Office of Rail & Road and Network Rail

Mandate L4AR007: Review of Network Capability - Phase 1

Review of CP5 Network Capability Processes

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1 Executive Summary

1.1 General

Arup has been appointed by the Office of Rail and Road (ORR) and Network Rail as Lot 4 Independent Reporter to monitor and evaluate Network Rail's delivery of its outputs and commitments.

1.1.1 Mandate

The purpose of Mandate L4AR007 Phase 1 was to provide assurance to ORR from evidence provided by Network Rail and ORR, that baseline Network Capability is being maintained as per Network Rail's obligation set out in ORR's Final Determination for CP5[1].

Where Network Capability has changed, ORR was seeking assurance that Network Rail has followed the Network Change process as defined in the Network Code.

In addition, under Phase 2, ORR was also seeking professional input from the Reporter on how Network Rail management of Network Capability may be best assessed in CP6. This Phase 2 output is reported in a separate report submitted to the ORR and Network Rail.

A full copy of the Mandate is included in Appendix A.

1.2 Context

In accordance with condition 1.20 of its licence, Network Rail must maintain appropriate, accurate and readily accessible information about the relevant assets, including their condition, capability and capacity. In the ORR PR13 Final Determination under the summary of regulated outputs for CP5, Network Rail's requirement for Network Capability is described as

'Track mileage and layout, line speed, gauge, route availability, electrification at least maintained, and improved where there are enhancement works'.

A Network Rail Internal Audit of the controls around the Network Change process in the Network Code was undertaken in December 2017. The audit identified deficiencies in the controls around the Network Change process in CP5 and made recommendations for improvement. Network Rail is currently in the process of implementing these improvements through its Network Change Improvement Programme (NCIP).

1.3 Approach

The Reporter's review has been based on a combination of desktop reviews of documentation supplied by Network Rail and a series of meetings with both Network Rail and ORR.

The Reporter split the Phase 1 activities in the Mandate into tasks to address four sub-aspects:

1a. Verify the consistency and accuracy of Network Rail's data management and reporting processes, procedures and associated governance from the point of extraction from source systems;

[1] ORR (2013) Periodic Review 2013: Final determination of Network Rail's outputs and funding for 2014-19 October 2013

1b. Assure ORR if Network Capability in Great Britain is being reported correctly against the CP5 baseline; and

1c. Review whether Network Rail's assessment of performance against the CP5 regulated output target be relied on?

2. At locations where Network Rail or the Reporter identifies that the capability of the network has changed since 1st April 2014, evaluate Network Rail's compliance with the Network Change element of the Network Code (having regard to the findings of Network Rail's Internal Audit Report[2]).

For Tasks 1a to 1c the Reporter held meetings with Network Rail and undertook a review of the documentation provided. This review provided an initial understanding and facilitated the development of further questions for individuals involved in the Network Change process.

For Task 2 the Reporter developed a sampling regime and was provided with a sample of the Network Changes in CP5 from Routes as a basis to assess compliance with the Network Code. The methodology for identifying these samples is included in Appendix C. A review of the completeness and accuracy of these samples was undertaken to assess the compliance with the Network Code and to assess Network Capability reporting against the CP5 baseline.

1.4 Findings

1.4.1 Task 1a

Question 1a: Verify the consistency and accuracy of Network Rail's data management and reporting processes, procedures and associated governance from the point of extraction from source systems

Network Rail's process for reporting Network Capability in the Annual Return appears to be reasonably sound, well documented with appropriate error checks. There is clear evidence of the reporting procedures and associated governance from the Network Code and Network Change Process Diagram and the Reporter has seen evidence of this from formal documentation and explanations from the Network Rail team.

Network Rail has carried out testing on the transition from GEOGIS to INM and errors have been progressively corrected. However we still have some concerns as to whether all the Network Capability changes introduced by the change to INM have been eradicated.

1.4.2 Task 1b

Question 1b: Assure ORR if Network Capability in Great Britain is being reported correctly against the CP5 baseline

We have not been able to reconcile all the sample documentation with the INM data and have several concerns:

- Baseline - There does not appear to be evidence of a formally agreed detailed baseline for Network Capability in CP5. The baseline for CP5 provided on 1st April 2014 in the Annual Return is derived from GEOGIS. This makes change difficult to identify because the baseline

[2] Network Rail (2017) Network Change - LNE & EM - Audit Report - FINAL - 04.12.2017

is not provided in enough detail to investigate how capability has changed on certain sections of the network.

- Checking – There does not seem to be a routine way of recording and checking that complex and temporal agreed changes to Network Capability are reflected in the database.
- Network Change - Actual Implementation - It has been identified that there is no final check or documentation to confirm an agreed change has been carried out.

In summary, the Reporter has not been able to assure that *'Network Capability is being correctly reported against the CP5 baseline'* and it is recommended that Network Rail further develops its Network Change process to address these issues.

1.4.3 Task 1c

Question 1c: Review whether Network Rail's assessment of performance against the CP5 regulated output target be relied on?

In assessing compliance with the Regulated Output the intent of 'maintaining' Network Capability needs to be considered. Maintaining the status-quo in terms of the Network Capability is not necessarily logical or beneficial. In that context assessment of compliance needs a detailed baseline and a detailed commentary / explanation of change. In the absence of these we have not been able to assess Network Rail's compliance with the CP5 Regulated Output.

1.4.4 Task 2

Question2: At locations where Network Rail or the Reporter identifies that the capability of the network has changed since 1st April 2014, evaluate Network Rail's compliance with the Network Change element of the Network Code (having regard to the findings of Network Rail's Internal Audit Report).

The Reporter notes that Network Rail were able to provide documents for nearly 90% of Network Changes.

Based on the evidence from the sampling data there would appear to be a general compliance with the Network Code, however, there were some issues identified within the process. Firstly, relating to access / availability of data – not all Routes were able to provide sample data in the timescale available. Secondly, there were a number of individual network change records that had been manually identified and corrected by Network Rail which indicates a possible process gap. Thirdly Network Rail had difficulty in furnishing the necessary documentation associated with a line of sight through the process from baseline to current Network Capability.

In summary, we have some concerns that the current system still has some gaps in meeting overall compliance with the Network Code requirements in relation to Network Change.

1.5 Recommendations

Our recommendations are made in the context that Network Rail is still in the process of implementing its internal Network Change Improvement Programme (NCIP). We have assumed that in the next year NCIP improvements will be implemented and embedded in the Route operations with suitable internal audit and review by the System Operator function or other Network Rail central team to assure embedment and continuing compliance.

On the above basis the following recommendations are made.

No.	Recommendation	Benefits	Evidence of Implementation	Owner	Target date for completion
L4AR007-05	An appropriate Network Capability baseline is agreed and signed-off with Routes, operators and ORR for CP6.	A formalised baseline to review network capability against in CP6.	Documents signed -off with ORR, operators and Routes.	Network Rail	1st July 2019
L4AR007-06	Put in place measures to ensure Network Capability / change reporting documentation provides a clear line of sight through the process of network change. This line of sight will require Network Rail to be able to clearly articulate the progress of all current and proposed changes. The documents need to be easily accessible such that multiple members of a team in a Route can have access to them. A detailed log (similar to the LNE example) should be kept by all Routes.	Improved access to information and understanding of line of sight.	Revised processes for documentation of change process.	Network Rail	April 2019

Table 1-1: Study Recommendations

1.6 Acknowledgements

The Independent Reporter Team would like to thank both ORR and Network Rail staff for their assistance with this study.

2 Introduction

2.1 General

Arup has been appointed by the Office of Rail and Road (ORR) and Network Rail as Lot 4 Independent Reporter to monitor and evaluate Network Rail's delivery of its outputs and commitments.

2.2 Scope of the Mandate

The purpose of this Mandate (L4AR007) was to provide assurance to ORR that baseline capability was being maintained as per Network Rail's obligation set out in the ORR's Final Determination for CP5. The focus of the review was on the processes applied to report Network Capability (line speed, route availability, electrification and gauging) from Network Rail's corporate systems (NESA[3], INM[4] and the national gauging database) and the process to transform the data from these systems to the reporting format provided by Network Rail in its Annual Return.

This assurance was to be arrived at based on evidence provided by, and direct engagement with, Network Rail. It was also to be based on supporting evidence provided by ORR from stakeholders. Specifically, where capability has changed, ORR was seeking assurance that Network Rail had followed the Network Change process as defined in the Network Code. Additionally, ORR was seeking professional input from the Reporter on how Network Rail management of Network Capability may be best assessed in CP6. The output of this work was to inform the ORR's Final Determination for CP6 on 31st October 2018.

A copy of the Mandate is included in Appendix A.

2.2.1 Phasing

The Mandate identified two phases of the study which were defined in three tasks.

Phase 1

The two tasks in Phase 1 were:

- Verify the consistency and accuracy of Network Rail's data management and reporting processes, procedures and associated governance, to assure ORR that Network Capability is being reported correctly, and that Network Rail's assessment of performance against the regulated output can be relied upon.
- At locations where Network Rail or the Reporter identifies that the capability of the network has changed since 1st April 2014, evaluate Network Rail's compliance with the Network Change element of the Network Code (having regard to the findings of Network Rail's Internal Audit Report[5]).

Phase 1 was then separately broken down into tasks 1a-1c and task 2, as described in Section 3 of this report.

[3] National Electronic Sectional Appendix
[4] Integrated Network Model
[5] Network Change - LNE & EM - Audit Report - FINAL - 04.12.2017

Phase 2

Phase 2 had one task:

- Make recommendations as to how Network Capability could be better monitored and reported in CP6, taking account of the HLOS requirements, ORR's PR18 consultation responses, and Network Rail's proposals in this area.

The Phase 2 review is reported in a separate report submitted to the ORR and Network Rail.

2.3 Background

2.3.1 Capability Documentation

The capability of the national railway infrastructure, which is owned and operated by Network Rail, is described in the following documents:

- National Electronic Sectional Appendix (NESA);
- Integrated Network Model (INM);
- Ellipse; and
- National Gauging Database.

Together these sources describe the capability of the network (Network Capability) as shown in Table 2-1.

	Track Length and Layout	Line Speed	Gauge	Route Availability	Electrification Type
NESA	X	X			
INM	X	X	X	X	X
Ellipse					X
Gauging Database			X		

Table 2-1: Capability Data Sources

Network Rail has moved to a position where INM is the 'single source of truth' regarding route capability. It has moved track data from the legacy GEOGIS system into INM as part of this transition. Network Rail stated that details of electrification equipment on the network are currently included in INM but not in the master system. There has been an upload from Ellipse and Network Rail intend for this to be refreshed to ensure the two systems remain aligned.

2.3.2 Network Change Process

Changes to Network Capability are governed by the requirements of Part G of the Network Code. The Network Change Process has five principle elements:

- Assessment of Network Change Requirement;
- Informal Network Change consultation;
- Formal Internal Network Change Consultation;
- Formal External Network Change Consultation; and

- Network Change Establishment.

The principle of the change process is that Network Rail must be clear about the changes to the network it intends to make and then formally consult with stakeholders (the train operators) to seek their approval for the change taking account of their future business interests. The key documents in terms of notifying operators and confirming agreement to proposed change are the notification of a proposed Network Change to the stakeholders (including details of the proposed changes in an Appendix A) and then the establishment of a Network Change once agreement has been reached with the stakeholders.

2.3.3 Roles and Responsibilities

Within Network Rail there are various parties that have accountability and responsibility for the adherence to the defined process. The document "*Summary of Accountabilities Associated with the Network Change Process*" sets out the division of roles and responsibilities across Network Rail. This is summarised in Table 2-2.

