the schedule seems to have been fundamentally flawed and to have omitted almost entirely to consider risks associated with the signalling element of the work.
20. It is apparent that weaknesses in risk assessment and risk management, which we identified in connection with the overrun of the Portsmouth resignalling project in 2007, were also present in two of the three cases we investigated, each in a different part of the country and related to a different type of project.
21. At Rugby and at Liverpool Street there were serious shortcomings in Network Rail's management of the works once the possession began. Not all projects are equally challenging, or equally critical. The degree of attention that Network Rail should give to successful project delivery, and the degree of scrutiny that it applies to assurances from its suppliers, should no doubt take this into account.
22. Rugby-Nuneaton was recognised as the most complex project in the WCRM Programme. The works were blocking a key section of one of the most important rail routes in the country. The late and controversial extension of the blockade into 31 December had already created problems for operators and rail users. We would therefore expect that Network Rail would have given maximum priority to ensuring that these works were completed successfully. Yet it is clear that by 31 December senior Network Rail managers were unaware of the extent of problems on the ground. This was in part because of excessive reliance on self-certification of work by the contractors. This led directly to failure to manage the problems effectively and failure to communicate reliable information to train operators and rail users.

23. At Liverpool Street the works were thought to be less complex, but the location again made prompt completion essential. Yet here too, Network Rail's management failed to understand the nature and extent of problems until far too late. It is Network Rail's responsibility to manage its suppliers and contractors so as to achieve an acceptable level of risk in projects such as these – a point we made in connection with the Portsmouth problems and which Network Rail acknowledged.
24. Largely as a result of Network Rail's own ignorance of the true progress with the projects once work was underway, it failed to provide operators and rail users with reliable information about the likelihood and extent of disruption. This exacerbated the situation and caused the overruns to have even more disruptive impact than they might have done.
25. However, some operators were learning of problems through unofficial channels long before they were formally advised.
26. These observations raise questions about other issues which we believe Network Rail should consider:
 - is there undue reluctance by some staff to send unwelcome messages clearly and promptly up through the organisation?
 - is there too much reluctance by Network Rail to alert operators to emerging risks while they are still striving to contain them (which we acknowledge to be a difficult balance)?
27. Our conclusion is that, when considering the similarities between weaknesses identified in risk management, site management and supplier management in combinations of these three cases – and Portsmouth, is that such weaknesses are not confined to these cases alone but are present to at least some degree more widely across the organisation.
28. An initiative which does appear to have been successful, once it was taken, was the introduction of 'Gold Command' arrangements at Rugby and at Liverpool Street to recover train services and to communicate with operators and customers. We support Network Rail's proposal to review how and when such arrangements are called into effect, to see whether they can be made still more effective.

29. Network Rail does not appear to have optimised the balance between risk and reward with its suppliers. Network Rail should consider whether it can improve this and, in the medium term, should consider development of a genuine spirit of partnership in project delivery, for example along the lines adopted by BAA plc for major projects such as Heathrow Terminal 5.
30. During 2007 Network Rail identified that OLE expertise is now a critical resource, use of which must be planned on a network-wide basis. It took steps to do this, which resulted in a considerable reduction in the work planned for Christmas. It took unprecedented steps to validate the resource plans by obtaining individual names. It is important that Network Rail now reviews all other key resources to establish whether there are likely to be other such constraints, well before these turn into live problems. With the work volumes proposed for the next control period this is a subject we will also be focusing on closely in the remaining stages of the Periodic Review.
31. Late in 2007 Network Rail took effective steps to review the portfolio of work planned for Christmas and to de-scope this where it was not deliverable. Hard decisions were taken, but it was costly and unnecessarily disruptive for these to have been taken so late in the day. The practice of booking blockades and major possessions long before the event may be constraining the design of stageworks and ultimately leading to inefficiencies. We believe that Network Rail should review, with the industry, its own planning timescales and the timescales for relevant industry processes such as possession booking and train planning, to seek a more efficient structure which provides both predictability and stability.
32. Network Rail has acknowledged that it cannot complete the WCRM works needed to support the December 2008 timetable improvements with an acceptable level of certainty, with the plans it had in place at the start of 2008. It is working up options for restoring robustness to the programme. These include consideration of whether it is still possible, and desirable, to plan to complete within the current timescales. To do so would require additional disruptive possessions during 2008, beyond what has so far been agreed.
33. Resolution of this is urgent. The existing programme is not robust, but any changes must be made in good time to minimise adverse impacts on operators and rail users.

34. Network Rail's plans for work over Easter 2008 are firm. We have held discussions with Network Rail and the relevant operators which have established that there is no reason to doubt that the work proposed can be successfully completed in the time allocated, but that there is still work to do to put adequate plans in place to handle passengers and freight affected by the possessions and to develop contingency plans.

1. Introduction

Background

- 1.1 The West Coast Route Modernisation (WCRM) programme was developed to deliver a strategy by the former Strategic Rail Authority in 2003, and funding and output requirements on Network Rail were established by the Rail Regulator in the 2003 access charges review (ACR2003). A key output is the provision of infrastructure capability to deliver significant timetable improvements in December 2008. One of the key milestones in delivering these is work at Rugby and Nuneaton. Critical work at Rugby was scheduled for the Christmas/New Year 2007 period.
- 1.2 On 12 December, Network Rail advised train operators that it intended to extend the planned blockade at Rugby from six days to seven, to include 31 December. On 17 December, Virgin Trains asked us to issue a provisional order preventing Network Rail from taking this additional day. After discussions and correspondence with Network Rail and Virgin Trains we concluded that it would not be in the best overall interests of rail users to make such an order, as it would probably lead to higher levels of disruption in total. However, we decided to conduct an urgent investigation into the background to the possession extension.
- 1.3 Subsequently, the possession at Rugby overran until 4 January. Also over the New Year, engineering work at Liverpool Street overran by a day with services affected for a further two days, and a number of items of work which had been scheduled at other locations were cancelled at short notice. In Scotland, work at Shields Junction then overran from 7 January until 14 January. All three overruns had significant impacts on passenger train operators and their passengers, and the overruns at Rugby and Shields Junction also seriously affected freight services.
- 1.4 We received a number of complaints and representations about these matters. In particular, Virgin Trains complained about the additional day's possession, the overrun and the management of the West Coast programme generally; National Express and Hull Trains complained about the failure to deliver work at Stevenage; Passenger Focus and London Travelwatch complained about the impact on passengers; EWS and Freightliner

complained about the impact on their customers; and Transport Scotland complained to us about the problems at Shields Junction.

- 1.5 In view of the events over Christmas/New Year at Rugby, Liverpool Street and elsewhere, we decided to extend the scope of our investigation.

Terms of reference of our investigation

- 1.6 We set out the terms of reference for our expanded investigation in a letter¹ to Network Rail on 8 January 2008. There are two strands to the investigation:

- to investigate the circumstances surrounding the late notice planned extension of the Rugby possession, and the major possession overruns at Rugby and Liverpool Street over Christmas/New Year. To investigate any relationship between these events and delivery of planned works elsewhere on the network over this period (for example at Stevenage and Shields Junction). To establish the impact of these events on train operators and their customers (passenger and freight), and the extent to which Network Rail contributed to mitigating these impacts; and
- to investigate the robustness of Network Rail's plans for the remaining work to enhance the West Coast Main Line (WCML) to meet its obligations under ACR2003 and to enable the planned December 2008 service upgrade.

Context for this investigation

- 1.7 We need to establish whether Network Rail has been, is, or is likely to be in breach of its network licence in connection with any of the matters set out in the terms of reference above. In addition, we need to establish whether there are any systemic or network wide failings underlying these events, which might reveal the potential for future breaches.

- 1.8 The relevant provisions in Network Rail's network licence are:

- Condition 7 – relating to the planning of the operation, maintenance, renewal and development of the network in accordance with best

¹ http://www.rail-reg.gov.uk/upload/pdf/mon-let-Network Rail-IC_080108.pdf

practice and in a timely, efficient and economical manner so as to satisfy the reasonable requirements of customers and funders; and

- Condition 9(2) – relating to the planning of the renewal, maintenance and enhancement of the network in a timely and efficient manner to enable the specification of the requirements for temporary changes to the national timetable (except in respect of changes arising from emergencies or severe weather conditions) so that the procedures to revise the national timetable in respect of such changes can be completed not less than 12 weeks prior to the date of any such change.

1.9 We are not investigating site safety in the possession problems over Christmas/New Year and do not currently have any concerns about the management of safety in these possessions.

Conduct of the investigation

1.10 During the investigation we received written representations from a number of interested parties regarding the issues surrounding this investigation; these are listed at Annex 1. Network Rail has provided us with numerous historic documents and letters setting out answers to specific questions posed by us. The key documents we have relied on in producing this report, and which are appended to this report, are listed at Annex 3.

1.11 We have also attended various meetings with Network Rail and other interested parties to enable us to question them and better understand what happened in relation to the issues we are investigating. A list of the meetings attended by us is attached at Annex 2.

1.12 We have analysed the large amount of information provided to us in order to understand what happened at Rugby, Liverpool Street and Shields Junction and to enable us to come to conclusions about what went wrong. Where possible we have cross checked the information provided to us by Network Rail after the events with documentation produced by it and its contractors before and at the time of the events.

1.13 To assist us with the analysis of the information provided to us and to provide us with expert opinion on programme management and engineering issues we have drawn on the services of the independent reporter, Halcrow.

Consideration of issues

1.14 We consider that the issues in the investigation fall under six different headings:

- the causes of the late notification of the additional possession on 31 December at Rugby;
- the causes of the subsequent possession overrun at Rugby;
- the causes of the overrun of the possession at Liverpool Street;
- the causes of the overrun of the possession at Shields Junction;
- the adequacy of Network Rail's overall planning of the Christmas/New Year possessions and any inter-relation between the problems at Rugby, Liverpool Street and Shields Junction; and
- the robustness of the WCRM programme to undertake the further work necessary to deliver the December 2008 timetable enhancements, including reliability.

Purpose of this document

1.15 This report sets out the findings of our investigation into the six issues set out above. It sets out both matters of fact that we have established and our views based on those.

1.16 The report does not draw any conclusions about any past, current or future licence breaches by Network Rail. Our conclusions on these issues – including specific enforcement actions – based on the findings in this report, are set out elsewhere.

1.17 In this report we do, however, make certain recommendations – separate from the enforcement actions – about steps Network Rail should consider in order to improve its management of possessions.

2. The possession extension and overruns

Rugby

Works in context

- 2.1 The work at Rugby during the Christmas/New Year period formed part of the overall WCRM programme and was designed to ease the current bottleneck presented by the track layout, to improve capacity and speeds through the station.
- 2.2 The original 2002-03 scheme to demolish and reposition Rugby station was, in 2004, replaced by a new less costly scheme that worked around the current position of the station to deliver capacity and performance improvements. However, the new scheme introduced technical challenges because of the complexity and alignment of the track layout.
- 2.3 The work planned for the Christmas/New Year blockade involved a sequence of: track layout changes; the installation of overhead line electrification (OLE) equipment; and the installation of signalling equipment. The work was a key stage in the on-going remodelling of Rugby station, due for completion in December 2008.
- 2.4 In its evidence to the House of Commons Transport Committee², Bechtel stated that “Rugby/Nuneaton is the most complex project in the WCRM programme ... The staging of the works at Rugby was critical for the operation of the December 2008 timetable, more so than any other project in the WCRM programme”.

Late Notice possession on 31 December 2007

Planning of the programme of works

- 2.5 From the documents we have received and the meetings we have had with Network Rail staff during the investigation and previously, we have gathered

² Written evidence submitted by Bechtel to Transport Committee inquiry into Network Rail engineering delays over the New Year period.

evidence that supports our view that there are good project management processes in place for the WCRM programme. The WCRM specific Programme Integrated Management System (PIMS) is a proven system of specifications, processes and procedures that govern the delivery of the WCRM programme outputs. PIMS was certified in 2003 by Lloyds Register Quality Assurance (LRQA), an internationally recognised organisation, against both ISO 9001 quality and ISO 14001 environmental standards. LRQA has recertified PIMS and regularly inspects its use, the last inspection being in November 2007³.

2.6 Halcrow, wrote in its Project Monitoring Report for 2006-07⁴ that:

“In conducting our reporting activity we have been impressed with the thoroughness of the programme management and reporting regime established by the WCRM programme team ... It is our view that the level of programme management expertise and concerted application of project management techniques, applied so successfully to this programme, should be applied in an appropriate manner on future Network Rail major programmes of work in order to increase their certainty of success.”