	Network Change Sponsor / Proposer	Network Change Co-ordinator	Regulatory Reform Manager	Network Capability Standard Owner	Director Route Safety and Asset Management	Head of Strategic Planning
Identify need for Network Change	Accountable / Responsible	Consulted			Consulted	Consulted
Maintain corporate guidance and review alignment to standard			Responsible	Accountable		
Provide local guidance / training to Network Change proposers	Consulted	Responsible			Informed	Accountable
Lead informal consultation	Accountable / Responsible	Consulted			Informed	Informed
Facilitate formal consultation documentation and recording of consultees responses	Consulted	Accountable / Responsible			Informed	Informed
Resolution of objections	Accountable / Responsible	Consulted	Consulted / Informed			
Issue establishment of Network Change	Informed	Accountable / Responsible	Informed		Informed	Informed
Requesting update of Sectional Appendix	Accountable / Responsible	Informed	Informed		Informed	Informed

Table 2-2 - Network Change RACI Diagram

The division of responsibilities shown above is representative of the current (September 2018) arrangement. Network Rail produced this document as part of the Network Change Improvement Programme.

2.3.4 Licence Obligation

According to condition 1.20 of its Licence, Network Rail has the following obligation:

"1.20 The licence holder shall maintain appropriate, accurate and readily accessible information about the relevant assets, including their condition, capability and capacity."

In addition, ORR's PR13 determination also stated that Network Capability must be maintained at the baseline level as set on 1st April 2014 unless changes are made in accordance with Part G of the Network Code.

ORR also required that Network Capability should be described in Network Rail's Sectional Appendices, Geographic and Infrastructure System (GEOGIS) database, and the National Gauging Database (page 99, 3.126) and must be measured for CP5 against electronic copies of the adjusted baseline for network capability as at 1st April 2014.

Extracts from ORR's Final Determination for CP5 are included as Figures 2-1 and 2-2 below.

Table 1: Summary of regulated outputs for CP5

Area	Outputs
Train service reliability	• Annual target for the percentage of trains on time (measured by PPM) for England & Wales and Scotland, with 92.5% on time by March 2019. • All franchised operators in England & Wales to reach 90% PPM by March 2019, except Virgin Trains which has a combined target of 88% PPM and 2.9% CaSL and East Coast which has a combined target of 88% PPM and 4.2% CaSL. First Great Western will have a minimum of 88% PPM for its long distance services.
	• Annual target for the percentage of trains cancelled or very late in England & Wales (measured by CaSL), with no more than 2.2% in this category by March 2019.
	• Annual target of 92.5% of freight trains on time (measured by the Freight Delivery Metric[14]).
Enhancements	• Wide range of improvement projects completed. Delivery milestones will be published in March 2014 delivery plan alongside development milestones for early stage projects. Includes funding for initial ETCS[15] cab fitment.
Safety	• Network Rail required to deliver a plan to maximise the reduction in risks of accidents at level crossings, using £99m ring-fenced fund[16]. This fund combines £67m from the DfT HLOS and £32m of further funding.
Disruption to passengers and freight caused by engineering works	• Disruption reduced by 8% for passengers and 17% for freight in 2019 compared to 2014, supported by an extension of funding for '7 day railway' projects.
Network capability	• Track mileage and layout, line speed, gauge, route availability, electrification at least maintained, and improved where there are enhancement works.

Figure 2-1: Extract ORR PR13 Final Determination – Regulated Outputs (page 23)

2.3.5 Annual Return

Each year in its Annual Return, Network Rail presents a 'snapshot' of Network Capability. A copy of the Network Capability section of the 2014 Annual Return[6] (capability as at 31st March 2014) is included for reference in Appendix D.

It is noted that there were three discrepancies between actual and published capability declared in the 2014 Annual Return and several ongoing Short-Term Network Change proposals.

Network Capability data has been published alongside the 2018 Annual Return[7] as Table 39[8].

[6] annual-return-2014.pdf
[7] Network-Rail-Infrastructure-Limited-Annual-Return-2018.pdf
[8] Annual-Return-Data-Tables-2018.xls

Table 3.1: Summary of our decisions on CP5 outputs

Area	Outputs
Train service reliability	• PPM[71] for England & Wales (annual[72] and CP5 exit of 92.5%), Scotland (annual 92% and CP5 exit of 92.5%) and franchised TOCs in England & Wales (rolling annual output JPIP[73], no TOC to exit CP5 below 90%, except East Coast and Virgin who must not exit CP5 with PPM below 88% or CaSL above 4.2% and 2.9% respectively). In addition First Great Western high speed services must not exit CP5 with PPM below 88% • CaSL[74] for England & Wales (annual and CP5 exit of 2.2%) and rolling annual output JPIP • Freight Delivery Metric[75] (National annual 92.5%)
Enhancements	• Enhancement projects to be delivered. Scheme delivery milestones (set in an enhancements delivery plan). Milestones for delivery of projects in ring-fenced funds. • Development milestones for early stage projects

Area	Outputs
Health and safety	• Network Rail required to deliver a plan to maximise the reduction in risks of accidents at level crossings, using a £99m ring-fenced fund [76]
Network availability[77]	• PDI-P (National CP5 exit of 0.58) • PDI-F (National CP5 exit of 0.73)
Network capability	• Base requirement at start of CP5 in terms of track mileage & layout, line speed, gauge, route availability, electrification type[78]
Stations	• Station Stewardship Measure (SSM) by station category, and Scotland (annual)[79]
Asset management[80]	• Asset management excellence model (AMEM) capability for each core group at National level • Asset data quality for each asset type at National level • Milestones for ORBIS (Offering Rail Better Information Services)

[78] This output provides for a minimum level for the whole network. The capability of some parts of the network will improve during CP5 as a result of the enhancement programme.

Figure 2-2: Extract ORR PR13 Final Determination – ORR decisions (pages 74,75)

2.3.6 Process Internal Review

An internal audit of the Network Change element of the Network Code in December 2017 identified a lack of central governance and accountability for the Network Change process. This led to the award of an overall rating of "Unacceptable". As a result, Network Rail is currently in the process of implementing many of the resulting recommendations through their Network Change Improvement Programme. The Reporter received an update on the four projects in the Network Change Improvement Programme dated 20th September 2018.

There are three outstanding tasks that are noted under two of the workstreams, these are shown below in table 2-3 and the tasks that have been completed and the full update document is provided in Appendix E.

Project	Task
Effective reporting and assurance and training	Need to clarify 2nd tier assurance process with the Network Capability Standard Owner
Industry Alignment	Recommendation for annual survey to be discussed at Network Capability Steering Group
Industry Alignment	"Effectiveness test" of NC process embedded in business as usual (1/11/18)

Table 2-3: Outstanding Network Change Improvement Programme tasks

3 Approach

3.1 Introduction

The Reporter's review has been based on a combination of desktop reviews of documentation supplied by Network Rail and a series of meetings with both Network Rail and ORR.

Specifically, there was no requirement in the mandate to validate Network Capability data on site.

The following sections describe the approach taken to respond to both phases of the study.

3.2 Phase 1

3.2.1 Task 1

Verify the consistency and accuracy of Network Rail's data management and reporting processes, procedures and associated governance from the point of extraction from source systems, to assure ORR if Network Capability in Great Britain is being reported correctly against the CP5 baseline and whether Network Rail's assessment of performance against the CP5 regulated output target can be relied upon.

This task has been split into three activities with the aim of focusing attention on the individual elements of the process. The Reporter therefore considered in turn:

- Verify the consistency and accuracy of Network Rail's data management and reporting processes, procedures and associated governance from the point of extraction from source systems;
- Assure ORR if Network Capability in Great Britain is being reported correctly against the CP5 baseline; and.
- Determine if Network Rail's assessment of performance against the CP5 regulated output target be relied on?

Task 1 was delivered though a review of the documentation supplied by Network Rail. This provided a framework for the understanding of the processes involved and the division of responsibilities between key individuals or departments. It also facilitated the drafting of questions to be put to individuals involved in the Network Change process and the handing of the data supporting the process at meetings. A full list of documents supplied for the review is included as Appendix B.

The focus of the meetings was to understand the process first-hand, and secondly to interrogate those involved in the management and manipulation of the supporting data. The following table summarises the meetings that took place.

No.	Meeting Name	Attendees	Comments
1	Network Change Improvement Programme	Mike Smith, Shona Beattie, Ian Hood	Initial meeting to explain the Network Change process and the Reporter's method of assessment for this mandate
2	Initial Process Description by Network Rail (20th June 2018)	Mark Hazell, Shona Beattie, Rosha Soltani, Matthew Jeffs, Ian Hood, Andrew Carson	This provided a high-level view of the data transition process to INM and how this was being cleansed. It also provided a description of how the reporting of capability in the Annual Return would be simplified. Finally, there was some discussion on the development of a capability metric going forward.
3	GEOGIS to INM Transition (13th July 2018)	Andrew Muyobo, Shona Beattie, Douglas Leeming, Andrew Carson	The purpose of the meeting was for Network Rail's INM team to explain in some detail the process and issues identified in the transition of data from GEOGIS to INM.
4	Phase 2 Network Rail views (14th August 2018)	Shona Beattie, Douglas Leeming	The purpose of this meeting was for Network Rail to share their views on the possible structure of the CP6 metrics and to provide comment on factors which may need to be addressed in any new metric. These views had been discussed at the Network Capability Steering Group and were supported by and added to by other industry attendees (including Rail Delivery Group).
5	Arup and ORR update meeting (10th September)	Sneha Patel, Dave Chewter, Mark Rudrum, Andrew Carson	The purpose of this meeting was to discuss current Arup progress and understand from ORR if there was anything additional that could help the reporting process.
6	Arup, ORR and NR Tripartite meeting (11th September)	Shona Beattie, Sneha Patel, Dave Chewter, Mark Rudrum, Andrew Carson	The purpose of this meeting was to inform NR on the discussion that had taken place in meeting 5 and to discuss any additional material that could help the reporting process.

Table 3-1: Summary of Meetings

The outcome of this approach allowed the Reporter to form a view in response to each of the elements of Task 1.

3.2.2 Task 2

At locations where Network Rail or the Reporter identifies (through sampling for England & Wales and Scotland) that the capability of the network has changed since 01 April 2014, evaluate Network Rail's compliance with the Network Change element of the Network Code (having regard to the findings of Network Rail's Internal Audit report).

Task 2 required the study to review the compliance with the Network Change process by means of sampling changes that have taken place.

The Reporter identified a methodology for the sampling of the dataset of changes which was described in a Technical Note shared with ORR and Network Rail[9]. The full note is included in Appendix C. The approach is summarised below.

[9] Technical Note "Capability Changes Sampling Proposal", 6th July 2018

Network Change Sampling

To evaluate Network Rail's compliance with the Network Change element of the Network Code the population of changes that had taken place was obtained from Network Rail. This covered the period in CP5 from its beginning until March 2018.

In each year the total number of changes were identified for each of four capability categories, by devolved Route, ELR and mileage and a sample of these was required for review by the Reporter. As part of the process to determine the size of sample required to provide an indication of compliance with the Network Code a high-level analysis of variations across the capabilities by year and Route was undertaken. The aim was to identify trends within the data to inform the determination of the sample sizes.

It was noted that there was a requirement in the Mandate to undertake sampling based on a review of all the tested capabilities for both Scotland, and England & Wales separately. Therefore, all Routes were included in the review, but it was agreed that there was no necessity to review all capabilities in each Route. The study also considered the changes across all the years of available data.

The volume of samples obtained had to be practical to deliver within the timescales of the commission, whilst providing a reliable outcome. It was noted that there was no requirement to undertake statistically significant sampling.

The approach taken to the sampling was based on determining the number of changes per category by Route. This was designed to include reasonable sample sizes for large populations whilst also providing assurance where the changes had been relatively small. The agreed sampling scale (from the Technical Note) is shown below in Table 3-2 and was to be taken from the whole population sample.

Number of Changes per Route, per Capability, per Year	Sampling Approach
0 to 5	Not sampled
6 to 20	2 samples
21 – 100	10% sample
> 101	5% sample

Table 3-2: Sample Sizing

Sample Data Provided

Based on the foregoing rate of sampling the study considered the number of Network Changes in the following Routes, capabilities and year.

Capability	Route	East Anglia	Kent	London North Eastern	London North Western	Midlands	Scotland	Sussex	Wales	Wessex	Western
Line Speed	14/15	3	6	3	5	7	2	2	2	2	2
	15/16	5	7	6	7	7	5	2	2	2	4
	16/17	0	2	2	7	5	2	0	2	16	4
	17/18	5	2	7	8	3	8	2	7	2	7
	18/19	-	-	-	-	-	-	-	-	-	-
Gauge	14/15	2	2	7	6	2	2	0	0	0	0
	15/16	2	2	6	8	4	4	2	0	2	2
	16/17	2	2	2	3	2	2	0	0	7	2
	17/18	5	7	10	10	4	8	6	7	7	9
	18/19	-	-	-	-	-	-	-	-	-	-
Route Availability	14/15	3	5	2	7	3	2	2	2	2	2
	15/16	4	6	9	5	8	3	2	2	2	2
	16/17	0	2	2	4	3	2	0	2	9	3
	17/18	5	3	6	11	4	8	2	6	2	6
	18/19	-	-	-	-	-	-	-	-	-	-
Electrification	14/15	3	5	3	8	4	2	2	2	2	2
	15/16	5	6	10	6	9	6	2	2	2	2
	16/17	0	2	2	5	3	2	0	2	9	5
	17/18	5	2	7	15	5	10	3	7	10	3
	18/19	-	-	-	-	-	-	-	-	-	-
Total for each Route		**49**	**61**	**84**	**115**	**73**	**68**	**27**	**45**	**76**	**55**

Table 3-3: Quantum of Sample Data Requested from Network Rail

The selection of individual changes was derived from the regular selection of entries listed in ELR and mileage order within each of the samples. Therefore, each Route was required to provide the samples requested from Table 3-3.

The Reporter was not provided with data from Wessex Route. As such it has not been included in the analysis of the samples.

Samples Used

Because of the bundling together of certain infrastructure changes into a single Network Change request the actual number of Changes to be reviewed is less than the quantum in Table 3-3. The data requested from Network Rail in relation to each sample covered the documentation associated with:

- The original notification of Network Change (confirming stakeholder consultation)
- Appendix A (showing the detail of the requested change); and
- The establishment of the change (i.e. agreement to the change).

Between them these documents provided a ‘line of sight’ between the original request, through consultation, to establishment of the final infrastructure change. Table 3-4 shows the quantum of changes which should have been supplied by each Route and the number received.

Route	Number of Network Changes in Sampled Data	Notification Evidence Provided?	Appendix A Evidence Provided?	Establishment Evidence Provided?
East Anglia	3	2	0 (awaited)	2
Kent	10	10	10	10
London North Eastern	10	10	9	10
London North Western	5	5 (and one variation)	4	5 (one found online)
East Midlands	10	10	10	10
Scotland	11	11	11	11
Sussex	1	1	1	1
Wales	5 (including one change with 4 variations, one change with two variations and two changes with one variation, so 13 in total)	5	13	5
Wessex	Not received			
Western*	8	7 (two found online)	8	7 (three found online)

* Western Route data highlighted some potential concerns which are discussed in Section 4.5.

Table 3-4: Number of Network Changes to be Reviewed with Supplied Data Summary

The findings in relation to the Phase 1 tasks are described below in Section 4.

4 Findings - Phase 1

4.1 Context

Phase 1 of the review is primarily concerned with the accuracy of the current CP5 Network Capability data and the robustness of the processes surrounding that. This includes, in Task 2, consideration of the accuracy of the reporting on Network Capability.

The findings have been split into the three parts of Task 1 of the Mandate (1a, 1b and 1c) and Task 2 as outlined above.

At the time of our review it should be noted that Network Rail is still in the process of implementing its internal Network Change Improvement Programme (NCIP) to address deficiencies in the controls around the Network Change process in CP5.

4.2 Task 1a - Consistency and Accuracy of Processes

The review of the consistency and accuracy of the process was focused on the provenance of the data used to record Network Capability and how this was kept up to date. We have also examined the procedures and governance associated with recording Network Capability.

4.2.1 Processes, procedures and governance

Evidence of the processes, procedures and governance has been provided by two key documents:

- The Network Code which describes the requirements that each proposed Network Change must go through and includes information on the key documentation that is required.
- The Network Change Process Diagram which outlines the five stages in the Network Change Process (associated with Network Code section G1 and G8) and the stages of assessment, consultation and establishment that are required to take place. This was published on 8th May 2018 as part of the ongoing Network Change Improvement Programme (copy provided in Appendix E).

We have been talked through the procedures and processes outlined in the Network Code and Network Change Process Diagram by Network Rail. The Network Rail teams have shown a clear understanding of the procedures and processes, which we have been assured are now embedded in the business.

4.2.2 GEOGIS and INM

An initial meeting with Network Rail (Meeting 1 in Table 3-1) confirmed that Network Rail was in the process of transitioning to INM as its prime capability database. A second meeting with Network Rail specialists involved in the transition process described how the migration of data from GEOGIS to INM had taken place.

2018 is the first year INM has been used by Network Rail to provide the source data for reporting network capability in the Annual Return, having used GEOGIS previously. INM was introduced in August / September 2017.

4.2.3 Transition of data from GEOGIS to INM

GEOGIS is a legacy system and is reliant on locating assets relative to the trackside mile posts. The move to INM was designed to provide a more accurate source of data and a structure such that improved information and data interrogation would be possible.

We understand that during the amalgamation of systems from GEOGIS to INM a small percentage of errors emerged equating to 249 miles or 1.2% of the track mileage.

On analysing the anomalies, Network Rail found that 67% of these records were associated with track lengths of less than 10 yards and around half of the remainder were between 10 and 30 yards in length.

Network Rail has explained that it is core to their methodology of the transition that old, and potentially incorrect data, will not be deleted until the INM is considered to have reached an acceptable level of accuracy, for which Network Rail aims for asset data quality level A2. A backup of the data that was in GEOGIS at the point of the handover has been retained in INM but GEOGIS has stopped being used.

4.2.4 INM Data Validation for Annual Return

As part of the process to check the accuracy and consistency of the data to be used for reporting Network Capability in the Annual Return, Network Rail undertook a series of checks of the source data. This was particularly important for 2018 because of the transition from GEOGIS to INM.

Starting in January 2018, Network Rail carried out three dummy runs of their reporting process using INM data, with the aim of identifying differences and potential errors associated with the switch from GEOGIS to INM. It is understood that there were initial issues with the formats of some of the INM fields when inputting into the Microsoft Access database used to produce the reports, but that these have been largely resolved by Network Rail.

It was noted that INM has combined yardages from some of the shorter sections to create longer sections of track in one record. As a result, the number of data records has decreased to 331,000 from 464,000 with GEOGIS.

Network Rail has explained that records that contain text had to be removed before the data was transferred into the Microsoft Access Database. Roughly 8,000 (~2.5%) records out of the 331,000 INM records had blank line speeds in the 1st April run which was used for the Annual Return. This was higher than it had been for GEOGIS. However, a large proportion of these were not on running lines (and the capability measures are for running lines). Blank records were assumed to be at the lowest capability band. Strategic Route Sections (SRSs) were used for internal reporting of capability measures within Network Rail. As part of the check it was found that SRSs could (erroneously) overlap within INM by 1–200 yards, which particularly affected gauge because gauge is measured by route km whereas electrification, line speed and route availability are measured by track km. It has therefore not been possible to produce capability reports by SRS for use within Network Rail this year, but Network Rail are aiming to correct the errors and produce these reports next year. To confirm, though, the reports by SRS are for internal use only and are not required for reporting Network Capability in the Annual Return.

4.2.5 Reporting Process

Network Rail has produced a detailed Work Instruction (*Annual Return Capability Measures – AIS – WI – 020a,* dated 11th May 2018) for producing the Network Capability figures for the Annual Return. It has been updated for sourcing data from INM. It clearly sets out the steps required to produce the figures for each type of capability, and includes a series of error checks. Two of these checks are:

- Gauge Processing: any changes identified by the reporting are sent to the gauging team for checking and confirmation; and
- Route Availability processing: the Excel input file is provided by the Structures Team. Sense checks are undertaken by comparing the data with the input file from the previous year.

A further check is that the process outputs all changes of greater than 200 yards for each of the four Network Capability metrics when compared to the previous year. This year, with INM, the list of changes for line speed has approximately doubled from the number of changes recorded last year, whereas the other three measures have approximately tripled. Network Rail believes that some of these will be due to the switch from GEOGIS to INM (that is, from a linear model to a more detailed geospatial model). The INM team are currently in the process of identifying such changes.

For next year's Annual Return (2019), Network Rail is planning to re-write the database application for producing the reports. Network Rail is finding that knowledge of Microsoft Access is increasingly limited and using a new application would widen the pool of staff who could use and develop it. It would also remove the manual interventions currently required for adapting the process from using GEOGIS to INM. To help make these changes, Network Rail plan to add two staff members to the team.

4.2.6 Conclusions

Network Rail's process for reporting Network Capability in the Annual Return appears to be reasonably sound, well documented with appropriate error checks. There is clear evidence of the reporting procedures and associated governance from the Network Code and Network Change Process Diagram. The Reporter has seen evidence of this from formal documentation and explanations from the Network Rail team.

Network Rail has carried out testing on the transition from GEOGIS to INM and errors have been progressively corrected. For the reporting in the 2018 Annual Return, the number of Network Capability changes is larger than in previous years, but the Network Rail explanation that most of this increase is due to the improved accuracy of INM is plausible. However we still have some concerns as to whether all the Network Capability changes introduced by the change to INM have been eradicated.

4.3 Task 1b - Correct Reporting against the CP5 Baseline

4.3.1 CP5 Baseline

As part of our review we looked at the CP5 baseline to understand the basis of compliance and reporting of subsequent change.

Discussions with both Network Rail and ORR have identified that the primary 'baseline' for the Annual Return provided on 1st April 2014 for CP5, is derived from GEOGIS. A more detailed Network Capability baseline was not developed or agreed between ORR and Network Rail.

The CP5 baseline is at a high-level and does not give visibility of individual sections of track. This makes it impossible to compare Network Capability changes in detail.

It was noted that there was no requirement for Network Rail to develop a detailed CP5 baseline for Network Capability or to gain Operator or ORR agreement of the Network Capability baseline for CP5.

4.3.2 Reporting against Baseline

As well as having a detailed Network Capability baseline, accurate reporting of Network Change is reliant on a robust system of monitoring and capturing changes to the infrastructure capability across all Routes. The reporting process is described in the Network Code Section G and in the accompanying Network Change Process Diagram.

The Network Code requires Network Rail to comply with the formal Network Change process when altering network infrastructure. That Network Change process has been set out by Network Rail in considerable detail[10], but as noted below, there are many complex facets of Network Capability to consider.

For our review we investigated how the proposed Network Changes were recorded by checking that the sample Network Change data record matched the corresponding Appendix A. Our cross check found that there were some discrepancies between the two data sets.