2.7 The original six day blockade was booked in 2006 in accordance with the industry timescales, as set out in the Network Code. Evidence provided in the form of T-8, T-4 and T-1 “readiness-reviews”⁵ confirms that a structured planning and risk review process was followed by Network Rail. These readiness-reviews were supported by Schedule Quantified Risk Assessments (SQRA) at T-8, T-4, T-1.⁶

2.8 The SQRA assumed that weekend preparatory work planned for November and December would be completed to schedule. As mitigation against losing any of this preparatory work, Network Rail had the option of either re-planning

³ Network Rail letter of 8/01/08, Appendix B. LRQA accreditation stated by Network Rail in its letter of 18/01/08.

⁴ *Independent Reporter A, Project Monitoring 2006/07, Final Report*; ORR, London, 12 December 2007. <http://www.rail-reg.gov.uk/upload/pdf/conrep-projmon07-Halcrow.pdf>

⁵ T-8 designates a point in time that is 8 weeks in advance of the start of the possession to which it relates. T-4 is 4 weeks ahead and T-1 is one week ahead.

⁶ Network Rail letter of 08/01/08, Appendix H and Network Rail letter of 18/01/08, Appendix G.

the work for a later weekend or incorporating it within the blockade. Either of these options relied on Network Rail being able to defer other non-critical work to accommodate the extra work.

- 2.9 At T-8 (30 October), the SQRA and peer review highlighted significant risks about the deliverability of the planned works in the blockade. Network Rail has stated that it considered that these issues were manageable⁷. At T-4 (27 November), the SQRA continued to indicate a low probability of handback on time, but with a high probability of completion 5 hours late⁸. However, at this stage Network Rail only had four weeks to mitigate the identified schedule risks (e.g. by de-scoping non-critical work).

Events leading up to decision to extend blockade

- 2.10 Network Rail has stated that it lost possession time on three successive weekends due to: the failure of a set of points in week 35 (24-25 November) that affected engineering train movements; high winds in week 36 (1-2 December) that prohibited the use of a high capacity crane; and a late running engineering train in week 37 (8-9 December)⁹.
- 2.11 Both London Midland¹⁰ and EWS¹¹ state that Network Rail also cited late completion of the design and approval of the OLE as a reason for the requirement to extend the blockade by an extra day. London Midland has also advised¹² that, since the commencement of its franchise on 11 November, it had experienced possession overruns on a weekly basis that required Network Rail to defer work into future weekends (not all of these were associated with the works at Rugby).
- 2.12 Between 26 November (after the loss of the first weekend) and 10 December (after all three weekends were lost), Network Rail did not specifically discuss the emerging impact of the lost preparatory work with

⁷ Network Rail letter of 08/01/08, page 9.

⁸ Network Rail letter of 08/01/08.

⁹ Network Rail letters of 08/01/08, page 13, and 18/01/08, page 20.

¹⁰ London Midland letter of 18/01/08, page 3.

¹¹ EWS letter of 18/01/07 (sic), page 2.

¹² London Midland letter of 18/01/08, page 3.

senior representatives of affected stakeholders. Nor was it mentioned at the West Coast Project Board on 6 December. However, informal/working level discussions did take place with Virgin Trains on 28 November and at the meeting of the West Coast Operations Group (WCOG) on 6 December where the possibility of an extra day was one of a number of options discussed. Network Rail made the decision to take the extra day on 12 December following the third consecutive weekend of lost work. Network Rail says that prior to this it was endeavouring to avoid the need for the additional day by looking for alternative options.

- 2.13 The decision only to request one day was based on a review of the deferred work and consultation with the contractor Jarvis. The evidence presented to us suggests that no SQRA was undertaken prior to applying for the additional day, although the T-1 SQRA carried out on 16 December¹³ validated that the extra day should be sufficient.

Communication with train operators

- 2.14 Network Rail says that it began informal discussions with the train operators' train planners about taking an extra day on 28 November (T-4), but there is some disagreement about how firm these discussions were¹⁴. EWS and Virgin Trains both deny any knowledge of the requirement for an extra day before 6 December. Even then there is disagreement about what days were offered with Network Rail claiming that it offered 15 December or 31 December and Virgin Trains claiming it was offered 24 December or 31 December. In any case, the operators agreed that 31 December was the least bad option.
- 2.15 The first significant discussions on the extra day were at the WCOG on 6 December (T-3), following lost work due to high winds over the weekend of 1-2 December. However, Network Rail was still not certain that it required the additional day and was still looking for alternative solutions such as de-scoping or accelerating the work.

¹³ Network Rail letter of 18/01/08, page 3, para 6, and Appendix B: SQRA.

¹⁴ Freightliner confirms that some discussions did take place at about this time and London Midland said that there were "rumours" about the need for an extra day's possession.

- 2.16 It was not until 09.32 hrs on 12 December (T-2), following the third consecutive weekend of lost work, that Network Rail's National Access Unit formally confirmed that the extra day was required. EWS said it needed the full 10 days consultation period, but on 14 December Network Rail declared that it would take the possession regardless of the outcome of the consultation, given that the time before the blockade was due to start was very limited and it needed to confirm arrangements to train operators as soon as possible in order to enable them to make arrangements for their passengers and other customers.
- 2.17 Between 6 December and 12 December, Network Rail and Virgin Trains were discussing compensation sums for the extra day and for all the possessions which Network Rail had planned for 2008. Network Rail sought to separate discussion about the extra day in order to progress that quickly, but it says that Virgin Trains would not agree to this and set a deadline of 09.00 hrs on 12 December for Network Rail to agree terms. Virgin Trains subsequently extended the deadline to 12.00 hrs at which point it reopened its reservation system for passengers to book tickets for 31 December¹⁵.
- 2.18 On 17 December Virgin Trains asked us to intervene by issuing a provisional order¹⁶ to prevent Network Rail from taking the additional day. We considered that it was clearly undesirable to have arrived at a position where an extra day was required at such a late date. Nonetheless we decided on 19 December¹⁷, following discussions and correspondence with Network Rail and Virgin Trains, not to issue a provisional order preventing Network Rail from taking that extra day. This was because we concluded that it would not be in the best overall interests of rail users to make such an order, as it would probably lead to higher levels of disruption in total. Network Rail notified operators of its intention to take the possession and issued a press notice immediately.

¹⁵ Virgin Trains emails of 18/01/08.

¹⁶ Section 55(2) of the Railways Act 1993 provides for ORR to, where a licence holder is contravening or is likely to contravene a condition of its licence, to make a provisional order for the purpose of securing compliance with that condition. In deciding whether to make the order ORR has to consider the extent to which any person is likely to sustain loss or damage in consequence of the breach. The ORR shall not make a provisional order if it is satisfied that the duties imposed on it by section 4 of the Railways Act 1993 preclude it from doing so.

¹⁷ Special ORR Board meeting: http://www.rail-reg.gov.uk/upload/pdf/board_191207.pdf

Summary

- 2.19 We consider that the WCRM programme team has good project management processes in place and that these processes were followed in the planning of the blockade. We are also satisfied that the works to be carried out in the possessions leading up to the blockade were critical to the success of the blockade and that the WCRM programme team was fully aware of this.
- 2.20 While the loss of critical works in weeks 35, 36 and 37 contributed to the need to extend the blockade, we consider that the T-8 and T-4 SQRAs should have indicated to Network Rail that even before the possessions were lost it would struggle to deliver the work that was planned to be delivered in the six day period originally booked for the blockade and, therefore, Network Rail should have taken a less optimistic view of its ability to absorb lost pre-blockade work into the blockade.
- 2.21 As it was, although the desire to avoid the need for an additional day was understandable, we consider that Network Rail was over-optimistic about its ability to manage delivery of the lost work that was arising in week 35 and 36, and might have reasonably been expected to request the extra day one week earlier, but not much earlier than that and certainly not early enough to be compliant with the T-12 timescales.

Overrun

Planning for the blockade, risk assessments, contingencies

- 2.22 The readiness-reviews include evidence that there was detailed planning of the works that were to be carried out in the blockade. The readiness-reviews were well structured and attended by key staff from Network Rail, Bechtel and the main contractors, Jarvis Rail and Atkins Rail¹⁸. The Rugby blockade schedule¹⁹ provides evidence that there was a detailed plan for the delivery of the works. It also shows that the work was sequential and, therefore, that delays to the early activities would have a knock on effect on the succeeding activities.

¹⁸ Network Rail letter of 08/01/08, Appendix H; Network Rail letter of 18/01/08, Appendices G and R; and Network Rail letter of 05/02/08, Appendix G.

¹⁹ Network Rail letter of 18/01/08, Appendix A.

- 2.23 Key risks were identified through the readiness-reviews and these included the requirement to confirm the availability of key staff for both the signalling and OLE works. Network Rail has also stated that the SQRA's it carried out were based on a duration allowance of +20% on all activities, including OLE, thereby building contingency into the work plan.
- 2.24 Network Rail has said that Jarvis advised on 3 December that it was struggling to find enough staff with 'wiring' experience and Jarvis was reviewing experience and competence to optimise staff deployment. At that time, 92 out of a required 96 OLE linesman were confirmed. One week in advance of the blockade, Network Rail required its contractor to commit to named OLE resources and a Network Rail engineer familiar with OLE resources verified the list²⁰. We understand that at that point an average of 70 individuals per day were identified as being available.
- 2.25 While it is normal for signalling resources to be named, it is not normal to obtain names for OLE resources, and we accept that to do so was in response to the identification of the risk, through the readiness-reviews, of the non-availability of OLE resources. We have also established that Network Rail checked that the named OLE staff for Rugby had not also been allocated to work at Liverpool Street; Network Rail found only two named staff who had been duplicated²¹.
- 2.26 Following a network wide review of the planned engineering work on 19 December, Network Rail cancelled packages of OLE works on the Midland Main Line (MML), East Coast Main Line (ECML) and WCML. This was, in part, to ensure that there were sufficient OLE staff available for Rugby, as well as accommodating other essential works on other parts of the network.
- 2.27 On 22 December, the weekend before the blockade started, OLE resource shortfalls were partly responsible for the deferral of further work into the blockade. Network Rail has stated that, despite the apparent shortfall in OLE resources, a review with its contractor provided it with the necessary confidence that the work that needed to be done within the possession could still be achieved with the 67 OLE linesmen²² per day who had been named at

²⁰ Network Rail letter of 05/02/08, page 15.

²¹ Network Rail letter of 30/01/08, "Network Issues".

²² Meeting between ORR and Network Rail, 23/01/08.

that time. We understand that Network Rail and its contractor agreed that this level of staffing provided around 6000 man-hours compared to a required activity level of around 4500 man-hours.

- 2.28 Network Rail has stated that on 26 December, two days after the full blockade started, OLE staffing actually on site fell significantly short of these planned requirements. Network Rail replanned the work of the blockade by changing the sequence of works to create additional time for the OLE work. At the same time Network Rail sought additional staff to supplement the staff already supplied by its contractor²³.
- 2.29 Based on the attendance log taken from the register that was maintained throughout the blockade by the Site Access Control Centre (SACC) at Rugby, it appears that the average number of OLE linesmen who attended on site over the first two days was at or above the planned requirement. However, the hours that they spent on site were only around 55% of that planned.
- 2.30 Over the same time period the average number of the contractor's supervisors who attended was around 50% of that planned with the average hours spent on site only around 30% of that planned. The lack of supervision had a direct impact on the productivity of the OLE linesmen.
- 2.31 On 27 December it became clear to the Rugby/Nuneaton team that its contractor was not on course to deliver the programme of works on time. In response Network Rail implemented contingency actions. Some of these were pre-planned and others were developed in real time. These included:
- de-scoping non-critical work;
 - implementation of a "Five Area" strategy for wheels-free testing to give an additional 24 hours to complete OLE work;
 - taking additional site supervisory staff from other WCRM projects; and
 - instituting a national search for additional OLE staff.

²³ Network Rail letter of 18/01/08, page 10.

The revised schedule at this point still supported an on-time handback, but depended on obtaining sufficient competent resources²⁴.