Discussion with Network Rail identified that Appendix A was not written with the intention of matching with Network Capability reporting, instead its purpose was to inform operators of potential impacts of a Network Change. There was no specific requirement to provide documentation to confirm the Network Changes have been carried out as stated in Appendix A or the notification document. Therefore, Network Rail provided Appendix A to the Reporter as the best alternative to review the sampled changes in network capability against. It is though noted that the regulated output (as discussed in Task 1c) does set a requirement to maintain network capability or provide evidence where it has changed. The provision of a high-level baseline at the start of CP5 with no detailed information for individual sections of track is therefore not beneficial to this process.

Discussions with Network Rail also identified that Network Changes can be complex and temporal. An example provided by Network Rail was that

"For example, the nature of the works may require S&C to change to plain line, which would then show as S&C track removed and plain line track added (and both records might not show up in the sample). It might also be a change of track ID to reflect a change in the type of traffic, so the comparison macro would see track removed even if it still exists with its updated attributes. There may also be cases where projects are completed over a period of time, so the snapshot of GEOGIS shows the track as out of use while the project is ongoing and it may be back in a later data set."

From our review it is unclear as to the extent that Network Rail consistently record such complex and temporal changes to Network Capability.

[10] Network Rail (2017) Network Code Part G – Network Change – 12 July 2017

4.3.3 Implementation

In reviewing the process, we have noted that there is no process to confirm that Network Changes have physically been carried out on the network as proposed in Notification and Appendix A documentation.

4.3.4 Conclusions

In summary, we have not been able to reconcile all the sample documentation with the INM data and have several concerns:

- Baseline - There does not appear to be evidence of a formally agreed detailed baseline for Network Capability in CP5. The baseline for CP5 provided on 1st April 2014 in the Annual Return is derived from GEOGIS. This makes change difficult to identify because the baseline is not provided in enough detail to investigate how capability has changed on certain sections of the network.
- Checking – There does not seem to be a routine way of recording and checking that complex and temporal agreed changes to Network Capability are reflected in the database.
- Network Change - Actual Implementation - It has been identified that there is no final check or documentation to confirm an agreed change has been carried out.

Overall it is recommended that Network Rail further develops its Network Change process to address these issues.

4.4 Task 1c – Reliability of Network Rail's Assessment of Performance against the CP5 Regulated Output

4.4.1 CP5 Regulated Output

The CP5 ORR Final Determination regulated output for Network Capability is as follows.

Network capability	• Track mileage and layout, line speed, gauge, route availability, electrification at least maintained, and improved where there are enhancement works.

Source: ORR (October 2013), Final Determination, pp.23

4.4.2 Assessment of Changes 2014-2018

Network Rail reports four measures[11] in Table 39 of the Annual Return.

We have compared Annual Returns for years between 2014 and 2018 inclusive to quantify the changes that have taken place to these four capabilities. The following tables show the changes in line speed and electrification (as examples) that have taken place over the four-year period - the percentage figures show the increase or decrease in network capability over that time.

[11] C1- line speed, C2 – gauge, C3 – route availability value, C4 – electrified track

		Speed			
Route	**Track Km**	**0-35**	**40-75**	**80-105**	**110-125**
East Anglia	-1.17%	-6.27%	0.02%	-1.78%	No Change
Kent	-0.65%	1.61%	0.09%	-2.98%	No Change
London North Eastern	-9.90%	-9.38%	-16.60%	0.79%	0.09%
London North Western	-0.18%	-7.71%	-1.52%	7.88%	-0.33%
East Midlands	21.31%	6.00%	39.63%	-2.31%	2.29%
Scotland	1.30%	-0.39%	1.79%	1.17%	0.08%
Sussex	2.29%	-3.37%	1.83%	5.63%	No Change
Wales	-0.01%	0.51%	-2.46%	5.74%	No Change
Wessex	-1.57%	-3.86%	-2.63%	-0.05%	No Change
Western	-1.10%	-10.28%	-0.93%	0.18%	1.14%
Network	**-0.24%**	**-4.74%**	**-0.39%**	**1.77%**	**0.35%**

Table 4-1: Change in Line Speed Capability between 2014 and 2018

Table 4-1 shows that overall there has been a -0.24% decrease in track km across the network. Other examples are that there has also been a -0.33% decrease in the track km that has the capability of a running speed of 110-125mph in LNW and a -2.98% decrease in Kent with a capability of running 80-105mph.

Route	**Track Km**	**25kV AC OLE**	**25kV AC OLE and DC 3rd Rail**	**650 / 750V DC 3rd Rail**	**1500V DC OLE**	**Not Electrified**
East Anglia	-1.17%	-2.18%	16.63%	-5.25%	n/a	0.53%
Kent	-0.65%	-53.07%	-12.87%	-1.90%	n/a	20.06%
London North Eastern	-9.90%	-1.04%	61.78%	3.98%	-4.59%	-15.62%
London North Western	-0.18%	-2.83%	-5.41%	-0.94%	n/a	1.90%
East Midlands	21.31%	-0.79%	n/a	n/a	n/a	25.50%
Scotland	1.30%	13.17%	n/a	n/a	n/a	-5.16%
Sussex	2.29%	14.96%	-9.59%	1.25%	n/a	11.86%
Wales	-0.01%	n/a	n/a	n/a	n/a	-0.09%
Wessex	-1.57%	n/a	n/a	-2.22%	n/a	-0.04%
Western	-1.10%	64.94%	n/a	n/a	n/a	-8.19%
Network	**-0.24%**	**3.12%**	**3.32%**	**-1.22%**	**-4.64%**	**-1.53%**

Table 4-2: Change in Electrification Capability between 2014 and 2018

Table 4-2 shows that DC overhead and DC have decreased across the network but AC/DC and OHL electrification have increased.

In isolation these results do not necessarily demonstrate compliance or non-compliance with the regulated output without understanding the nature of the individual changes that have contributed to the variations. The 9.9% decrease in track kms in LNE and 21.3% increase in track kms in East Midlands Route can probably be explained by boundary changes where the maintenance responsibility changed from LNE to East Midlands. However, this does demonstrate that the importance of having a detailed commentary to accompany the headline numbers and to provide explanation.

Although there was a decrease in overall network kms from 2014 to 2018, it is noted that there was an increase each year until 2018 when the data was first taken from INM - which is recognised as being a more accurate representation of the network.

Using the electrification capability as an example, the quantum of track in each category needs to be considered to determine whether, based on these figures, the capability is being improved or not.

However, as noted above the difference in regulated output from 2014 to 2018 relies on having a detailed original baseline and a sound process for agreeing changes in Network Capability.

4.4.3 Conclusions

In assessing compliance with the Regulated Output the intent of 'maintaining' Network Capability needs to be considered. Maintaining the status-quo in terms of the Network Capability is not necessarily logical or beneficial to the future development of the railway. It is expected that there will be changes to Network Capability over the course of the Control Period other than from enhancements that may be beneficial. The system of monitoring change and compliance needs to be able to record this clearly. This confirms the importance of the explanation / commentary in the Annual Return.

As noted in the previous section, we have some concern over the method of Network Rail's reporting of Network Capability. This makes it difficult to assess Network Rail's compliance with the CP5 Regulated Output.

4.5 Task 2 - Compliance with the Network Code

4.5.1 Context

Task 2 required the study to review compliance with the Network Code where changes had taken place. This was considered at two levels. Firstly, a high-level review of the process and the organisational structure designed to deliver it. Secondly a sample of actual Network Changes which had been undertaken was reviewed to check for evidence of the 'line of sight' through the process.

4.5.2 Network Change Process Compliance

The Network Change Process has five elements as outlined in the Network Change Process Diagram[12]. The following comments are made based on the available documentation and direct engagement with Network Rail. This includes a master spreadsheet provided from LNE Route that is a log of the communication of the proposed Network Change at each of the five stages. This information logged is also described below.

1. Assessment of Network Change Requirement

From the review of the Network Change Process diagram it has been found that the first step is for the Network Change Co-ordinator to assess any possible Network Change. However, the Reporter has been informed that some Network Changes may not get logged. A possible example cited by Network Rail was as follows:

[12] Network-Change-Process-Map-08.05.2018.pdf

"in CP5 there have been incidents at Elephant and Castle, and Hull Paragon have inadvertently resulted in a change in gauge (a series of factors including wet beds and the type of maintenance activity contributed to these). There is also the possibility that allowing an asset to degrade means it is no longer at the same capability as it was previously" (Although Network Rail do not have any specific examples, so they only cited this as a possibility).

However, the study was advised that a records update would normally be required, and confirmation that a Network Change had been followed would normally be requested.

[Data Source: Data provided in the LNE Log: Date the proposal was received and who from, category of proposal, date of endorsement.]

2. Informal Network Change Consultation

Network Rail advised that an internal discussion would be held, proposed changes are then circulated internally and externally to see if there are any questions before the Network Change becomes formalised. Network Rail has provided a master spreadsheet from LNE Route which outlines what is logged at each of the five stages, this is described below.

[Data Source: Data provided in the LNE log: Date the informal consultation was distributed, deadline set for comment, responses from train operators, further comments, verdict on consultation (not fit for purpose/eligible for consultation).]

3. Formal Internal Network Change Consultation

Network Rail has confirmed that this process takes place, evidence for this is provided in the LNE log.

[Data Source: Evidence provided in the LNE log: Date the internal consultation was distributed, deadline set for internal response, internal response/queries/rejections/issues, grading of Network Change after Internal Consultation.]

4. Formal External Network Change Consultation

As part of the sampling process described earlier the Reporter was able to review evidence of documentation associated with this stage.

[Data Source: Evidence was provided in the LNE log: Date the external consultation was distributed, deadline set for external response, reason for objection, external responses/queries/rejections/issues.]

5. Network Change Establishment

As part of the sampling process described earlier the Reporter was able to review evidence of documentation associated with this stage.

[Data Source: Data provided in the LNE log: Whether the Network Change has been established and the date.]

In addition, the log also provides information on the GRIP status and, the parties the documents were distributed to and on what date.

We have only been provided with a master spreadsheet log for LNE. Network Rail advises that similar logs exist for other Routes but that the LNE log represents best practice. It was also noted that for some Routes it is not easily possible to track a change through the spreadsheet log – however the responsibility for the format of the log is at Route level.

4.5.3 Sample Data

As noted in Section 3.2.2 a key element of the review of the compliance with the Network Change process was the sampling of actual changes that had taken place to the check whether there was a 'line of sight' through the process.

Network Rail firstly provided data detailing the number of individual network capability changes that had been logged for 2014-15 to 2017-18 inclusive, split into each of the four measures; line speed, gauge, route availability and electrification. To undertake the review the Reporter then requested a sample of these changes, the full methodology detailed in Appendix C. Network Rail noted that a formal Network Change could include a number of individual changes to network capability.

The Routes then provided a spreadsheet which listed the individual changes to network capability that were requested. Each change also had an associated comment and for those that stated the change related to formal Network Changes, the Routes were required to provide the documentation as required by the Network Code; a Notification, the associated Appendix A (which is the document designed for operators to provide further information on potential operational impacts but for this review was provided to allow the Reporter to try and match with the individual changes noted in the spreadsheet) and an Establishment. Analysis was undertaken to understand which Network Changes had these three documents. It was found that most of the Network Changes had associated Notifications and Establishments as shown in table 4-3.

Route	Percentage of Network Changes with Notification, Appendix A and Establishment
Anglia	(All notification and establishment documents provided but no Appendix A documents)
East Midlands	100%
Kent	100%
London North Eastern	90%
London North Western	80%
Scotland	100%
Sussex	100%
Wales	100%
Wessex	No documentation provided
Western	75% (after investigating the Network Rail archive*)

Table 4-3: Percentage of Complete Sample Documentation Reviewed

*Two notifications and three establishments were found online, two Network Changes did not have all documents.

4.5.4 Outcomes

Each individual change to Network Capability typically had an associated comment in the spreadsheet and these have been analysed to provide a breakdown of the data provided by Network Rail. Some Network Changes are made up of multiple changes to the network, hence Table 4-4 below shows that there are less unique Network Changes than total rows which relate to Network Change data. As a result, the total number of rows in columns '*Number of Network Change Rows'* was higher for every Route than the column '*Unique Network Changes*'.

Route	Number of Samples Received / Requested	Number of Network Change Rows	Unique Network Changes	Number of Data Errors / Corrections	Number with no Physical Changes	Number of Rows Highlighted Red – Requiring Route Review	Another Route Responsible	No Material Impact on Capability - Network Change not Applicable	Network change documentation not available	Unsure/No note
Anglia	49/49	16	3	25	4	4	0	0	0	0
East Midlands	73/73	26	10	23	9	0	15	0	0	0
Kent	61/61	42	10	0	0	0	6	12	1	0
London North Eastern	83/84	14	10	33	17	4	15	0	0	0
London North Western	114/115	11	5	83	5	15	0	0	0	0
Scotland	68/68	18	11	41	8	0	1	0	0	0
Sussex	27/27	3	1	0	0	0	0	13	11	
Wales	45/45	27	5	7	11	0	0	0	0	0
Wessex	Not received (0/76)									
Western	55/61	39	8	13	0	0	2	0	2	5

Table 4-4: Analysis of associated comments with individual changes in network capability

In reviewing the samples, it was possible to view examples of rejections and acceptances by operators in response to the Network Change notifications on the Network Rail archive site. Some proposals also had Network Change variations issued after consultation where the proposed change had been altered because of stakeholder comments.

When the requested sample provided by each Route was reviewed by the Reporter there were a number of rows where the associated comment for individual changes to network capability referenced a data error or data correction. Although there are a number of these data errors, the fact they have been identified means that these errors have been corrected and no longer exist in the data. This allows the Reporter to be more confident that overall network capability is being reported more accurately. However, the Reporter cannot be sure that all errors have been found and has concerns over the manual interventions required to address these potential issues.

It is noted that on Sussex and Kent Routes (South East) that 'Network Change to follow' was highlighted for 11 out of 27 sampled rows for Sussex and one of the Kent rows, these are included in the *'Network Change documentation not available'*. Network Rail explained that these documents have been produced but the documentation was unable to be located in the timescale. Accordingly, the Reporter has some concerns that the documentation was not able to be found when the Routes provided their other samples.

There are also concerns in relation to the Western data, as presented in Table 3-4, 4-3 and 4-4. In Table 3-4 there were four Network Changes that had variations in the documents provided by Network Rail but no variations were listed in the sample spreadsheet. One of the Network Change notifications referenced in the spreadsheet was issued in November 2006 with the first variation issued in August 2012 and the second variation issued in April 2013. However, the sampling spreadsheet references the first notice which was issued in November 2006. Network Rail did note *'There are updated versions for some of those referenced (which will have the same file name with "v2" or similar added'*, however, the Reporter has concerns regarding this reporting as these exact variations are not specifically noted in the spreadsheet provided.

In Table 4-3 it is highlighted that some notifications and establishments for Western had to be found online on the Network Rail Archive site. Additionally, not all of these documents were under the Western heading, as some were located within Crossrail. Table 4-4 highlights that there are two cases where the *'Network Change documentation not available'*. The comment on

these two samples in the spreadsheet stated, '*Freight branch taken out of use'* but there is no associated Network Change reference or documentation. Network Rail explained that this is because the Network Changes took place many years ago and therefore there is no associated documentation available.

4.5.5 Conclusions

In total we requested 653 samples and received 581, over 88%. The high percentage of 'line of sight' documentation from most of the Routes is indicative of a process generally being adhered to. In total there were 63 formal Network Changes identified and all three documents were provided in 56 cases, which equates to 89%.

Based on the evidence from the sampling data there would appear to be a general compliance with the Network Code, however, there were some issues identified within the process.

One issue relates to accessing data – we understand that in Kent and Sussex the Network Change documentation has been produced but this was not able to be provided to the Reporter. In addition in Western Route, discrepancies with the process were identified where changes in capability from many years ago were included in the sample. Wessex were not able to provide any sample data in the timescale available, citing problems with staff availability to extract the requested samples.

There were a number of individual network changes that had comments of errors and corrections associated with them in the spreadsheet provided by Network Rail. However, the fact that these data errors were identified and resolved by manual intervention is a positive outcome, indicates a possible process gap.

A further finding from this review is linked to the difficulty Network Rail has had in furnishing the necessary documentation associated with this line of sight through the process. This is evidenced by Anglia, Western and Wessex. This difficulty has been acknowledged by Network Rail we understand that measures are being put in place measures to resolve this shortcoming. However, it was noted by Network Rail that if they had been given clear requirements for monitoring at the start of the control period they would have had the opportunity to design processes to give an appropriate line of sight to the Reporter.

In summary, we have some concerns that the current system still has some gaps in meeting overall compliance with the Network Code requirements in relation to Network Change.

5 Recommendations

Our recommendations are made in the context that Network Rail is still in the process of implementing its internal Network Change Improvement Programme (NCIP). We have assumed that in the next year NCIP improvements will be implemented and embedded in the Route operations with suitable internal audit and review by the System Operator function or other Network Rail central team to assure embedment and continuing compliance.

The following recommendations are made in relation to this review.

No.	Recommendation	Benefits	Evidence of Implementation	Owner	Target date for completion
L4AR007-05	An appropriate Network Capability baseline is agreed and signed-off with Routes, operators and ORR for CP6.	A formalised baseline to review network capability against in CP6.	Documents signed -off with ORR, operators and Routes.	Network Rail	1st July 2019
L4AR007-06	Put in place measures to ensure Network Capability / change reporting documentation provides a clear line of sight through the process of network change. This line of sight will require Network Rail to be able to clearly articulate the progress of all current and proposed changes. The documents need to be easily accessible such that multiple members of a team in a Route can have access to them. A detailed log (similar to the LNE example) should be kept by all Routes.	Improved access to information and understanding of line of sight.	Revised processes for documentation of change process.	Network Rail	April 2019

Table 5-1: Study Recommendations

Appendix A

Mandate

INDEPENDENT REPORTERS: TEMPLATE MANDATE

Mandate for Independent Reporter Lot 4

Title: Review of evidence of Network Rail's performance against the CP5 regulated output target for Network Capability

Unique Mandate Reference Number: L4AR007

Date: June 2018

ORR Lot Lead: Sneha Patel

ORR lead for this inquiry: Dave Chewter

Network Rail Lot Lead: Jonathan Haskins

Network Rail lead for this inquiry: Shona Beattie

Background

An accurate picture of Network Capability is essential for Network Rail's current and future TOC and FOC customers, as well as franchising authorities and rolling stock manufacturers, to assist them in their planning and operating their businesses with a reasonable degree of certainty.

According to condition 1.20 of its Network Licence, Network Rail must maintain appropriate, accurate and readily accessible information about the relevant assets, including their condition, capability and capacity. The capability of the national railway infrastructure, which is owned and operated by Network Rail is described in corporate systems (such as the National Electronic Sectional Appendix (NESA), the Integrated Network Model (INM) and national gauging database). Together these sources must describe the capability of the network (Network Capability) in terms of track length and layout, line speed, gauge, route availability and electrification type.

ORR'S PR13 determination also stated that Network Capability in Great Britain must be maintained at the baseline level as set on 1 April 2014 unless changes are agreed in accordance with the Network Change process in the Network Code (Part G). ORR and Network Rail are currently considering the approach that should be taken to monitor and assess Network Capability in CP6.

In December 2017, a Network Rail Internal Audit of the controls around the Network Change process in the Network Code gave an overall rating of "Unacceptable". The report made many recommendations that have been accepted by Network Rail and which are currently in the process of being implemented.

In addition, Network Rail manages the cross-industry Network Capability Steering Group (NCSG). The NCSG:

Reviews Network Rail's progress in maintaining the baseline capability of the network

Provides a high-level overview of the management and maintenance of assets, information and operating instructions necessary to facilitate the potential enhancement of capability

Identifies and supports the resolution of systemic challenges in the management of network capability obligations

Provides a platform for industry stakeholders and customers to provide details of current and longer term operational requirements.

Purpose

ORR is seeking assurance of the reporting process that Network Rail follows to provide evidence (which will be provided to the Reporter) in its Annual Return alongside evidence provided by ORR from stakeholders for England & Wales and Scotland, that baseline capability in Great Britain is being maintained as per its obligation set out in ORR's Final Determination for CP5. Where capability has changed, ORR is seeking assurance that Network Rail has followed the Network Change process in the Network Code. Additionally, ORR is seeking professional input from the Reporter on how Network Rail management of Network Capability in England & Wales and Scotland may be best assessed and monitored in CP6.

ORR therefore requires the Independent Reporter to:

1. Verify the consistency and accuracy of Network Rail's data management and reporting processes, procedures and associated governance from the point of extraction from source systems, to assure ORR if Network Capability in Great Britain is being reported correctly against the CP5 baseline1 and whether Network Rail's assessment of performance against the CP5 regulated output target can be relied upon.
2. At locations where Network Rail or the Reporter identifies (through sampling for England & Wales and Scotland) that the capability of the network has changed since 01 April 2014, evaluate Network Rail's compliance with the Network Change element of the Network Code (having regard to the findings of Network Rail's Internal Audit report).
3. Make recommendations as to how Network Capability in England & Wales and Scotland could be better monitored and reported in CP6, considering HLOS requirements, ORR's PR18 consultation responses and Network Rail's proposals in this area.

This work will be split into two phases – phase 1 will cover CP5 (questions 1 and 2 above) and phase 2 will cover CP6 (question 3 above).

The purpose of this work is to assist ORR in forming an assessment of Network Rail's achievement of the CP5 regulated output for network capability.

Scope

This review will focus on the processes applied to report capability data (line speed, route availability, electrification and gauging) from corporate systems and the process to transform the data from the system to the reporting format provided by Network Rail in the Annual Return.

Methodology

The Independent Reporter is expected to undertake a combination of desk research and route visits. The approach to the questions should be as follows:

<u>Question 1</u>

The CP5 baseline was set in relation to track mileage and layout, line speed, gauge, route availability and electrification type.

Provide an assessment of Network Rail's achievement, to date, of the CP5 regulated output target for Network Capability.

The Reporter is expected to carry out a desktop review of the published processes for managing data within corporate systems and data extraction, analysis and reporting. This will require input from the ORR, Network Rail routes and national functions.

Question 2

Provide an assessment of Network Rail's achievement, to date, of the CP5 regulated output target for Network Capability.

Through the desktop review of the evidence supplied by Network Rail and using a sampling methodology agreed with the ORR and NR, identify locations at which the capability of the network has changed since 01 April 2014. The Reporter will also, review evidence provided by Network Rail routes to assess whether the Network Change process in the Network Code has been correctly applied, and appropriate downstream processes followed (e.g. update of systems and published documents).

Question 3

Provide recommendations on the monitoring and assessment of Network Capability in CP6.

Considering findings from phase one, carry out a desktop review of any Network Rail proposed metric(s) and reporting method for monitoring and assessing Network Capability in CP6. Consider requirements for CP6 (e.g. Scotland HLOS) and relevant responses to ORR's PR18 consultation.

Timescales and Deliverables

This work is expected to be carried out to the following timescales:

w/c 18 June 2018	Arup, ORR and Network Rail kick off meeting
06 July 2018	Phase 1: Initial findings from the review of the Network Capability data management and reporting processes and provide an assessment of whether Network Rail is on track to deliver the CP5 regulated output target.
25 July 2018	Phase 1: Initial findings from the review into Network Rail's compliance with Network Change requirements where capability has changed and provide an assessment of whether Network Rail is on track to deliver the CP5 regulated output target.
15 August 2018	Phase 2: Initial assessment of the proposed approach to monitoring and assessing Network Capability in CP6
07 September 2018	Draft slides/report based on the above

28 September 2018	Final report

The output of this work will inform the publication of the Final Determination for PR18 on 31 October 2018.