- 2.32 We understand Network Rail site managers had support from Network Rail directors to try and secure extra OLE staff. Network Rail states that it did not instruct any resources to be moved from Liverpool Street to Rugby, but there is uncertainty as to what, if anything, was agreed locally between the contractor and agency staff.
- 2.33 In the event, we understand that the percentage of OLE linesmen who turned up for duty throughout the whole blockade was around 85%, but the actual time spent on site was only around 60% of that planned. Of the supervisors, the percentage attendance and time spent on site was only around 30% of that planned. Throughout the blockade, the lack of supervisors had a material impact on the productivity of the OLE linesmen. Network Rail states that this level of absence had not been experienced before²⁵.
- 2.34 Several times after 27 December the blockade plan was re-configured to deliver an on-time handback, but this continued to rely on remaining OLE staff reporting for duty, supplemented by extra OLE staff from other contractors and Network Rail OLE maintenance staff.
- 2.35 The continued shortage of competent OLE resources on site meant that the revised plans were undermined and unachievable. This appears to us to have been compounded by progress reports from the contractor that did not accurately reflect the remaining work to be done. Network Rail continued to rely upon the common practice of allowing contractors to self-certify their own work. This was despite the fact that there were resourcing problems on site and that some resources had been brought in from other contractors. Flaws in the assumptions underlying the revised plans, along with the use of self reporting in these circumstances, led to inaccurate forecasts for the completion of the work that, in turn, led to delays in establishing that a serious overrun was imminent.
- 2.36 Network Rail has said that the pre-blockade contingency planning addressed issues relating to plant and equipment breakdown, and materials availability.

²⁴ Network Rail letter of 18/01/08, page 10.

²⁵ Meeting between ORR and Network Rail, 23/01/08.

In addition, to mitigate the impact of adverse events, Network Rail had a number of options to re-open the railway with reduced functionality. Some of these, including the blocking of the Down Coventry line to electric trains, were indeed implemented to mitigate the overrun²⁶.

2.37 Although we consider that there was contingency in the number of hours that the OLE resource plan could support, we consider that Network Rail should have done more to test the sensitivity of its assumptions in SQRAs regarding, for example the completion of preparatory work, and taken appropriate mitigation measures.

2.38 While, clearly, the low level of OLE staff attendance on site was a key reason for the overrun, Network Rail has said²⁷ that there were a number of other problems which led to poor productivity and underperformance against the plan for both Permanent Way (Pway) and OLE work. These were:

- Pway:
 - the number of personnel undertaking Pway work was less than planned;
 - an engineering train derailment;
 - discovery of unforeseen buried services; and
 - inefficient shift changes.
- OLE
 - inadequate supervision of OLE personnel, some of whom were on the job for the first time;
 - inefficient shift changes;
 - lack of consistency of crews undertaking the work; and
 - knock on effect of delays to the PWay works.

²⁶ Network Rail letter of 05/02/08, page 13.

²⁷ Network Rail letter of 18/01/08, page 9.

- 2.39 Network Rail has since told²⁸ us that Pway resources were not a significant issue. The Network Rail WCRM programme team has confirmed that the derailment of the train did not impact on the delivery of the works in the blockade.
- 2.40 In respect of the failure to detect the buried service, Network Rail has confirmed that standard pre-possession checks were carried out including searches of Public Utility records, subsurface surveys and digging a number of trial pits²⁹. The work affected was the excavation of the track formation. Halcrow does not consider that discovery of the buried service should have had a material impact on the delivery of the works in the blockade.
- 2.41 Network Rail has confirmed³⁰ that the decision to implement a twelve hour shift pattern was taken prior to the blockade. The principal reason for this was the shortage of OLE resources to support any alternative shift pattern, e.g. three nine hour shifts per day with half hour overlaps. While we understand why this shift pattern was necessary, we consider that the management of the shift changeovers was inadequate³¹ and, other than the correction of the shift change mis-alignment for the machine controllers, no action appears to us to have been taken to rectify the problem.
- 2.42 On 31 December Network Rail concluded that an overrun would happen. By this stage senior managers from Network Rail and the Bechtel programme director were on site endeavouring to manage the situation. However the full extent of the remaining work was not properly understood and the overrun was only anticipated to be a few hours. Only when a detailed check was carried out by Network Rail staff was the shortfall in the work done discovered; this and problems with the quality of some work indicated that more time would be needed to restore the infrastructure to a state where it could be reopened for traffic.

²⁸ Network Rail letter of 05/02/08, page 15.

²⁹ Network Rail letter of 05/02/08, page 18.

³⁰ Network Rail letter of 05/02/08, page 18.

³¹ Network Rail letter of 05/02/08, page 18.

2.43 We consider, from the evidence made available to us, that the OLE staff shortfall, particularly in the time spent on site, and the absence of supervisors was the principal cause of the over-run. This is because:

- the contractor's supervisors were spread too thinly to: identify problems as they emerged; manage the distribution of work to ensure good levels of productivity; keep track of progress; and identify and record outstanding work;
- the work gangs did not work their full shift times and, as a result, did not complete the planned work in each shift; and
- the work gangs, at the contractor's suggestion, consisted of a mixture of experienced and less experienced staff which resulted in mistakes being made and not being recognised.

2.44 While it is quite normal practice to accept self-certification of work completed by contractors, with the significant reduction in skilled staff on site and the shortage of supervisors we consider that this was no longer an appropriate approach for such a critical project. However, because Network Rail's on site engineers were being distracted by other problems they were unable to step up inspection levels. Therefore, the developing backlog of planned work was not completed and the developing volume of corrective work needing to be done was not identified by Network Rail at the earliest opportunity.

Communication with train operators

2.45 Until 21.00 hrs on 30 December Network Rail was still telling Virgin Trains that the track would be handed back on time³². However, many train operators were getting informal indications of problems through control centres at an earlier stage, and Virgin Trains questioned Network Rail about this. It was not until 14.00 hrs on 31 December that Network Rail declared an overrun, at that stage of about six hours into the next day³³. Information to train operators was updated on the morning of 1 January 2008 and at 14.00 hrs on 1 January the overrun was turned into an operational incident and a Gold Command was set up and headed by Network Rail.

³² Meeting between ORR and Virgin Trains, 23/01/08.

³³ Network Rail letter of 22/01/08.

2.46 We understand that operators were informed in the morning of 2 January that the railway would not reopen before 05.00 hrs on 3 January. The confidence level for this estimate was low. At 13.00 hrs on 2 January operators were told by Network Rail that the lines would reopen at 05.00 hrs on 4 January.

Impact of overrun on train operators

2.47 All affected train operators have complained about the very late notice they were given regarding the overrun and the lack of updates as it continued. Most had been hearing rumours of problems at an operational level from their staff in the integrated control centres, but were being assured at a high level that everything was on target and the line would be handed back on time.

2.48 The operators also complained that the Network Rail project managers were, not unreasonably, focussed on getting the project finished on time, but that there did not appear to have been anyone in overall charge or taking an overview who understood the needs of train operators, including their need for timely information. Some train operators were able to put contingency arrangements into place for 1 January as these had been pre-planned, but there was more of a problem on 2 & 3 January due to a lack of pre-planning and a lack of information from Network Rail. Freightliner said that as Network Rail initially declared a six hour overrun, it did not think it worth taking its wagons back to the depot to put on smaller containers to run on the diversionary routes available. This meant that its wagons were then effectively out of use for the full three days of the overrun. Virgin Trains said it would have made arrangements to run some of its diesel Voyagers on the non-electrified diversionary routes if it had known the extent of the problem earlier.

2.49 London Midland said that there were not enough Train Service Database staff available to deal with the changes in services so even where information was available it was not being uploaded to the database which drives the systems making information available to the public through websites and enquiry services. This added significantly to the confusion affecting operations and passengers.

2.50 Passenger Focus also said that information to passengers over the overrun was poor. Industry websites (both Network Rail and operators') were out of

date³⁴, inaccurate, and were not offering adequate alternatives. Display boards and customer information systems at stations were showing wrong information, which led to lack of confidence in all information. Ticketing services were still selling tickets on trains that were not running.

- 2.51 National Rail Enquiries has responded to Passenger Focus' letter outlining the considerable investments the industry has made over the last year for improving passenger information during disruption, and the measures it has discussed since the Christmas overruns. National Rail Enquiries points out that all its services showed the correct information for the day, except on 2 January 2008. In addition, it pointed out that it has a "Live Updates" ticker on every page with up to date information, but it will make this more prominent in future.

Summary

- 2.52 We consider, from the evidence made available to us, that the blockade overrun was primarily caused by the failure of the contractor to provide sufficient, competent OLE linesmen and supervisors. The number of OLE staff 'no shows', particularly supervisors' attendance, and general absenteeism during shifts, was considerably higher than would have been reasonably expected based on experience. However, in the lead up to the blockade, Network Rail knew that the contractor was struggling to secure these resources. Coupled with the acknowledged complexity and criticality of the work, this should have driven the provision of a higher level of supervision during the blockade which would have helped Network Rail to predict and to minimise the extent of the over-run. However, it is not clear that it would have prevented the overrun.
- 2.53 We have seen evidence that the WCRM programme team has good project management processes in place and that these processes were followed in the planning of the blockade. Works that were deferred from the previous weekends' possessions were incorporated into a revised plan for the blockade and this plan was subject to review by Network Rail with its contractors to ensure that it could be delivered in the time available. The plan for the blockade, including contingency within the activity durations, when tested after

³⁴ Passenger Focus letter of 04/02/08.

the blockade, produced an SQRA with an 85% probability that the works would not overrun by more than 1 hour 45 minutes.

- 2.54 However, while the revised plans for the blockade were updated by the Network Rail site management team as the works progressed, the information on which they were based was not accurate. This arose in part from the lack of supervisory resources on site and partly because Network Rail continued to rely on the contractor to self-certify the works it was undertaking even though the circumstances on site did not suggest that this practice was robust. This led to serious flaws in the estimation of hand back time and in decisions about appropriate actions to be taken in response to that situation, together with poor communication.

Liverpool Street

Works in context

- 2.55 Over Christmas/New Year 2007 there were engineering works at Liverpool Street, Bethnal Green, Shenfield and Stratford on the Great Eastern Main Line.
- 2.56 The blockade at Liverpool Street was taken primarily to allow the demolition of bridge 19, 1000 metres east of Liverpool Street. The demolition was to allow the future installation of a new steel bridge for the East London Line extension. The bridge passed over the entire throat of Liverpool Street and the work would require the station to be completely closed for 11 days. The project to demolish the bridge was initiated approximately four years ago and more detailed planning commenced around two years ago. Network Rail decided to take advantage of the closure to include various pieces of additional work, in particular the complete renewal of the OLE on all lines between the buffer stops at Liverpool Street and a point just east of Bridge 19. These lines had become unreliable and were affecting the performance of services in to and out of Liverpool Street.
- 2.57 The scope and outline design of the OLE renewals to be included in the blockade was confirmed in December 2006 and a contract for detailed design and construction of the works was awarded to AMEC Spie (now Colas) on 13 April 2007. Network Rail's plan was to start work on 22 December 2007 and to complete it by 2 January 2008.

Overrun

Planning for the blockade

- 2.58 In relation to the OLE project, SQRAs were carried out on 22 May, 29 June and 22 August 2007. Network Rail has provided copies of the SQRA reports, the outputs from which seem to us to indicate an increasing level of confidence that the works in the blockade would be completed on time. The last SQRA showed a 93% probability of completion on time, albeit it did not include the risks of resource availability at Christmas and failure to carry out the enabling works in the possessions preceding the blockade. While the report expresses an intention to carry out a further SQRA to model these risks it was not revisited to assess emerging risks between September and December 2007.
- 2.59 To secure critical OLE resources, Network Rail obtained a list of named OLE staff from its contractor, together with their sentinel card³⁵ numbers in advance of the possession³⁶.
- 2.60 In late November/early December further work was added to the planned possession³⁷. Network Rail has stated³⁸ that some of this was work which had not been completed in the possessions preceding the blockade (although Network Rail also says this could have been completed after the blockade) and some was additional work at the country end of the suburban lines. In addition, the scope of the works was altered due to late finalisation of the design. Halcrow has reviewed the quantum of additional work, as advised by Network Rail, and considers that it is very close to 10%. For the 11 day blockade the additional scope would potentially equate to an additional day's work.
- 2.61 Network Rail has advised that a key member of the contractor's staff resigned with immediate effect two weeks prior to the start of the blockade. This individual had been responsible for planning the supply of labour and

³⁵ The Sentinel card scheme is mandatory for staff working on Network Rail's infrastructure and seeks to ensure that staff are competent and medically fit.

³⁶ Meeting between ORR and Network Rail, 23/01/08.

³⁷ Network Rail letter of 22/01/08.