Progress updates will be required on a weekly basis considering timescales set out above.

At the end of Phase 1, a review will be held between the ORR and Network Rail whereby a decision will be made to progress to phase 2.

Related Work

Network Rail undertook an Internal Audit in December 2017 as referenced previously. In response to this, it is in the process of establishing a Network Change improvement programme to address the concerns highlighted.

Independent Reporter Proposal

The Reporter shall prepare a proposal for review by ORR and Network Rail based on this mandate. ORR and Network Rail will review the proposal with reference to the criteria for selection – see attached guidance document.

The final approved proposal will form part of the mandate and shall be attached to this document.

The proposal will detail methodology, tasks, programme, deliverables, resources and costs.

Given the importance of this inquiry, the Reporter shall provide qualified personnel with direct experience in the respective disciplines to be approved by the ORR and Network Rail. The contractor is asked to submit details of the previous experience and qualifications of such personnel as part of their proposal.

Appendix 1 – Joint ORR and Network Rail Guidance to Reporters

1. The purpose of this document is to describe the trilateral relationship between ORR, Network Rail and each Reporter. It sets out in a practical context what both ORR and Network Rail expect from Reporters, and seeks to encourage best practice. This will help Reporters to deliver work in a way which meets these expectations and requirements. These requirements will be taken into account as part of the Reporter Framework (as provided to Reporters).

2. This guidance is owned and updated as necessary jointly by ORR and Network Rail. In the event of any discrepancy between this document and the Reporter contract, the latter will prevail. This guidance does not provide an exhaustive list of responsibilities and should Reporters wish to discuss these guidelines further they should contact the following for a trilateral discussion:

   Andy Lewis for ORR; and

   Jonathan Haskins for NR.

The trilateral relationship

3. Licence Condition 13 (LC13) of Network Rail network licence states:

   > "The role of the Reporter is to provide ORR with independent, professional opinions and advice relating to Network Rail's provision or contemplated provision of railway services, with a view to ORR relying on those opinions or advice in the discharge by ORR of its functions under, or in consequence of, the Act. Where appropriate, ORR shall give the licence holder an opportunity to make representations on those opinions or advice before relying on them."

4. Reporters should be familiar with the obligations as set out in LC13 and the terms of the contract.

5. For the avoidance of doubt, in delivering this role, ORR and Network Rail expect that Reporters will also add value to Network Rail in helping it to improve its performance and business as provider of railway services, wherever possible. However, it is recognised that this is not the primary purpose of the Reporter under the Licence and that this may not always be possible to deliver each mandate.

Role & duties of the Reporters

6. Reporters must provide an independent view and remain impartial throughout the review.

   For example:

   information should be shared equally and at the same time with both clients. Any correspondence or clarifications sought by Reporters should also be dealt with in the same way; and

   communication between all three parties should be open e.g. both ORR and Network Rail should be invited to or made aware of meetings or discussions even if the meeting is more appropriate with only one client.

Identifying Reporter work

7. ORR will identify instances where there is a requirement to engage a Reporter. In practical terms, this is likely to arise from on-going discussions with Network Rail and in

most cases (except urgent or exceptional cases) the potential for engagement of Reporters will have been identified in advance.

Mandates – Reporter Proposals

8. Clause 4 of the contract sets out the key requirements around provision of services. Requirements for Reporter work normally arise from the day to day discussion of issues between ORR and Network Rail.

9. ORR will prepare a draft mandate for each piece of work and will in most cases agree this with Network Rail.

10. Mandates will be presented in a standard format for consistency and will clearly set out:

    the purpose;

    the scope;

    why the review is necessary;

    what it will achieve;

    the expected outputs; and

    timescales for providing reports.

11. Once agreed with Network Rail, ORR will email the mandate to the relevant Reporter(s), asking for comments and a proposal for the work, which should include costs and CVs for the proposed Reporter team. The Reporter has seven working days to respond with a proposal or such other timescale as determined by ORR. Every proposal must include:

    costs;

    resources;

    CVs of the proposed mandate team – when providing proposals, Reporters should make the most efficient use of their resources including the most appropriate make-up of the review team;

    methodology for delivering the aims of the mandate;

    timescales;

    framework of meetings, including a tripartite findings meeting before issue of the draft report;

    expected deliverables and a concise explanation of how the aims of the mandate will be met; and

    for larger scale Reporter studies, the project management approach and project plans should be made explicit

12. Where there are multiple Reporters on a Lot, the ORR and Network Rail will use the following criteria to determine which Reporter they will select to conduct the work:

Procedure for Call Off under the Framework Agreements Where more than one Contractor has been selected for any particular lot, ORR and Network Rail will allocate mandates on the basis of the following criteria:

1. The expertise required is only available from one source. This may be due to ownership of exclusive design rights or patents.

2. Where the mandate constitutes follow up work, which is directly related to a recently completed study.

3. The Contractor which demonstrates the greatest expertise in the subject matter of the mandate or the approach required.

4. The Contractor's performance against the performance framework

5. An overall assessment of value for money based on cost and complexity of work.

If the ORR and Network Rail cannot determine the most appropriate Contractor for a mandate using the above criteria, ORR and Network Rail will conduct a mini-tender with the Contractors who have been awarded the relevant lot using the following criteria in order to determine the most economically advantageous proposal:

1. The Contractor demonstrates sufficient knowledge of subject matter and possesses the technical skills, resource and competencies required for the work.

2. Contractor Costs.

3. The Contractor demonstrates innovation and value for money in its proposal.

4. The Contractor's performance against the performance framework.

13. Prior to conducting such a mini-tender, ORR and Network Rail will inform Contractors of the relative weighting of the above criteria and of any additional sub-criteria applicable in the context of a particular mandate.

14. ORR and Network Rail will endeavour to discuss the proposals received and to confirm by e-mail within five working days that the proposal is acceptable (or otherwise). There may be circumstances where ORR and Network Rail need longer to respond.

15. ORR will then formally instruct the Reporter to start work, and the Reporter will arrange a start-up meeting with key representatives from both ORR and Network Rail.

Mandates – During Delivery

16. The following sets out some key points regarding conduct of any inquiry. Reporters must provide an independent view and remain impartial throughout the inquiry. They should expect to discuss their progress and findings trilaterally with ORR and Network Rail and for some challenge to be given – particularly in relation to the factual accuracy of the findings.

Costs and expenses

17. If additional funds are required to deliver a mandate beyond those agreed at the outset, a timely proposal and justification must be given to ORR and Network Rail (as soon as the issue arises). The Reporter should notify ORR and Network Rail who will discuss and respond in a reasonable timescale. Additional work (and cost) must not proceed without approval.

18. Any reasonably incurred expenses will be reimbursed by Network Rail. Only expenses that have been incurred in accordance with Network Rail's expenses policy will be paid.

It should be specifically noted that Reporters must use standard class travel and plan journeys in advance as much as possible.

19. All invoices should be sent to Matthew Blackwell at Network Rail prior to being sent to Network Rail Accounts Payable.

Amendment to mandates

20. For practical reasons it may be necessary for a mandate to be revised once work has commenced or awarded. For the avoidance of doubt this will not lead to the ORR and Network Rail seeking to re-run the award of the mandate unless ORR and Network Rail agree that the revision constitutes a material change to the original mandate.

Meetings

21. Unless otherwise directed, all key meetings must be trilateral and both parties should be made aware of any other meetings taking place.

22. The Reporter should take minutes of meetings, which should be provided to all parties within 7 working days.

Issues or concerns

23. Should a situation arise whereby either ORR or Network Rail is dissatisfied with the quality of a piece of work, we will explain clearly our reasons, gain approval from the other client and then, if we deem appropriate, may request the Reporter to re-do that part of work at no additional cost.

24. Should the Reporter encounter any issues with an inquiry (review) the Reporter should notify:

    Andy Lewis for ORR

    Jonathan Haskins for NR

Reports

The report document

25. All Reports must include an ‘Executive Summary’ which should be written clearly, concisely and highlight key findings and key recommendations.

26. The full reports should also be written concisely in plain English, and should provide a brief ‘Introduction’ outlining the aims of the mandate and how these have been met. They should provide further detail on what is mentioned in the Executive Summary and there should not be any material points raised in the main report which have not already been mentioned in the Executive Summary.

27. Where there is commercially sensitive information in the report, the Executive Summary will be published on ORR’s website, with any necessary redactions, instead of the full report. Otherwise, usually the full report will be published unless any redactions are appropriate due to a Freedom of Information Act exemption.

Recommendations

28. A recommendation is a specific action that the Reporter considers, following its analysis, should be undertaken by either Network Rail, or any other party. While the majority of recommendations are likely to be for Network Rail, not all need to be.

29. Reporters should make all recommendations SMART (Specific, Measureable, Achievable, Realistic and Timebound). The Reporter should:

    provide a clear description of the recommendation and the benefit that implementation will deliver;

    outline the evidence which is required in order for the recommendation to be closed out; and

    discuss and agree a target date for completion of the recommendation with ORR and Network Rail.

30. Recommendations should only be included in the report if they actually add value to either ORR or Network Rail or another industry party and the benefits are sufficient to justify implementation. It is acceptable for a report not to include recommendations, as long as key requirements of the mandate have been met (e.g. if an inquiry finds that Network Rail is fully compliant with its requirements). A smaller number of well-targeted and SMART recommendations which will deliver tangible improvements is preferable to a large number of general recommendations.

31. In order to add further value, the report may also include observations on areas for improvement which do not need to be captured in a formal Recommendation if they are not central to delivery of the mandate requirements.

32. Recommendations will be tracked by the Reporter which generated them.

Payment

33. Reporters must include the purchase order number, and unique mandate reference (UMR) number for work when invoicing Network Rail for payment.

34. The clients can query invoices and have the right to check timesheets (and expenses) and investigate work before payment is agreed.

Post-mandate review

35. The clients will provide feedback on the work carried out, having assessed performance using the Performance Framework on a per mandate basis. This will reflect any issues or concerns raised with the Reporter during delivery of the mandate.

36. The clients will also hold formal feedback sessions with each Reporter every six months to review progress.

Appendix B

Documents Received

External Data Register
Project: Review of evidence of Network Capability
Number: 262940-00

No.	Filename	Description	Sent by	Date	Note
1	The Network Code - Part G.pdf	Network Code that sets our the network change process	Network Rail	31/05/2018	
2	Network Change - LNE & EM - Audit Report - FINAL - 04.12.2017.pdf	Report from the internal audit of Network Change in December 17	Network Rail	31/05/2018	
3	NC Improvement Programme - Status summary010618.pdf	Latest update on the improvement programme that was developed in response to the audit recommendations	Network Rail	31/05/2018	
4	AIS - WI - 020a - Annual Return Capability Measures - INM.docx	Work instruction for reporting of network capability	Network Rail	19/06/2018	
5	Capabilities 2014-15 AR.xls	Capability changes from 2015	Network Rail	20/06/2018	
6	Capability Measure 2016.xls	Capability changes from 2016	Network Rail	20/06/2018	
7	Capability Measure 2017.xls	Capability changes from 2017	Network Rail	20/06/2018	Replaced by document 17
8	NR-ARM-C01DF Linespeed Capability.docx	Definition sheet - linespeed	Network Rail	25/06/2018	
9	NR-ARM-C02DF Gauge Capability.docx	Definition sheet - gauge	Network Rail	25/06/2018	
10	NR-ARM-C03DF Route Availibility.docx	Definition sheet - route availability	Network Rail	25/06/2018	
11	NR-ARM-C04DF Electrification Capability.docx	Definition sheet - electrification	Network Rail	25/06/2018	
12	TS Letter Capability.pdf	Transport Scotland views on network capability	ORR	26/06/2018	
13	DB Cargo Letter Capability.pdf	DB Cargo views on network capability	ORR	26/06/2018	
14	FW Network Capability Steering Group 26th October 2017.msg	GB Railfreight views on network capability	ORR	26/06/2018	
15	v8.1 NC-Roles and Responsibilities.pdf	Network Capability - roles and responsibilities	Network Rail	27/06/2018	
16	Network Change Process Map - 08.05.2018.pdf	Updated network change process (NB compliance should be against network code, ref 1 above)	Network Rail	27/06/2018	
17	Capability Changes 2017.xlsx	Capability changes from 2017	Network Rail	05/07/2018	
18	..\5-02 Incoming Docs\Network Rail\Capability Changes 2018 - ARUP sample.xlsx	Capability changes from 2018	Network Rail	06/07/2018	
19	ToR - Network Capability steering Groupv3_1.pdf	Terms of Reference for the Network Capability Steering Group	Network Rail	05/07/2018	Also provided by ORR on 11/09/2018
20	Copy of Capability Changes Sampling_Scotland_EVIDENCE.xlsb	Scotland Capability Changes Sampling	Network Rail	06/08/2018	
21	NC-G1-2006-SCOT-0315.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
22	NC-G1-2006-SCOT-0315 Establishment.pdf	Scotland Capability Changes evidence	Network Rail	06/08/2018	
23	NC-G1-2012-SCOT-0489 Establishment.pdf	Scotland Capability Changes evidence	Network Rail	06/08/2018	
24	NC-G1-2012-SCOT-0489.PDF	Scotland Capability Changes evidence	Network Rail	06/08/2018	
25	NC-G1-2015-SCOT-0609.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
26	NC-G1-2015-SCOT-0609 Establishment.pdf	Scotland Capability Changes evidence	Network Rail	06/08/2018	
27	NC-G1-2013-SCOT-0502.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
28	NC-G1-2013-SCOT-0502 Establishment.pdf	Scotland Capability Changes evidence	Network Rail	06/08/2018	
29	NC-G1-2011-SCOT-0471 Establishment.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
30	NC-G1-2011-SCOT-0471.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
31	NC-G1-2015-SCOT-0613 Establishment.pdf	Scotland Capability Changes evidence	Network Rail	06/08/2018	
32	NC-G1-2015-SCOT-0613.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
33	NC-G1-2016-SCOT-0642A Establishment.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
34	NC-G1-2016-SCOT-0642A.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
35	NC-G1-2013-SCOT-0519 Establishment.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
36	NC-G1-2013-SCOT-0519.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
37	NC-G1-2017-SCOT-0674 Establishment.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
38	NC-G1-2017-SCOT-0674.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
39	NC-G1-2014-SCOT-0581 Establishment.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
40	NC-G1-2014-SCOT-0581.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
41	NC-G1-2011-SCOT-0472 V3.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
42	NC-G1-2011-SCOT-0472-V3 Establishment.doc	Scotland Capability Changes evidence	Network Rail	06/08/2018	
43	Network Capability in CP6.pptx	Network Capability in CP6 slides	Network Rail	09/08/2018	
44	2018.07.10_Network Capability Steering Group notes_actions.pdf	NCSG Minutes July 10th	Network Rail	15/08/2018	
45	NCG12015LNE031 Notification Letter.pdf	East Mids Capability Changes Sampling	Network Rail	31/08/2018	
46	NCG12017LNE031a Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
47	NCG12017LNE031a Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
48	NCG12017LNE031a Notification Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
49	NCG52011LNE001 Final Notification Scope.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
50	Capability Changes Sampling EMID.xlsx	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
51	NCG12010LNE012AV2 Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
52	NCG12010LNE012AV2 Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
53	NCG12010LNE012AV2 Notification Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
54	NCG12012LNE026A Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
55	NCG12012LNE026A Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
56	NCG12012LNE026A Notification Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
57	NCG12013LNE007 Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
58	NCG12013LNE007 Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
59	NCG12013LNE007 Notification Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
60	NCG12013LNE031 Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
61	NCG12013LNE031 Notification Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
62	NCG12013LNE031Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
63	NCG12014LNE028 Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
64	NCG12014LNE028 Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
65	NCG12014LNE028 Notification Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
66	NCG12014LNE032V Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
67	NCG12014LNE032V Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
68	NCG12014LNE032V Notification Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
69	NCG12014LNE052 Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
70	NCG12014LNE052 Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
71	NCG12014LNE052 Notification Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
72	NCG12014LNE056 Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
73	NCG12014LNE056 Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
74	NCG12014LNE056 Notification Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
75	NCG12015LNE031 Appendix A.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
76	NCG12015LNE031 Establishment Letter.pdf	East Mids Capability Changes Evidence	Network Rail	31/08/2018	
77	Capability Changes Sampling LNE.xlsx	LNE Capability Changes Sampling	Network Rail	31/08/2018	
78	NCG12016LNE019 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
79	NCG12016LNE019 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
80	NCG12016LNE019 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	

81	NCG12016LNE028 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
82	NCG12016LNE028 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
83	NCG12016LNE028 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
84	NCG12017LNE025 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
85	NCG12017LNE025 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
86	NCG12017LNE025 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
87	NCG12017LNE042 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
88	NCG12017LNE042 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
89	NCG12017LNE042 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
90	STNCG1LNE2016003V Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
91	STNCG1LNE2016003V Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
92	STNCG1LNE2016003V Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
93	STNCG12015LNE005 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
94	STNCG12015LNE005 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
95	STNCG12015LNE005 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
96	STNCG12016LNE002 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
97	STNCG12016LNE002 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
98	STNCG12016LNE002 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
99	NCG12013LNE016 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
100	NCG12013LNE016 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
101	NCG12013LNE016 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
102	NCG12013LNE20V Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
103	NCG12013LNE20V Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
104	NCG12013LNE20V Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
105	NCG12014LNE053 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
106	NCG12014LNE053 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
107	NCG12014LNE053 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
108	NCG12014LNE054 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
109	NCG12014LNE054 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
110	NCG12014LNE054 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
111	NCG12014LNE055 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
112	NCG12014LNE055 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
113	NCG12014LNE055 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
114	NCG12015LNE054 Appendix A.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
115	NCG12015LNE054 Establishment Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
116	NCG12015LNE054 Notification Letter.pdf	LNE Capability Changes Evidence	Network Rail	31/08/2018	
117	Capability Changes Sampling Wales Updated - OLD.xlsx	Wales Capability Changes Sampling	Network Rail	31/08/2018	Replaced by doc 169
118	Capability Changes Sampling LNW.xlsx	LNW Capability Changes Sampling	Network Rail	03/09/2018	
119	NCG52011LNW527 NW electrification notice of intended scope.pdf	LNW Capability Changes Evidence	Network Rail	03/09/2018	
120	NCG12013LNW583 Notice.doc	LNW Capability Changes Evidence	Network Rail	03/09/2018	
121	NCG12013LNW583 Todmorden Curve Network Change Establishment.pdf	LNW Capability Changes Evidence	Network Rail	03/09/2018	
122	NCG12013LNW587 Notice.doc	LNW Capability Changes Evidence	Network Rail	03/09/2018	
123	NCG12013LNW587 Wigan Springs Branch Network Change Establishment.pdf	LNW Capability Changes Evidence	Network Rail	03/09/2018	
124	NCG12013LNW599 Notice.doc	LNW Capability Changes Evidence	Network Rail	03/09/2018	
125	NCG12014LNW638 Banbury resignalling Network Change Establishment.pdf	LNW Capability Changes Evidence	Network Rail	03/09/2018	
126	NCG12014LNW638 Notice.pdf	LNW Capability Changes Evidence	Network Rail	03/09/2018	
127	NCG12017LNW638v Banbury resignalling Network Change Variation Notice.doc	LNW Capability Changes Evidence	Network Rail	03/09/2018	
128	NCG12017LNW638v Banbury Resignalling Variation NC Establishment.pdf	LNW Capability Changes Evidence	Network Rail	03/09/2018	
129	Capability Changes Sampling Western.xlsx	Western Capability Changes Sampling	Network Rail	06/09/2018	Replaced by doc 247
130	GWEP-007 WBJ to East of Chippenham G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
131	GWEP-007 WBJ to East of Chippenham G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
132	NC353 NASR G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
133	NC353 NASR G1 Network Change notice.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
134	NC353V1 Revised NASR G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
135	NC353V1 Revised NASR G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
136	NC353V2 NASR G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
137	NC353V3 NASR G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
138	NC353V3 NASR G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
139	NC391 Swindon to Kemble Redoubling Network Change establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
140	NC391 Swindon to Kemble Redoubling Network Change notice.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
141	NC391V1 Swindon-Kemble Redoubling G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
142	NC391V1 Swindon-Kemble Redoubling G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
143	NC391V2 Swindon-Kemble Redoubling G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
144	NC552 OARS G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
145	NC552V1 OARS G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
146	NC552V1 OARS G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
147	NC562 Bristol Resignalling G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
148	NC562V1 Bristol Area Signalling Renewal Notification of G1 Network Change Variation.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
149	NC562v2 Bristol Resignalling G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
150	NC588R Oxford Phase 0 Network Change.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
151	NC599 Oxford Phase 1 G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
152	NCG1CRL2011009Slough West Outer.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
153	WLG2B-MAN-NOT-NCB-000001.doc	Western Capability Changes Evidence	Network Rail	06/09/2018	
154	WSK1A-MPM-SPE-NCB-000002.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
155	GWEP-001 EIS Area 01 G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
156	GWEP-001 EIS Area 01 G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
157	GWEP-001EISv1 Area 01 G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
158	GWEP-001v1 EIS Area 01 G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
159	GWEP-002 RS1-1a Notification of G1 Network Change (Internal).pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
160	GWEP-002 RS1-1a Establishment of G1 Network Change (Internal).pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	