³⁸ Network Rail letter of 13/02/08, page 4.

supervisory staff. Despite the loss of this key resource, and the potential additional day's work in an already tight schedule, following a joint review with its contractor Network Rail concluded the blockade was still manageable. For this reason, Network Rail did not consider that any further formal schedule risk assessment was required, despite the changes to the assumptions that had been used in previous SQRA's.

- 2.62 On the evening of 21 December, immediately prior to commencement of the blockade, a revised plan for the OLE project was issued. This was due to the late delivery of some materials which, in turn, required a change in the sequencing of some activities³⁹.
- 2.63 For the duration of the blockade the Programme Management team set up a Command and Control Centre to coordinate all project activities and produce regular update reports.

Events during the blockade

- 2.64 The OLE work plan was further revised on 26 December again to re-sequence activities due to problems with the availability of materials. Throughout the duration of the project there were problems with the availability of materials. Network Rail has told us that this led to work being unfinished and instances of on the spot redesign. These outstanding pieces of work were not properly identified by the contractor and time to finish these "snagging" items was not built into the plan.
- 2.65 Network Rail says⁴⁰ that the material availability problems arose in part from late ordering (due itself, in part, to late design) and in part from insufficient resources to manage the handling of materials on site. In addition we understand that COLAS had problems with moving materials between its depot in Norwood and the site. Arrangements had been made for a sub-contract metal fabricator to be open over Christmas in order to mitigate against materials not being delivered, but this was not sufficient to overcome the late arrival on site of materials and inadequate distribution of materials around the site.

³⁹ Network Rail letter of 22/01/08.

⁴⁰ Network Rail letter of 22/01/08.

- 2.66 Network Rail has told us⁴¹ that up until the penultimate day of the blockade (31 December) the project management team considered that the amount of delay in the project (four hours) was recoverable.
- 2.67 However, on 31 December eight sub-contracted agency OLE staff failed to turn up for duty for the early shift. We understand this represented around 50% of the linesmen needed, but caused the loss of around 75% of the output from this shift because of the particular skills that the missing staff had. Because the absence was unexplained, Network Rail adopted a cautious approach and assumed that the sub-contracted agency staff for the late shift would also not show. Further resources were sought to make up the lost time and cover for the presumed further absences but given the level of agency staff already deployed and the fact that this was New Year's Eve, Network Rail was unable to get any more staff. However, a Network Rail maintenance manager who was on site offered 20 of his staff - although the skill sets between maintenance and construction linesmen are somewhat different. In the event, the late shift did arrive on site and it appears that, if anything, the site then became congested and, with limited supervisory presence, it was not possible to use productively all the resource available. On 1 January 2008, the eight sub-contracted agency staff again failed to turn up for the early shift. Network Rail has stated that its contractor has not yet given a satisfactory explanation for this.
- 2.68 The OLE work programmed for the Suburban Lines took 24 – 30 hours to complete rather than the planned 12 hours. This was caused by the shortage of competent OLE staff, combined with underestimation of the difficulties of working within Bishopsgate Tunnel and use of equipment that was novel to the work gang.
- 2.69 The OLE plan (like the other plans) was updated each day by a project planner provided by COLAS. However, Network Rail admits that the process for updating the OLE project was not as robust as for the other projects, one reason being that there was no project planner on the night shift. In addition, reporting from site was not accurate, possibly due to an inadequate number of planned supervisory staff and problems with the shift patterns of the few staff that were available⁴². In consequence, shortfalls in work done were not

⁴¹ Network Rail letter of 22/01/08.

⁴² Network Rail letter of 22/01/08 and meeting between ORR and Network Rail, 23/01/07.

properly identified by the contractor, and the time to finish these was not built into the updated plan.

- 2.70 Network Rail considers that a further consequence of the inadequacy of the supervisory staff was that agency OLE staff were not sufficiently monitored by the contractor leading to poor productivity because of a lack of drive and urgency. The combined effect of these problems meant that until the last 36 hours, Network Rail considered⁴³ that the project was running “broadly on schedule”.
- 2.71 Finally, during the last 36 hours of the blockade, it seems that supervisory staff were so closely involved in detailed work, because of the severe time pressure, that they were not able to stand back and take an overview of the whole project.
- 2.72 The first declaration of a likely overrun was made by the OLE team at around midnight on the morning of 2 January, when Network Rail considered this would only be 90 minutes. However, the full severity of the overrun was not declared until 01.00 hrs 2 January after Network Rail staff fully inspected the site, when the extent of the outstanding work was finally understood, three hours before the scheduled completion time. Network Rail's view now, following investigation, is that the project was at least 12 hours behind schedule by the evening of 31 December. This was not identified by the project planning system at the time, and so not escalated to the Command and Control Centre.
- 2.73 With the overrun declared so close to the scheduled finish time, and with the rest of the Liverpool Street blockade successfully complete, Network Rail considered that the only course of action was to complete all outstanding work as quickly as possible using the mitigation plan previously agreed with train operators. This gave priority to restoring lines in a sequence that would least inconvenience passengers.

Communication with operators

- 2.74 Although there were generally good communications with the train operator ‘one’ at working level throughout the blockade, we consider there were shortcomings with formal information provided at a more senior level. ‘one’

⁴³ Network Rail letter of 22/01/08.

has told us that it received quite different information 'on the ground' from that which it received formally from Network Rail.

- 2.75 On 1 January 'one' arranged a conference call at 17.30 hrs with Network Rail. Network Rail reported to 'one' that work was progressing well. This was the last point at which 'one' could put any contingency arrangements in place, but Network Rail assured them that all was progressing well, and agreed that the contingency buses would not be required⁴⁴. At 23.00 hrs on 1 January 'one' was informed that Network Rail was still confident that the railway would be handed back on time at 05.00 hrs. Network Rail staff then inspected the site at 23.00 hrs and began to realise the scale of the problem⁴⁵.
- 2.76 The first declaration of an overrun of 90 minutes was made at midnight on 1-2 January, due to OLE work problems. This was updated with the true severity of the overrun at 01.00 hrs, three hours before the scheduled completion time, with the estimated hand back at 09.00 hrs. By 04.30 hrs, Network Rail reported that the line would not be handed back before 12.00 hrs⁴⁶. Network Rail now admits that, with hindsight, it was clear that by the evening of 31 December the project was at least 12 hours behind⁴⁷.
- 2.77 Once it was clear to Network Rail that there was a serious problem, we understand that Network Rail directors were kept informed by regular email or text updates and on the morning of 2 January, Network Rail's Anglia Route took overall command of the incident, with a Gold Command led by the Route Director.
- 2.78 'one' says that once Gold Command was set up the situation improved considerably, with regular telephone conferences. Information on handback of the different lines (mainline, suburban and electric) was drip-fed throughout the day⁴⁸. However, the late notice of the overrun meant that 'one' was not able to make any arrangements for alternative travel or to inform passengers

⁴⁴ 'one' letter of 22/01/08.

⁴⁵ Meeting between ORR and One, 01/02/08.

⁴⁶ 'one' letter of 22/01/08.

⁴⁷ Network Rail letter of 22/01/08.

⁴⁸ 'one' letter of 22/01/08.

not to travel, leading to problems at stations on the morning of 2 January, and there was uncertainty for much of 2 January as to whether replacement buses would be needed on 3 January.

- 2.79 Clearly there was poor communication on site caused by the lack of supervision by the contractor, which led to a dearth of information being relayed to the Command and Control Centre which, consequently, did not have an overall picture of the scale of the emerging problem. Reporting from site was inaccurate, especially once slippage occurred and, in particular, the loss of work due to lack of materials or poor installation was not recorded so there was no planning for recovery⁴⁹.
- 2.80 Network Rail says⁵⁰ that it did not receive accurate information from its contractor and that this meant it did not provide accurate information to its customers. We consider that, given what it knew about problems with resourcing on site, Network Rail placed undue reliance on its contractor and that its own site presence was not adequate to ensure that it had access to sufficient, accurate, information to, in turn, ensure its customers received the information they needed.

Summary

- 2.81 We consider that Network Rail's planning of the OLE work at Liverpool Street fell below the level of good practice and does not exhibit the level of thoroughness that we would have expected for a project at a location where an overrun would have very serious consequences for train services.
- 2.82 In particular we consider that there were significant omissions in Network Rail's SQRA's to assess the risks prior to the blockade. In consequence we do not consider that the mitigation measures put in place by Network Rail were sufficient to deal with the reasonably foreseeable risks that, when they materialised, led to the overrun.
- 2.83 Among those foreseeable risks were:

⁴⁹ Network Rail letter of 22/01/08.

⁵⁰ Network Rail letter of 22/01/08.

- the low level of contractor management and supervisory staff planned for the possession. This affected the ability to manage efficiently work activities and monitor the quality of work done;
- the use of equipment novel to the work gang working in Bishopsgate tunnel and the difficult working conditions. This led to the work taking longer than planned;
- having only one planner. This meant that re-planning of work once slippages occurred could not be done effectively;
- the addition of some of the pre-blockade preparatory work into the scope of blockade. This stretched resources and timings;
- problems with delivery of materials from the contractor's depot to site and around the site due to late design, late ordering, shortages of staff and logistics problems. This led to redesign and rescheduling of work and the diversion of staff to managing the logistics of materials distribution to the various work fronts with consequent slippages in the schedule and loss of productivity; and
- deficiencies in the skills of some of the OLE staff secured (Network Rail had been told this specifically by its contractor ahead of the blockade). This led to poor quality work and productivity.

2.84 The issue of quality control and accurate reporting of site progress again raises the questions of whether Network Rail was unduly reliant on its contractors and whether Network Rail had sufficient of its own staff on site; this was a particular lesson that came out of the Portsmouth overrun in January 2007⁵¹.

Shields Junction

Works in context

2.85 The Shields Junction project is a £9 million programme of modernisation to allow more services to run through the busy section of track between Glasgow Central and Inverclyde, Ayrshire and Paisley. This work is associated with the provision of the Glasgow Airport Rail Link (GARL).

⁵¹ Network Rail letter of 13/08/07, Portsmouth lessons learnt.

2.86 To allow higher speeds through the junction, a new layout was designed by Arup⁵², and the main work of the blockade involved the relaying of the junction to this design⁵³. The new track layout meant that alterations to signalling and OLE were also required. Network Rail contracted out the signalling installation and testing to Jarvis⁵⁴.

Overrun

Planning for the blockade: risk assessments, control actions and contingencies.

2.87 The blockade was booked to run from 00.20 hrs on 25 December 2007 to 05.00 hrs on 7 January 2008⁵⁵. The project plan included 30 hours of float for all work leading up to the final signalling testing⁵⁶. Transport Scotland said it considered that there was sufficient possession time available if the work had been designed, planned and implemented efficiently⁵⁷. A risk register was maintained for the blockade, but was exclusively focussed on cost risks and not on schedule risks⁵⁸. SQRA's were not used because peer review of their previous use had found them to be inaccurate⁵⁹. The risk register identifies only one signalling orientated risk (late delivery of long lead items). There is nothing which relates to possible design deficiencies or interface problems.

2.88 The project plan for the blockade used standard planning tools including linked activities with durations allocated based on experience and from supplier information. A deliverability review was undertaken based on professional judgement and work items were identified which could be de-scoped if delays occurred during the blockade⁶⁰. The contractor's

⁵² Network Rail letter of 30/01/08, "Shields Junction", appendix C.

⁵³ Network Rail letter of 30/01/08, "Shields Junction", page 1.

⁵⁴ Network Rail letter of 30/01/08, "Shields Junction", appendix D.

⁵⁵ Network Rail letter of 30/01/08, "Shields Junction", page 3.

⁵⁶ Network Rail letter of 30/01/08, "Shields Junction", page 4.

⁵⁷ Transport Scotland letter of 17/01/08.

⁵⁸ Network Rail letter of 30/01/08, "Shields Junction", page 4.

⁵⁹ Network Rail letter of 30/01/08, "Shields Junction", page 5.

⁶⁰ Network Rail letter of 08/02/08, Further Supplementary Questions (Shields Junction), pages 2 & 3.

resource levels, plant, proposed methodology and timescales for each activity appear to us to have been subject to appropriate challenge by the Network Rail team. This covered the deliverability of the physical work, but did not take account of the schedule risk associated with the signalling design.

- 2.89 Signalling design should include an activity known as “correlation” to check that drawings of circuit designs of the existing equipment accurately reflect what is actually in use. At Shields Junction this activity was waived because a similar process had taken place in July 2006⁶¹. It appears to us, however, that the correlation in 2006 only covered the relay room and not the lineside location cases.
- 2.90 Transport Scotland has questioned whether Network Rail would have identified the risks arising from signal record drawing errors if it had run the project under the European Railway Interoperability and Safety Directives, which should normally apply to major works on a Trans European Network route. This would have required the use of a Notified Body to review and accept the design. However, works on a TENs route do not automatically trigger the interoperability process. The contracting entity, in this case Network Rail, has to decide that it is a major upgrade or renewal and consult DfT for a decision whether the interoperability process applies. If the contracting entity decides that the project is below the 'major' threshold then they can opt to manage the project through the arrangements in the ROGS Safety Management System. Network Rail chose this option. Even if the interoperability process had applied, it is Network Rail's responsibility to set the scope of the review, so if it had not instructed the Notified Body to review the accuracy of the drawings but to only assess the design based on existing drawings, the risks would not have been identified.

Events during the blockade

- 2.91 On 24 December 2007 the Tester in Charge (TIC) confirmed that he was prepared to proceed while noting that “matters were not ideal”. This comment has not been properly explained⁶². Throughout the early part of the blockade, progress reports indicated only minor deviations from the programme. On

⁶¹ Network Rail letter of 08/02/08, Further Supplementary Questions (Shields Junction), page 3.

⁶² Network Rail letter of 30/01/08, “Shields Junction”, page 12.

4 January 2008, Pway and OLE staff both reported that they were about to complete their work after having had some delays. Signals and Telecommunications (S&T) staff agreed to commission 29 of the routes through the junction against the original 51 routes planned.

- 2.92 At 19.00 hrs on 4 January OLE work was reported as overrunning but S&T staff stated that they were able to work around this. The Route Director, Infrastructure Investment Director, Director Scotland, and Programme Director Track were advised of the problems⁶³.
- 2.93 At 14.00 hrs on 5 January further delays with OLE work reduced S&T staff's ability to commission routes. We understand from First ScotRail that at this point it was decided that only 15 out of 51 routes through the junction would be commissioned by the end of blockade. At 23.30 hrs on 6 January the TIC confirmed to Network Rail that the Up Main line, the Down Main line and the "Burma Road" line could be commissioned on time. However, at 06.10 hrs on 7 January this estimate was revised again. It now indicated that it would not be possible to complete the testing on any routes by the planned completion time. On 9 January the Programme Director Track was directly involved. On 10 January the Director, Future Train and Operational Control Systems was directly involved.

Communication with train operators

- 2.94 First Scotrail has told us⁶⁴ that it was receiving regular updates on progress. At first these were daily but became more frequent once the work overran. The progress reports given were regularly found to include estimates of completion that were not fulfilled, which created difficulties for First Scotrail planning and reduced its confidence in subsequent updates.
- 2.95 First ScotRail said⁶⁵ that it was in daily communication with Network Rail throughout the blockade but the information it was getting turned out to be completely wrong, and that Network Rail had no idea what was actually happening on site. It says that there was no real understanding of the

⁶³ Network Rail letter of 30/01/08, "Shields Junction", page 14.

⁶⁴ Teleconference between ORR and First Scotrail, 18/02/08.

⁶⁵ Teleconference between ORR and First Scotrail, 18/02/08.

problem, as people on the ground did not have enough experience. It was not until 9 January, well into the overrun, that First ScotRail began to have confidence that Network Rail was in control of the situation.

- 2.96 The lack of accurate information had a severe impact on First ScotRail's ability to plan contingencies. They held three conference calls with Network Rail on 6 January when they were told that the Canal Line would overrun but that the Ayrshire line would be opened on time. First ScotRail therefore only made contingency arrangements for the Canal Line, but at 05.00 hrs on 7 January, when the line was due to be handed back, Network Rail confirmed that the Ayrshire line would also overrun.

Direct causes of overrun

- 2.97 Pway activities were delayed by an underestimation of the time required for relaying of track panels. The overall programme slippage was six hours. OLE design errors led to 17 hours of lost time through the need to rework some installations.
- 2.98 The critical "wheels-free" test period for signalling commissioning started 13 hours late, but it was not until towards the end of the blockade when the new circuits were re-connected to the existing circuits that the need to redesign circuits was identified and the main delay occurred.
- 2.99 The majority of the overrun was as a result of signalling design errors identified by testing during the blockade (24 test logs were raised requiring redesign)⁶⁶. These can be divided into two main categories:
- within the relay room wiring, problems were found during aspect sequence testing; and
 - within the location cases, testing identified anomalies and space issues affecting point detection and track circuit functions.
- 2.100 Network Rail has told us that the reason for the delay in identifying problems with the testing plan was that its early development was in the hands of a tester with less experience than it would have wished. This arose because the TIC originally nominated was not acceptable to Network Rail due to his

⁶⁶ Network Rail letter of 08/02/08, Further Supplementary Questions (Shields Junction), page 1.

insufficient experience and it took until 29 November 2007 to find an acceptable replacement.

- 2.101 The project specification⁶⁷ identified the need for correlation between recorded and actual wiring to take place prior to the commencement of design work. This is a normal activity that should highlight any shortcomings in the signalling records. The Arup design plan⁶⁸ shows correlation planned for 10 days in May 2007 and subsequent versions of the plan include comments indicating problems with the records. However, it is not possible to see from the documentation how this was resolved.
- 2.102 Although a formal project plan for the blockade had been produced and reviewed, we do not believe that schedule risks had been fully identified or quantified. In particular, Network Rail did not identify the risks arising from designing new signalling to interface with existing infrastructure, especially considering that some of the infrastructure was 40 years old. An SQRA had been developed to cover this but it was not used. This is not compliant with the requirements of Network Rail's 'GRIP' Project Management Manual (PM10). The project team's use of a quantified cost risk analysis and an informal review of schedule risk would not be able identify the risks to the schedule of individual activities, and so would not highlight where to concentrate management effort in order to ensure that the project was delivered on time. This is an issue particularly highlighted in PM10.

Summary

- 2.103 The signalling design faults were the single biggest cause of the overrun. We consider that Network Rail's response to finding these defects was prompt and appropriate. However, because the defects were found so late in the blockade it was not possible to recover the programme within the remaining time allocated.
- 2.104 We consider that it is likely that the need for redesign of the signalling interfaces was a result of the poor accuracy of records compared with the actual installations and the failure to correlate existing circuit drawings for location cases before design work started meant this problem was not

⁶⁷ Network Rail letter of 30/01/08, "Shields Junction", appendix B.

⁶⁸ Network Rail letter of 30/01/08, "Shields Junction", appendix C.

identified and dealt with. The design faults in the relay room circuits occurred despite being checked. This may indicate a lack of familiarity with the detailed operation of the 40 year old circuits.

- 2.105 The failure to use SQRA's meant that key schedule risks were not identified and managed or mitigated. In particular, not having an SQRA meant that Network Rail did not identify or mitigate the foreseeable risk that the design would not function when connected to the existing circuits.

Common issues

Network Rail's management of schedule risk

- 2.106 A theme at both Liverpool Street and Shields Junction (and previously at Portsmouth) has been the management of schedule risk by Network Rail. Whilst good planning processes are available to project managers it appears to us that these are not always used effectively. In particular schedule risks appear to us not to have been fully identified and properly quantified given the evidence available, and not to have been adequately updated as information changed. There is some suggestion from what happened at Shields Junction that the importance of effective SQRA's might in some cases be underestimated. In addition the sensitivity of some risk assumptions do not appear to us to have been tested so that the true impact of these risks materialising was not identified and mitigated against.
- 2.107 A more specific issue relates to Network Rail's use of detailed readiness-reviews at T8, T-4 and T-1. These supplement SQRA's, but Network Rail processes only require them to be carried out on the larger signalling blockades (type A and type B), rather than on those blockades where disruption in the event of an overrun would be severe.
- 2.108 When writing to us to identify lessons learnt from Portsmouth⁶⁹, Network Rail confirmed that it would undertake more verification of the information provided to it by its contractors. Although there is evidence that this was done for OLE resources, there were shortcomings at Liverpool Street where the contractor's resource plans were not robust for OLE supervision and material distribution around the site. Clearly there are limits to how deeply information can be

⁶⁹ Network Rail letter of 13/08/07, Portsmouth lessons learnt.

probed, but it is not clear to us that the level of probing was commensurate with the risk that might arise from having inaccurate or incomplete information.

Management of information

2.109 With regard to the availability of information during blockades, especially information about progress against schedule, it appears to us that there is a lack of clear simple site management reporting milestones to provide better visibility for all parties about the volume of physical work remaining and the time required to complete it. Network Rail has acknowledged that its blockade reporting procedures need re-assessing. Network Rail needs to ensure that it knows what work has been completed and whether the work is progressing according to its latest plan; its processes for doing this must be reasonably proof against problems on site.

2.110 Finally, the uncertainties that existed among train operators at Rugby and Liverpool Street regarding hand back times until a Gold Command was put in place indicate the need to consider, again on a risk basis, whether some form of blockade oversight needs to be built in from the beginning. The role of this oversight would be focussed on progress with the schedule and the likely impacts on train operators. When things start going wrong the engineers naturally focus on putting them right, but if the situation is not recoverable train operators need early, reliable information to enable them to minimise the impact on their customers.

3. Network Issues

Introduction

- 3.1 In addition to looking individually at the events at Rugby, Liverpool Street and Shields Junction, we considered it important to review what was happening at a network level in the run up to the Christmas programme.
- 3.2 Network Rail is in a period of increasing capital investment. A large amount of work across the network was planned for Christmas/New Year 2007. In Period 10 (P10) 2007-08 Network Rail had planned £319M of renewals and enhancement work. This compares with £149M in P10, 2006-07 and £119M in P10, 2005-06.
- 3.3 In terms of OLE related work alone, possessions were planned for locations including:
- Liverpool Street (Colas);
 - Great Eastern Main Line (rationalisation package - Colas);
 - MML (neutral sections - Jarvis);
 - MML (span wires - First Engineering);
 - ECML (Carillion);
 - ECML (Balfour Beatty);
 - Milton Keynes;
 - Trent Valley 4 tracking (TV4) (First Engineering);
 - Longsight (support to Switch & Crossing [S&C] work);
 - Willesden (support to S&C work);
 - Westoning;
 - Shields Junction (support to S&C work).

- 3.4 As has been evidenced by the experience of other infrastructure providers, notably the water companies, such an increase in investment activity brings with it challenges for established corporate systems and processes.

Network Rail's overall planning of possessions

- 3.5 In addition to the planning at an individual project level, Network Rail has an Annual Integrated Work Plan (AIWP) which enables it to take an overview of the deliverability of possessions depending on, for example, the national availability of staff and plant. The development of the AIWP for the Christmas/New Year 2007 blockades began in early 2006 and Network Rail sought to add progressively more detail and robustness to the plan over time. Network Rail has said⁷⁰ that to be successful the AIWP must be deliverable and at every stage its resource requirements are assessed to ensure the plan remains sound.
- 3.6 As part of this process, in the lead up to Christmas/New Year 2007 the various asset programme teams (including Track, Signalling and OLE) undertook a series of deliverability reviews. As a result of these, on 9 November 2007 Jarvis advised the Programme Director Electrification & Plant (E&P) that it was unlikely to be able to carry out OLE on the MML as all available resources were being focussed on Rugby. On 22 November Balfour Beatty Rail Projects advised of a reduction of scope of ECML OLE work due to the withdrawal of Coyles and Shannons Agency staff (it is not known if the staff were withdrawn entirely or re-allocated). On 28 November Jarvis confirmed it could not carry out the MML works due to resource constraints.
- 3.7 During early December the WCRM Project Team sent details of its resource data to the E&P team to allow an overview of resourcing. After reviewing the programme of work, it decided not to proceed with some of it.

Timing of decisions and impact on train operators

- 3.8 The timing of this review meant that train operators had little time to adjust to changes. For example, the planned work at Stevenage was only de-scoped by Network Rail on 14 December 2007 and National Express East Coast complained to us that, with the blockade due to start on the 22 December,

⁷⁰ Network Rail letter of 30/01/08, "Network Issues".

they did not have sufficient time to reinstate trains at such short notice. Network Rail de-scoped Stevenage to secure signalling tester resources for the WCML work and Airport Junction S&C renewal on the Great Western main line. The priority was based on the performance impact of deferring work, which was judged to be lower risk at Stevenage. Network Rail has confirmed that work actually carried out at Stevenage was renewal of a main to main crossover supplemented with heavy maintenance to other S&C to reduce the risk of failure pending the postponed full renewal.

- 3.9 Freightliner has told us that failure to complete the work at Rugby by New Year's Day was compounded by work underway on the line to Felixstowe, leaving it without any option of running services. Freightliner said⁷¹ that the overrun on the Great Eastern Main Line would have had a considerable effect on services out of Felixstowe had it not been for the fact that they could not run the services anyway because of the Rugby overrun. Freightliner said that effect of overruns was that, as at 2 January 2008, it had been unable to move freight for its customers for 10 days which had led to a considerable backlog and which might have a long term effect on its business if its customers lose confidence in rail.
- 3.10 A number of operators have given evidence of similar problems with possessions and possession overruns across the network over the last year. EWS said⁷² it has kept records of all late possession requests from Network Rail and has given some recent examples. It has also provided examples of other disruptive possessions over the Christmas/New Year 2007 period which were not completed as originally planned, either due to overrunning or cancellation of works, and examples of how it thinks planning for possessions is poor or inefficient. 'one'⁷³ has provided us with a list of 145 overruns which have directly impacted travel into Liverpool Street between August 2007 and January 2008, with some 30 of these causing more than 2 hours of delay. In particular, it cites problems with platform widening at Stratford Station in August 2007 where there were late changes to the work plan and project scope, inadequate site management and supervision, incorrect and

⁷¹ Freightliner letter of 02/01/08.

⁷² EWS letter of 18/01/08.

⁷³ 'one' letter of 22/01/08.

inadequate supply of materials and loss of critical resources by the contractors immediately prior to the possession. 'one' states that it is becoming increasingly concerned as it is facing major projects at Stratford (for the Olympics), Clacton resignalling, Crossrail and renewal of the overhead line in the next few years. Indeed, 'one' was so concerned with Network Rail's lack of focus in completing its activities within the agreed timescales that in November 2007 it wrote to Network Rail to complain.

- 3.11 West Coast Trains has also provided evidence of overruns that have occurred between April and December 2007 and a list of significant additional possessions that Network Rail has requested for the West Coast Programme in 2008⁷⁴. London Midland told⁷⁵ us that it wrote to Network Rail in early December 2007 expressing concern about the poor performance of Network Rail regarding overruns on every weekend since the start of its franchise. First Group has highlighted⁷⁶ to us four projects where it is concerned that the project management arrangements appear unsatisfactory and appear to demonstrate the need for comprehensive project management competence within Network Rail. Rail Freight Group also expressed⁷⁷ to us concern about engineering overruns and inefficiently utilised possessions on main rail corridors. Whilst we have not looked at these examples in detail, we consider that they are indicative of the general concern felt throughout the industry that Network Rail needs to review its engineering planning processes.

Summary

- 3.12 We recognise the value of Network Rail taking an overview of all the engineering work it has planned and making decisions about the deliverability of that programme based on the emerging situation regarding to the availability of, for example, resources. However, within that process the timing of decisions, in particular to de-scope the programme and cancel or change possessions can clearly have significant impact on train operators.

⁷⁴ West Coast Trains emails of 18/12/07

⁷⁵ London Midland letter of 23/01/08.

⁷⁶ First Group letter of 15/01/08.

⁷⁷ Rail Freight Group letter of 30/01/08.

- 3.13 A further issue is the efficiency with which Network Rail uses its project planning resources. The ambitious programmes of work for 2007 were initially scheduled two years out from their planned implementation and then progressively deferred or de-scoped as deliverability problems gradually became apparent. Apart from the wasteful levels of project development and planning work that results from aiming high only to scale back later, development and planning work that could better be focussed on genuinely deliverable projects is diverted into ultimately nugatory work.

Network Rail and industry planning timescales

- 3.14 The sort of significant de-scoping of the AIWP that took place over the Christmas/New Year 2007 period is likely to have led to wasteful levels of project development and planning work and the diversion of development and planning resources away from genuinely deliverable projects.
- 3.15 Although train operators need to have advance knowledge of engineering possessions of the line so that the disruption to passenger and freight services these will cause can be properly managed, the events over Christmas/New Year 2007 raise questions about the current planning processes, especially in relation to the very long lead times for blockades. We consider that, given the levels of engineering activity that will be undertaken during CP4, Network Rail should work with the industry to review its own planning timescales and the timescales for relevant industry processes, such as possession booking and train planning, to see whether a different approach would offer a more efficient structure which provides both predictability and stability.

Network Rail's management of its contractors

- 3.16 OLE staffing was a significant issue in the overruns at both Rugby and Liverpool Street. It is understandable that Network Rail sought to keep to its programme of work and it is in no one's interest for Network Rail to take an over cautious view of deliverability. In this context, we recognise the very considerable efforts Network Rail made to secure sufficient OLE resources for Rugby and Liverpool Street, including working with Jarvis to increase the skills of its staff and offering bonus packages for attendance on site. We consider that the steps Network Rail took were reasonable and, in particular, the use of identifying named staff had proved successful when previously used with

signalling technicians. It is not clear to us that, without the benefit of hindsight, Network Rail should have reasonably taken additional steps.

- 3.17 However, the fact that the steps Network Rail took were not successful in enabling it to deliver its original plan of OLE work over the Christmas/New Year 2007 period might, therefore, reflect deeper structural problems within the current national provision of OLE staff and, in particular, the split between staff working for Network Rail's own in-house teams, Network Rail's direct contractors, sub-contractors and agencies. It is significant that the limitations in its supply chain which would constrain the amount of work Network Rail could expect to complete apparently only became clear at corporate level in October and November, barely weeks away from the planned events⁷⁸. Halcrow considers that, looking more widely, it is apparent that there is a natural constraint on the volume of railway infrastructure work that can be designed, supplied and executed by the present Network Rail supply chain.
- 3.18 Halcrow also considers that the extent of deliverable resource and its productivity, as distinct from the theoretically possible resource and productivity, was overestimated by Network Rail. It seems that the nature of the contractual relationships between Network Rail and its supply chain "partners" can lead to an understandable desire on the latter's part to demonstrate willingness to cooperate in order to secure future contract opportunities, which may give rise to a degree of over confidence in what can actually be delivered.
- 3.19 Halcrow considers that the shortcomings evidenced at Rugby, Liverpool Street, Shields Junction and, previously, at Portsmouth indicate that Network Rail has not adopted good practice in relation to its contracts with its suppliers. The shortcomings, for which Network Rail is accountable, indicate that it has not optimised the balance between risk and reward with its suppliers. In the short term Network Rail should consider whether its contracts ensure that its suppliers take an appropriate share of the financial consequences of any risk to the projects, and equally share the financial rewards of success. In the medium term Network Rail should consider the development of mutually beneficial contractual relationships with its supply chain and a genuine spirit of partnership in project delivery, for example along

⁷⁸ Network Rail's letter of 30 January 2008.

the lines adopted by BAA plc for major projects such as Heathrow Terminal 5⁷⁹.

- 3.20 Halcrow considers that, in the light of events over Christmas and New Year, Network Rail should review the structure of its supply chain for OLE work and consider whether a different structure or a different manner of using that structure would better enable it effectively and efficiently to deliver its programme of work over Control Period 4. Halcrow also considers that Network Rail's declared intention to take back in-house the skills that are key to its investment plans is not without its own risks. Where there is a reliance currently on Network Rail's suppliers to design and implement schemes in an efficient manner, balancing time, cost and quality requirements, this will pass to Network Rail. Network Rail will therefore need to develop its management skills to ensure that satisfactory productivity levels are achieved.

⁷⁹ Managing risks with delivery partners, H M Treasury & Office of Government Commerce, London, 2005, <http://www.ogc.gov.uk/documents/cp0013.pdf> . The T5 Agreement, <http://www.heathrowairport.com/assets/B2CPortal/Static Files/agreement.pdf>

4. West Coast Route Modernisation Programme deliverability

Robustness of the programme management process

- 4.1 The independent reporter, Halcrow, considers that the WCRM Programme has a mature project management system, developed over a number of years, for the implementation and delivery of the programme⁸⁰. The programme team consists of experienced staff who have proved themselves capable of delivering enhancements on the West Coast in the past; the September 2004, June 2005 and December 2005 timetable changes were all, largely, successful.
- 4.2 The procurement strategy adopted by Network Rail has sought to mitigate risk by allocating work to contractors on the basis of their ability to deliver and by minimising the number of interfaces to be coordinated. For example, the Atkins signalling contract combined Rugby and Nuneaton and Network Rail considered Jarvis's commitments on other West Coast projects when determining who should carry out the next phase of OLE works at Milton Keynes and Bletchley. Network Rail has deferred other projects, e.g. Basingstoke, where there is a perceived risk of resource problems that may impact on the delivery of the WCRM Programme.
- 4.3 The West Coast project teams have had the responsibility of determining the possession requirements for 2008 to ensure that they have sufficient access, including contingency allowances, to carry out the work. The results of the exercise that was carried out in the summer of 2007 have been provided by Network Rail⁸¹.
- 4.4 The scope and cost reforecast carried out towards the end of 2007 determined the budgetary requirements for the next stages of the WCRM Programme. Network Rail subsequently approved the funding required to deliver the Programme.

⁸⁰ Network Rail letter of 08/01/08, PIMS Document Register - Appendix B.

⁸¹ Network Rail letter of 18/01/08, Appendices L and M.

- 4.5 Most of the live projects on the West Coast are well advanced and have established project teams.

Robustness of the Easter blockade plans

- 4.6 We are speaking with Network Rail and the affected operators seeking assurance that adequate measures will be taken to deliver the works at Easter successfully, with robust arrangements for handling diverted passenger and freight traffic and for coping with any genuinely unavoidable overruns.
- 4.7 The Easter 2008 possessions are less complex than the work at Rugby over Christmas and New Year. Readiness-reviews are under a high level of scrutiny and, for example, the T-8 SQRA for Nuneaton currently indicates a 90% probability of delivery on time.
- 4.8 Network Rail announced at the West Coast Project Development Group on 12 February 2008 that its contractor had advised against carrying out signalling commissioning work for TV4 at Easter, and as a result this work would be deferred until later in the year. Network Rail will need an additional possession for this. The OLE and PWay works will continue as planned. A readiness-review has been conducted by Network Rail and the outcome is awaited.
- 4.9 Halcrow is satisfied from the information provided to date by Network Rail that the works currently planned at Nuneaton and Trent Valley at Easter can be delivered. Further SQRA's and readiness-reviews are planned between now and the possession start date, the outcomes from which will be subject to review. To mitigate against staff absenteeism Network Rail is seeking further evidence from its contractors that staff are named and committed to turn up for their planned shift, including telephone numbers and PTS sentinel card numbers.

Robustness of the overall programme for 2008

- 4.10 The assessment of Halcrow, based on the movement of the key milestones over the past twelve months, and viewed against the background of the Christmas/New Year overruns, is that the programme of work has been compressed to the extent that it is increasingly unlikely that the infrastructure required to support and sustain the December 2008 timetable will be delivered

on the basis of the current plans and planned possessions. The deferral of the commissioning of the TV4 signalling gives further support to this view.

4.11 Network Rail recognises that the programme is challenging and, following the events over Christmas/New Year 2007 instigated a comprehensive peer review of the West Coast Programme using personnel that are not assigned to work on the Programme. In its letter to us of 18 January Network Rail told us that it considers the programme for the delivery of the infrastructure necessary to operate the planned 2008 timetable to be “generally complete and robust”⁸². The basis for this statement is that each element of the programme is subject to continual detailed review⁸³. Subsequently, Network Rail has told us⁸⁴ that it now considers that the existing plan is no longer robust and it is developing alternative options.

4.12 A number of key risks were evident in the plans in place at the start of 2008:

- the remaining signalling commissionings for Rugby/Nuneaton had zero or negative float and parts of the Atkins signalling design programme were behind schedule, with the result that the design would not be ready for the remaining commissionings unless progress was accelerated. (We note, however, that Network Rail previously recovered from a similar position with the design for the Stage E works at Christmas.);
- detailed design work was not complete for all projects and, therefore, there was a risk of emerging scope adding to schedule pressure. Furthermore, the current delivery plan depended on the resolution of access disputes still being negotiated; and
- as the work intensified there would be pressure on the availability of key staff throughout the Programme and across the various asset types (i.e. signalling, OLE, etc.). This includes management staff and a thorough review of the resource demand and retention to deliver the Programme was required.

⁸² Network Rail letter of 18/01/08, page 12.

⁸³ Network Rail letter of 05/02/08, page 3.

⁸⁴ Meeting between ORR and Network Rail, 26/02/08.

4.13 There was also potential for costs to increase. Possible additional costs include:

- securing extra resources (staff, plant, possessions – assuming TOCs/FOCs agree) to increase redundancy in the Programme;
- re-planning and delivering deferred work;
- lack of competitive bids during tendering, particularly for signalling schemes;
- contractor claims resulting from delivering a compressed schedule; and
- deferred work from the Rugby Christmas/New Year 2007 blockade will add to preparatory work for May 2008.

4.14 Both EWS⁸⁵ and London Midland⁸⁶, in the evidence that they have presented, have indicated that Network Rail will not deliver the functionality that they originally anticipated would be available from December 2008. An example of this is the absence of bi-directional signalling through the Trent Valley, north and south of Nuneaton, which will have an impact on the availability of diversionary routes. EWS has said that it is also concerned that the additional capacity provided by the TV4, a key part of the project outputs, will not be delivered on time. This could have an impact on the over-night timetable.

4.15 EWS has also indicated⁸⁷ that it has referred a number of possession requests relating to critical works at Rugby and through the Trent Valley to dispute, and will reject any future requests for disruptive possessions.

4.16 Virgin Trains has submitted a further complaint⁸⁸ alleging that planned rescheduling of works by Network Rail will make it impossible for its drivers to be trained on the new layouts in the time available, leading to, in Virgin Trains' view, significant cancellations of services. We met with Virgin Trains⁸⁹ and

⁸⁵ EWS letter of 18/01/07 (sic), page 5.

⁸⁶ London Midland letter of 23/01/08, page 5.

⁸⁷ EWS letter of 18/01/07 (sic), pages 4 and 5.

⁸⁸ Virgin Trains letter of 05/02/08.

⁸⁹ Meeting between ORR and Virgin Trains, 20/02/08.

agreed that we would take this complaint into account as part of this investigation. Network Rail has confirmed that it continues to consult with all train operators on requirements for driver training. Such requirements will need to be taken into account in any plan for the delivery of the December 2008 timetable.

- 4.17 Works deferred to CP4 (e.g. Power Supply Upgrade, Bletchley and parts of Nuneaton) should not impact on successful delivery of the December 2008 timetable. However, there are questions about the reliability of the December 2008 timetable because, although asset reliability has been improving over the last four years, there is uncertainty on the predicted reliability of infrastructure (e.g. axle counters, HPSA points) when newly installed. This can be exacerbated where infrastructure is delivered late so that time for bedding in is reduced.

Summary and conclusion

- 4.18 Network Rail's review of options for completion of the infrastructure work required to support and sustain the December 2008 timetable is not yet complete. At this stage, therefore, no robust plan exists for Network Rail to meet its WCRM obligations under ACR2003.

ORR review of maintainability of WCML post December 2008 timetable changes

- 4.19 Our safety inspectorate, HMRI, is planning inspection work in 2008-09 to test the ability of Network Rail to inspect and maintain the WCML within the constraints imposed by the performance and capacity improvements provided by the December 2008 timetable.
- 4.20 The aims of this work are to -
- obtain assurance that the WCML will be maintainable within the constraints imposed by the increases in capacity and performance delivered by the December 2008 timetable;
 - identify appropriate ORR action if maintainability is not demonstrated; and
 - obtain initial assurance that maintenance is being delivered when the timetable is introduced.

4.21 HMRI will, in particular, be looking at:

- whether Network Rail has in place an adequate mechanism for deciding whether, in the context of the inspection and maintenance of the WCML, the December 2008 changes can be delivered, and that this decision can be made in sufficient time to maintain effective cooperation with other duty holders;
- the required additional staff are in place, competent, organised and supervised;
- the track inspection regime provides sufficient access and resource to meet inspection standards, particularly for S&C;
- possessions can be taken and surrendered safely, including isolations, allowing sufficient access time to meet planned maintenance hours; and
- Network Rail has demonstrated compliance with the Railway and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) and its own Safety Management System in relation to the management of change.

4.22 If necessary Inspectors will require Network Rail to implement additional risk control or mitigation measures. HMRI will subsequently review how the maintenance arrangements are working out when applied to the live railway.

5. Conclusions

The Christmas/New Year disruption

- 5.1 The overruns of engineering works at Rugby, Liverpool Street and Shields Junction in early 2008 caused serious and unacceptable disruption to rail users and train operators. Most of this should have been avoidable with better planning and management of the projects involved. Urgent steps must be taken to ensure that there is no recurrence of this kind of event.

The engineering challenge

- 5.2 Historically high levels of investment are now being made in Network Rail's infrastructure. There are two drivers for this:
- the need to apply sustainable asset management policies which will improve the safety, efficiency and performance of the network over the long term; and
 - the need to enhance the network so that it can meet the growing demand from rail users and offer improved levels of service.

This is a very healthy situation, but it poses a major challenge: to combine delivery of a large volume of engineering work with providing continuity of service to existing rail users.

- 5.3 Particularly high volumes of work are carried out over holiday periods, when total demand for rail services is lower than average. Over the four weeks including Christmas and New Year 2007-08 Network Rail scheduled £319m of renewal and enhancement work. This figure was more than double that for the equivalent period in the previous year, and 2.7 times higher than two years previously.

The risk of unplanned disruption

- 5.4 A great deal of this engineering work is completed successfully, and services are restored promptly as planned. But, as the events covered by this report demonstrate, this is not always the case and when work overruns the impact on rail users can be severe.

- 5.5 The scale of disruption suffered by passengers is widely recognised. The impact on freight operators has been less visible but is no less serious. Time-critical freight deliveries cannot be postponed and once diverted to road haulage may not be returned to rail. The potential for long-term damage to rail freight businesses is real.
- 5.6 Clearly the higher the level of engineering work being carried out, the greater the risk that this kind of unplanned disruption could arise. The greater, therefore, is the importance that Network Rail must attach to doing all that it reasonably can to minimise that risk.

Project and risk management

- 5.7 We have found wide variation in the quality of project and risk management in Network Rail's engineering programmes, based on the examples under investigation.
- 5.8 The WCRM programme has good quality programme and project management procedures in place, which have been certified by Lloyds Register and inspected by Halcrow. These include structured risk review processes which, for Rugby, were followed in practice. Inevitably with the benefit of hindsight it is possible to see where different judgements might have been made which could have led to better outcomes. However this does not show, and we do not believe, that the problems encountered at Rugby over Christmas – whether in needing to seek an extra day for the possession at a late date, or in failing to complete the work on schedule - were caused by any significant failure of project or risk management in the weeks beforehand.
- 5.9 However the planning for Liverpool Street was altogether less satisfactory. The last time a proper SQRA was carried out was in August, four months before the work itself. This was despite late design changes and the inclusion of additional work. Many of the problems which contributed to the overrun at Liverpool Street were, in our view, foreseeable and should have been identified if a proper risk assessment had been carried out. This would, as a minimum, have enabled better control and mitigation actions to have been put in place.
- 5.10 For Shields Junction the SQRA's were not used on the grounds that this methodology had not previously been found to be robust. Such a step

should only have been contemplated if it was proposed to replace SQRA with an equally or more thorough risk assessment process. Instead, Network Rail created a delivery risk register and tracker, which concentrated the contractor's planning of resources and methodologies. Based on the information supplied to us by Network Rail, the assessment of risks to the schedule seems in fact to have been fundamentally flawed and to have omitted almost entirely to consider risks associated with the signalling element of the work.

- 5.11 It is apparent that weaknesses in risk assessment and risk management, which we identified in connection with the overrun of the Portsmouth resignalling project in 2007, were also present in two of the three cases we investigated, each in a different part of the country and related to a different type of project. Our conclusion is that such weaknesses are not confined to these cases alone but are present to some degree across the organisation.

Site management

- 5.12 At Rugby and at Liverpool Street there were serious shortcomings in Network Rail's management of the works once the possession began.
- 5.13 Not all projects are equally challenging, or equally critical. The degree of attention that Network Rail should give to successful project delivery, and the degree of scrutiny that it applies to assurances from its suppliers, should no doubt take this into account.
- 5.14 In its written evidence to the Select Committee on Transport, Bechtel stated that "Rugby-Nuneaton is the most complex project in the WCRM programme" and that "staging of the works at Rugby was critical for the operation of the December 2008 timetable, more so than any other project in the WCRM programme." The works were blocking a key section of one of the most important rail routes in the country. The late and controversial extension of the blockade into 31 December 2007 had already created problems for operators and rail users. We would therefore expect that Network Rail would have given maximum priority to ensuring that these works were completed successfully.
- 5.15 Although early in the blockade, on 27 December, the risk of overrun was identified and contingency plans were put into effect, by 31 December it is clear that senior Network Rail managers were unaware of the extent of the

problems on the ground. This was in part because of reliance on self-certification of work by the contractors. Under the circumstances the extent to which this was relied on was excessive. This led directly to failure to manage the problems effectively and failure to communicate reliable information to train operators and rail users.

- 5.16 At Liverpool Street the works were thought to be less complex, but the location again made prompt completion essential. Yet here too Network Rail's management failed to understand the nature and extent of problems until far too late.

Supplier management

- 5.17 In the cases of both Rugby and Liverpool Street some criticism has been levelled at the contractors. However it is Network Rail's responsibility to manage its suppliers and contractors so as to achieve an acceptable level of risk in projects such as these – a point we made in connection with the Portsmouth problems and which Network Rail acknowledged.
- 5.18 Network Rail's response to the Christmas problems has been to plan to internalise some of the critical resources, notably for OLE work.
- 5.19 Even if this is successful it will not solve the wider problem. Network Rail does not appear to have optimised the balance between risk and reward with its suppliers. In the short-term Network Rail should consider whether its contracts ensure that its suppliers take an appropriate share of the financial consequences of any risk to the projects, and equally share the financial rewards of success. In the medium term, Network Rail should consider the development of mutually beneficial contractual relationships with its supply chain and a genuine spirit of partnership in project delivery, for example along the lines adopted by BAA plc for major projects such as Heathrow Terminal 5.

Communication with operators and users

- 5.20 Largely as a result of Network Rail's own ignorance of the true progress with the projects once work was underway, it failed to provide operators and rail users with reliable information about the likelihood and extent of disruption. This exacerbated the situation and caused the overruns to have even more disruptive impact than they might have done.

- 5.21 Some operators have told us that they were learning of problems through unofficial channels long before they were formally advised. It is also notable that critical and difficult discussions about extending the Christmas blockade were taking place on 6 December 2007 as the West Coast Project Board met, but that there was no mention of them at the board.
- 5.22 These observations raise questions about other issues which we believe Network Rail should consider:
- is there undue reluctance by some staff to send unwelcome messages clearly and promptly up through the organisation?
 - is there too much reluctance by Network Rail to alert operators to emerging risks while they are still striving to contain them (which we acknowledge to be a difficult balance)?
- 5.23 An initiative which does appear to have been successful, once it was taken, was the introduction of 'Gold Command' arrangements at Rugby and at Liverpool Street to recover train services and to communicate with operators and customers. We support Network Rail's proposal to review how and when such arrangements are called into effect, to see whether they can be made still more effective.

The WCRM Programme

- 5.24 As this programme has progressed, elements have been deferred for a variety of reasons. Within the constraint of completing key works by December 2008 the need to reschedule these elements has, in the view of Halcrow, made the overall programme increasingly demanding.
- 5.25 Network Rail has acknowledged that it cannot complete the works, with an acceptable level of certainty, with the plans which were in place at the start of 2008. It is therefore working up alternative options for restoring robustness to the programme plan. These include consideration of whether it is still possible, and desirable, to plan to complete within the current timescales. To do so would require additional disruptive possessions during 2008, beyond what has so far been agreed.
- 5.26 Planning works within possessions is not the only consideration which must be taken into account. Network Rail must demonstrate that preliminary works

(e.g. design) can be completed, that the reliability of installed infrastructure can be lifted to the levels necessary to support a more intense services, and that the needs of operators – e.g. to train drivers in the new track layouts – are also being satisfied.

- 5.27 Resolution of this is urgent. The existing programme is not robust, but any changes must be made in good time to minimise adverse impacts on operators and rail users.
- 5.28 Network Rail's plans for work over Easter 2008 are firm. We have held discussions with Network Rail and the relevant operators which have established that there is no evidence to doubt that the work proposed can be successfully completed in the time, but that there is still work to do to put adequate plans in place to handle passengers and freight affected by the possessions and to develop contingency plans.

Network issues

- 5.29 During 2007 Network Rail identified that OLE expertise is now a critical resource, use of which must be planned on a network-wide basis. It took steps to do this, which resulted in a considerable reduction in the total work volume planned for Christmas. It also took unprecedented steps to validate the resource plans by obtaining individual names, something which had not previously been done for these resources.
- 5.30 This approach was already being applied to signalling testing resources which have been known to be a critical constraint for much longer.
- 5.31 It is important that Network Rail now reviews all other key resources to establish whether there are likely to be other such constraints, well before these turn into live problems. With the work volumes proposed for the next control period this is a subject we will also be focusing on closely in the remaining stages of the Periodic Review.
- 5.32 Late in 2007 Network Rail took effective steps to review the portfolio of work planned for Christmas and to de-scope this where it was not deliverable. Hard decisions were taken, but it was costly and unnecessarily disruptive for these to have been taken so late in the day. We have also seen evidence that the practice of booking blockades and major possessions long before the event may be constraining the design of stageworks and ultimately leading to

inefficiencies. We believe that Network Rail should review, with the industry, its own planning timescales and the timescales for relevant industry processes such as possession booking and train planning, to seek a more efficient structure which provides both predictability and stability.

Annex 1- List of written representations

Key Letters from ORR

Date sent	Heading
18 December 2007	West Coast Route Modernisation – Christmas Engineering work – seeking information
19 December 2007	West Coast Route Modernisation – Christmas Engineering work – decision not to make a provisional order
8 January 2008	Network Rail's management of engineering works – announcing the scope of ORR's investigation
8 January 2008	Network Rail's management of engineering works - letter to stakeholders seeking representations
5 February 2008	ORR's investigation into Network Rail's management of engineering projects, focussing on 2007-08 Christmas/New Year possessions and the robustness of Network Rail's plans to complete the west coast route modernisation programme – requesting final representations.

Letters from Network Rail to ORR

Date	Heading
19 December 2007	West Coast Main Line and Liverpool Street Christmas engineering works
03 January 2008	West Coast Main Line and Liverpool Street Christmas engineering works
08 January 2008	West Coast Main Line and Liverpool Street Christmas engineering works Appendices A-M
18 January 2008	West Coast Main Line and Liverpool Street Christmas engineering works Appendices A-T
18 January 2008	Written Submission to the Transport Committee
22 January 2008	Network Rail's Management of Engineering Projects - supplemental information in relation to WCML
22 January 2008	Network Rail's Management of Engineering Projects - Liverpool Street Appendices A-D
23 January 2008	Email with chronology of communications with train operators in the run up to Rugby hand back.
30 January 2008	Network Rail's Management of Engineering Projects - Network Issues
30 January 2008	Network Rail's Management of Engineering Projects - Shields Junctions Appendices A-H

5 February 2008	Network Rail's Management of Engineering Projects - supplementary Questions Appendices A-J
5 February 2008	Letter on chronology
8 February 2008	Network Rail's Management of Engineering Projects – further supplementary questions (Network wide issues)
8 February 2008	Network Rail's Management of Engineering Projects – further supplementary questions on Shields Junction
11 February 2008	ORR's investigation into Network Rail Management of Engineering Projects Appendix – email to EWS.
12 February 2008	Network Rail's Management of Engineering Projects - Further Supplementary Questions (West Coast Programme)
12 February 2008	Network Rail's Management of Engineering Projects (this includes Section 7 - Network Issues)
13 February 2008	Confidential - Jarvis Resource Analysis Appendices A-I
13 February 2008	Network Rail's Management of Engineering Projects - Liverpool Street Interim Internal Report
13 February 2008	Network Rail's Management of Engineering Projects - Supplementary Questions Appendices A-E
15 February 2008	Email responding to outstanding questions on Jarvis resource analysis

Representations from stakeholders

Date received	From
17 December 2007	EWS - email
17 December 2007	Virgin Trains – email.
18 December 2007	Virgin Trains – 3 emails
19 December 2007	Virgin Trains
2 January 2008	National Express
2 January 2008	Passenger Focus
2 January 2008	Freightliner
3 January 2008	London Travelwatch
3 January 2008	Mike O'Brien MP
8 January 2008	ORR – Stakeholders
8 January 2008	Stagecoach
15 January 2008	First Group

REPORT OF ORR'S INVESTIGATION INTO ENGINEERING OVERRUNS

17 January 2008	Northern Rail
17 January 2008	Transport Scotland
18 January 2008	EWS
18 January 2008	DfT
18 January 2008	Rugby Rail Users Group
18 January 2008	Virgin Trains
21 January 2008	Essex County Council
22 January 2008	'one' Railway
24 January 2008	London Midland
31 January 2008	RFG
1 February 2008	London Travelwatch
4 February 2008	Passenger Focus
5 February 2008	Virgin Trains
8 February 2008	National Rail Enquiries.

Annex 2 - List of the meetings attended by ORR

Date	Company
18 January 2008	DfT/ORR
23 January 2008	Network Rail/ORR
23 January 2008	Virgin Trains /ORR
28 January 2008	Freightliner/ORR
29 January 2008	Network Rail/ORR
1 February 2008	'one' Railway /ORR
8 February 2008	Network Rail/ORR
13 February 2008	Network Rail/ORR
18 February 2008	First Scotrail/ORR (teleconference)
26 February 2008	Network Rail/ORR

Annex 3 - Key supporting documents

Correspondence from Network Rail

1. Appendices to Network Rail letter of 18 January 2008:
 - B – pre blockade SQRA.
 - G – T-4 readiness review – update for T-1.
 - K – programme risk register.
 - O – RuN project risk register.
2. Appendices to Network Rail letter of 5 February 2008:
 - E – SQRA of 13 September 2007.
 - G – T-4 readiness review.
3. Appendices to Network Rail letter of 13 February 2008:
 - C – SQRA for Liverpool Street, 22 August 2007.

Key documents on Portsmouth

4. Letter of 13 August 2007 from Network Rail on applying lessons from failings at Portsmouth.
5. Letter of 6 September 2007 from ORR to Network Rail confirming penalty for Portsmouth.

Annex 4 - OLE resource

Sequence of key events

From the considerable information provided by Network Rail we have tried to draw together the key events regarding the provision of OLE staff in the run up to the blockades and during their execution:

- 2006 (April onwards): Following submission of prequalification documentation for Rugby OLE work, Jarvis invited to submit a tender, along with the other bidders. Jarvis short-listed with one other as preferred bidders; between the two, the other preferred bidder was evaluated as being the stronger technically, but it also had the highest cost. Jarvis asked to take a number of initiatives to address skills issues⁹⁰.
- September 2007: Initiatives taken by Jarvis prove beneficial because from contract award until September 2007, Jarvis's staff deliver as required. They complete successful work for the two previous commissioning packages in 2007, bridge 274 and the Hilmorton Junction⁹¹.
- 30 October 2007: Network Rail aware that only 40% of required OLE staff so far secured for Rugby. Jarvis asked to provide detailed staff requirements and report to Network Rail on a weekly basis⁹².
- 9 November 2007: Jarvis advises the Programme Director E&P that it is unlikely to be able to carry out OLE on the MML as all available OLE staff are being focussed on Rugby⁹³.
- 22 November 2007: Balfour Beatty Rail Projects advise Programme Direct E&P of a reduction of scope of ECML OLE work due to the

⁹⁰ Network Rail letter of 05/02/08.

⁹¹ Network Rail letter of 05/02/08.

⁹² Network Rail letter of 18/01/08.

⁹³ Network Rail letter of 30/01/08, "Network Issues".

withdrawal of Coyles and Shannons Agency staff (it is not known if the staff were withdrawn entirely or re-allocated)⁹⁴.

- 28 November 2007: Jarvis confirms to Programme Direct E&P that it can not carry out the MML works due to staff constraints⁹⁵.
- 3 December 2007: Jarvis believes it has 92 out of planned 96 linesmen available.
- 7 December 2007: a review meeting held between the Liverpool Street and West Coast project teams to ensure that there was no duplication of named OLE staff between the two possessions. This results in two individuals being allocated to West Coast and replaced on the Liverpool Street project. The named list is also crosschecked against the other E&P OLE projects. At the time of the review it is Network Rail's view that the available resources support the planned work⁹⁶.
- 17 December 2007: Jarvis has an average of 70 named OLE staff available per day.
- 18-19 December 2007: Jarvis present revised plan for Rugby requiring 67 linesmen and supervisors.
- 19 December 2007: the Programme Director E&P reviews all the E&P jobs to see how staff might be allocated to favour the West Coast work. At that time: Jarvis MML work was already cancelled; First Engineering MML work was cancelled to allow redeployment of resources to Rugby; Carillion ECML work was cancelled to allow resources to go to Rugby.⁹⁷
- 20 December 2007: Rugby OLE staff bolstered by additional staff from First Engineering and Carillion in response to national request from Network Rail and cancelling of other OLE work.

⁹⁴ Network Rail letter of 30/01/08, "Network Issues".

⁹⁵ Network Rail letter of 30/01/08, "Network Issues".

⁹⁶ Network Rail letter of 30/01/08, "Network Issues".

⁹⁷ Network Rail letter of 30/01/08, "Network Issues".

- 21 December 2007: For Rugby, rostered staff show a total of around 6000 linesmen hours of work available; scheduled work totals around 4500 linesman hours. Additional resource available on 24-25-26 December 2007 and 2 shifts on 30 December 2007 when no work rostered due because of “wheels-free” testing of signalling. Little rostered float on 27-28 December 2007. Overall OLE plan reduced to permit Rugby, Liverpool Street and other E&P works to be resourced with named staff⁹⁸.
- 26 December 2007: OLE staffing actually on site at Rugby falls significantly short of planned requirements.
- 27 December 2007: Jarvis request 4 additional shifts at Rugby (2 days x 2 shifts) with 15 linesmen per shift to supplement resources on 28-29 December 2007. Jarvis senior OLE construction manager goes on leave for rest of blockade.
- 27 December 2007: additional linesmen and engineering supervisors requested from Liverpool Street to support Rugby. Engineering and construction supervisory staff arranged from the E&P programme team without affecting Liverpool Street. No linesmen or linesmen supervisors released⁹⁹.
- 28 December 2007: Jarvis OLE team 3 at Rugby does not show for midnight shift.
- 28-29 December 2007: Jarvis request another 40 linesmen (2 days x 2 shifts x 20 per shift) for 30-31 December 2007 as staff obtained earlier prove not as productive as hoped. New staff obtained from Network Rail maintainer, Balfour Beatty and TV4 project.
- 29 December 2007: to take advantage of the early completion of the demolition of bridge 19 at Liverpool Street 6 extra linesmen procured from ETI Ltd from another completed project¹⁰⁰.

⁹⁸ Network Rail letter of 30/01/08, “Network Issues”.

⁹⁹ Network Rail letter of 30/01/08, “Network Issues”.

¹⁰⁰ Network Rail letter of 30/01/08, “Network Issues”.

- 31 December 2007: Eight sub-contracted agency OLE staff on the day shifts at Liverpool Street fail to turn up (also fail to turn up on 1 January 2008). Network Rail say that the staff had been named by COLAS in advance¹⁰¹.
- 31 December 2007: staff from Network Rail's OLE maintenance function deployed at Liverpool Street for late shift to cover for possible non-attendance of agency staff. However, agency staff do arrive.
- 2 January 2008: OCR and Balfour Beatty teams drafted in to assist on OLE work at Rugby.

¹⁰¹ Network Rail letter of 22/01/08.

Annex 5 – Glossary

Control Period 4	The 5 year period running from 1 April 2009 to 31 March 2014 for which ORR sets Network Rail's outputs, revenue requirement and access charges.
Access charges review 2003	The review by the Rail Regulator of the track access charges payable to Network Rail by franchised passenger train operators.
Gold Command	The strategic level of the three level (Gold, Silver, Bronze) command structure instituted to manage complex operational incidents.
GRIP	Network Rails Guide to Railway Investment Projects which seeks to minimise and mitigate the risks associated with delivering rail projects on an operational railway.
Readiness-review	A structured meeting held in advance of major possessions/blockades, attended by senior management from Network Rail and its supply chain (project managers, designers and contractors), to present and review the integrated possession/blockade plan and to identify risks, issues and contingencies.
Schedule quantified risk assessments	A tool for assessing when a project may finish, with relative likelihoods against this. It also produces a ranking of the most dominant activities in relation to the project finish time.
West Coast Project Board	A senior level meeting between DfT (Chair), Network Rail, Virgin Trains, an independent adviser and ORR (observer).
West Coast Operations Group	Four weekly liaison meeting between Network Rail and Train Operators.