161	GWEP-003 RS5 Didcot to Swindon to WBJ G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
162	GWEP-003 RS5 Didcot to Swindon to WBJ G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
163	GWEP-004 WBJ to Stoke Gifford G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
164	GWEP-004 WBJ to Stoke Gifford G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
165	GWEP-005 Patchway to Cardiff G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
166	GWEP-005 Patchway to Cardiff G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
167	GWEP-006 Newbury G1 Network Change Establishment.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
168	GWEP-006 Newbury G1 Network Change Notification.pdf	Western Capability Changes Evidence	Network Rail	06/09/2018	
169	Capability Changes Sampling Wales - New.xlsx	Wales Capability Changes Sampling	Network Rail	06/09/2018	
170	NC033V1.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
171	NC040 Establishment.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
172	NC040 Notification.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
173	NC040.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
174	NC378.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
175	NC378V1.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
176	NC378V2.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
177	NC378V3.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
178	NC378V4 Establishment.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
179	NC378V4 Notification.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
180	NC378V4.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
181	NC002A.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
182	NC002AV1Establishment.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
183	NC002AV1Notice.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
184	NC002AV1.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
185	NC007.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
186	NC007V1Establishment.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
187	NC007V1.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
188	NC007V2 Notification.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
189	NC007V2.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
190	NC033.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
191	NC033V1Establishment.pdf	Wales Capability Changes Evidence	Network Rail	06/09/2018	
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193	HLOS Tracker for DD response.xlsx	HLOS Tracker	Network Rail	13/09/2018	
194	P13 - Executive Report - IPost WBPRI.pdf	NR executive pack	Network Rail	18/09/2018	
195	ESR-TSR_2017-18_Week-44_ALL.xls	TSR reports	Network Rail	18/09/2018	
196	ESR-TSR_2017-18_Week-32_ALL.xls	TSR reports	Network Rail	18/09/2018	
197	ESR-TSR_2017-18_Week-33_ALL.xls	TSR reports	Network Rail	18/09/2018	
198	ESR-TSR_2017-18_Week-34_ALL.xls	TSR reports	Network Rail	18/09/2018	
199	ESR-TSR_2017-18_Week-35_ALL.xls	TSR reports	Network Rail	18/09/2018	
200	ESR-TSR_2017-18_Week-36_ALL.xls	TSR reports	Network Rail	18/09/2018	
201	ESR-TSR_2017-18_Week-37_ALL.xls	TSR reports	Network Rail	18/09/2018	
202	ESR-TSR_2017-18_Week-38_ALL.xls	TSR reports	Network Rail	18/09/2018	
203	ESR-TSR_2017-18_Week-39_ALL.xls	TSR reports	Network Rail	18/09/2018	
204	ESR-TSR_2017-18_Week-40_ALL.xls	TSR reports	Network Rail	18/09/2018	
205	ESR-TSR_2017-18_Week-41_ALL.xls	TSR reports	Network Rail	18/09/2018	
206	ESR-TSR_2017-18_Week-42_ALL.xls	TSR reports	Network Rail	18/09/2018	
207	ESR-TSR_2017-18_Week-43_ALL.xls	TSR reports	Network Rail	18/09/2018	
208	Draft RACI Network Capability Databasesv1.4 2017 1312.xlsx	Draft RACI for Network Capability Database	Network Rail	18/09/2018	
209	20171222 - 2019 Annual Return additional measures (draft) Annex A.doc	Annual Return information	Network Rail	18/09/2018	
210	20171222 - Measures decoupled from 2018 Annual Return specification FINAL Annex B.	Annual Return information	Network Rail	18/09/2018	
211	20171222 - 2018 Annual Return specification Final Annex A.doc	Annual Return information	Network Rail	18/09/2018	
212	20171222 - 2019 Annual Return letter.docx	Annual Return information	Network Rail	18/09/2018	
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214	Anglia - Greater Anglia.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
215	Anglia - MTR Crossrail.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
216	FNPC - Caledonian Sleeper.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
217	LNE - Cross Country.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
218	LNE - East Midlands Trains.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
219	LNE - Grand Central.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
220	LNE - GTR.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
221	LNE - Hull Trains.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
222	LNE - LNER.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
223	LNE - Nexus.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
224	LNE - Northern.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
225	LNE - TPE.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
226	LNW - Chiltern.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
227	LNW - Merseyrail.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
228	LNW - Northern.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
229	LNW - TPE.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
230	LNW - Virgin Trains West Coast.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
231	LNW - West Midlands Trains.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
232	Wessex - Route.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
233	Wessex - SWR.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
234	Western - GWR.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
235	Western - Heathrow Express.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
236	Anglia - Arriva Rail London.pdf	TOC Level 2 Scorecard	Network Rail	18/09/2018	
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240	System Operator Supporting Document - CP6 Scorecards.pdf	System Operator Supporting Document	Network Rail	19/09/2018	
241	ToR - Network Capability steering Groupv2.pptx	NCSG - ToR ppt	ORR	11/09/2018	
242	2018.01.23 Network Capability Steering Group notes_actions.pdf	NCSG - Notes/Actions - January 23rd 2018	ORR	11/09/2018	
243	2018.01.23 NetCapSteerGroup-NCCProgrammeupdate230118.pdf	NCSG - NCC programme update - January 23rd 2018	ORR	11/09/2018	
244	2018.04.19 Network Capability Steering Group notes_actions.pdf	NCSG - Notes/Actions - April 19th 2018	ORR	11/09/2018	
245	IDRG TOR 2018.pdf	Industrial Delivery Review Group - Terms of reference	ORR	11/09/2018	
246	DRS Performance Strategy.pdf	DRS Performance Strategy	ORR	11/09/2018	
247	Capability Changes Sampling Western update.xlsx	Western Capability Changes Sampling updated	Network Rail	24/09/2018	
248	new LNE Master Spreadsheet v4 trial.xls	LNE network change process log	Network Rail	24/09/2018	
249	ADG CoP Minutes.docx	ADG minutes 5th October 2017	Network Rail	24/09/2018	
250	NC Improvement Programme. - Status summary200918.pdf	NC Improvement Programme update 20th September 2018	Network Rail	24/09/2018	

Appendix C

Sampling Methodology

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Project title	Mandate L4AR007: Review of Network Capability - Phase 1	**Job number**	262940-00
cc		**File reference**	
Prepared by	Douglas Leeming	**Date**	01 November 2018
Subject	Capability Changes Sampling Proposal		

1 Background

As part of the Reporter's review of Network Rail's performance against the CP5 regulated output targets for Network Capability there is a requirement to review compliance with the network change element of the Network Code. It has been agreed with Network Rail and the ORR that the approach should be based on the checking of the accuracy of a sample of the changes that have taken place since April 2014.

The review is to cover the four capabilities of: line speed; gauge; route availability; and electrification. This activity is aligned to Question 2 in Mandate L4AR007 and in accordance with Task 1 in the Arup proposal to deliver the commission.

2 Purpose

The purpose of this short Technical Note is to outline the proposed methodology for the derivation of the sample to be considered as part of the review.

3 Analysis of Changes to Network Capability

Network Rail has provided summary spreadsheet files covering the changes recorded to line capabilities over the years from 2014 to 2017. In each year the changes are identified for each of the four categories, by devolved Route, ELR and mileage.

As part of the process to determine the size of sample required to provide a true indication of compliance with the Network Code we have undertaken a high-level analysis of variations across the capabilities by year and Route. The aim of this is to identify trends within the data to inform the determination of the sample sizes. Table 1 below shows the outcome of this analysis.

Table 1: Summary of Network Changes by Route and Year

Capability	Route	East Anglia	Kent	London North Eastern	London North Western	Midlands	Scotland	Sussex	Wales	Wessex	Western
Line Speed	14/15	34	59	27	103	73	20	9	13	11	19
	15/16	46	70	123	148	146	49	10	16	12	41
	16/17	1	18	15	70	51	15	4	14	324	39
	17/18	53	16	139	160	34	156	11	71	24	71
	18/19	-	-	-	-	-	-	-	-	-	-
Gauge	14/15	8	8	71	59	21	9	2	3	0	4
	15/16	22	16	120	80	40	44	6	5	12	23
	16/17	7	8	14	28	11	21	1	4	65	6
	17/18	102	67	206	193	44	155	57	72	75	86
	18/19	-	-	-	-	-	-	-	-	-	-
Route Availability	14/15	25	48	23	71	31	13	6	10	6	9
	15/16	37	60	95	108	84	33	7	12	7	22
	16/17	1	22	19	43	30	10	2	9	176	29
	17/18	53	25	128	227	36	155	15	64	19	64
	18/19	-	-	-	-	-	-	-	-	-	-
Electrification	14/15	28	48	28	81	43	17	8	10	6	11
	15/16	47	58	99	123	95	56	9	12	8	23
	16/17	1	18	15	52	32	11	2	9	176	47
	17/18	53	24	141	295	47	201	28	66	32	98
	18/19	-	-	-	-	-	-	-	-	-	-

4 Sampling Parameters

It is noted that there is a requirement in the Mandate to undertake sampling based on a review of all the tested capabilities for both Scotland, and England & Wales separately. All Routes must be included in the review, but there is no necessity to review all four capabilities in each Route. We are also committed to cover the variations across all the years of available data.

It is also clear that the volume of samples, whilst providing a reliable result, must be practical to deliver within the timescales of the commission.

It is noted that there is no requirement to undertake statistically significant sampling.

5 Proposed Sampling

In considering the foregoing it is proposed that samples are derived based on the number of changes in each of the cells as shown in Table 2. This is designed to include reasonable sample sizes for large populations whilst also providing assurance where the changes have been small.

Table 2: Proposed Sampling Scales

Number of Changes per Route, per Capability, per Year	Sampling Approach
0 to 5	Not sampled
6 to 20	2 samples

21 - 100	10% sample
> 101	5% sample

Where the foregoing structure does not comply with the parameters set out in Section 4 then a rate of 10% sampling will be undertaken.

The selection of individual items from within the dataset will be undertaken by placing the changes in ELR (alphabetical order) and mileage (increasing mileage order within ELR) order, dividing the total number of changes by the number of samples selected, and then using that rounded figure as the spacing between samples from the ordered list.

As an example:

Assume there are 34 changes (the dataset)

The sampling rate is thus 10% - this gives a sample size of 3.4

Dividing the population by the sample size gives 10 (34/3.4)

Thus, the selected samples are numbers 10, 20 and 30 listed by ELR and mileage dataset.

Where the sampling level is set at two (if the dataset has a population of between 6 and 20) then the selected samples will be at the rounded third and two-thirds point in the ELR and mileage ordered dataset.

As an example:

If there are 14 changes then the sampled elements would be numbers 5 and 10 from the ELR and mileage ordered dataset.

Based on the foregoing the following provides a view on the overall number of samples to be considered in this exercise.

Table 3: Numbers of Samples to be Considered

Capability	Route	East Anglia	Kent	London North Eastern	London North Western	Midlands	Scotland	Sussex	Wales	Wessex	Western
Line Speed	14/15	3	6	3	5	7	2	2	2	2	2
	15/16	5	7	6	7	7	5	2	2	2	4
	16/17	0	2	2	7	5	2	0	2	16	4
	17/18	5	2	7	8	3	8	2	7	2	7
	18/19	-	-	-	-	-	-	-	-	-	-
Gauge	14/15	2	2	7	6	2	2	0	0	0	0
	15/16	2	2	6	8	4	4	2	0	2	2
	16/17	2	2	2	3	2	2	0	0	7	2
	17/18	5	7	10	10	4	8	6	7	7	9
	18/19	-	-	-	-	-	-	-	-	-	-
Route Availability	14/15	3	5	2	7	3	2	2	2	2	2
	15/16	4	6	9	5	8	3	2	2	2	2
	16/17	0	2	2	4	3	2	0	2	9	3
	17/18	5	3	6	11	4	8	2	6	2	6
	18/19	-	-	-	-	-	-	-	-	-	-
Electrification	14/15	3	5	3	8	4	2	2	2	2	2
	15/16	5	6	10	6	9	6	2	2	2	2
	16/17	0	2	2	5	3	2	0	2	9	5
	17/18	5	2	7	15	5	10	3	7	10	3
	18/19	-	-	-	-	-	-	-	-	-	-
Total for each Route		**49**	**61**	**84**	**115**	**73**	**68**	**27**	**45**	**76**	**55**

There is a total of 653 samples out of a dataset of 8082 entries. This provides an overall sample rate of just over 8% of the population.

Appendix D

Annual Return 31st March 2014
Network Capability

Section 5 – Network capability and network availability

Introduction

This section reports on the capability of the network through our linespeed, gauge, route availability and electrified track measures (C1 – C4). We also include information on Network Change, platform length and the availability of the network through our possession management.

Network Capability

Data on the four capability measures, and an explanation of changes during the year, are reported for:

- C1 – linespeed
- C2 – gauge
- C3 – route availability value
- C4 – electrified track.

The information contained within this section is derived from around a quarter of a million GEOGIS records (GEOGIS is a major database of railway infrastructure assets containing information on the physical location and type of track).

The capability data presented in this section includes actual changes to the network as well as changes as a result of data cleansing (review and subsequent amendment to data where necessary).

As part of reporting the capability of the network, we report on Network Changes (changes which are likely to have a material effect on the operation of the network or on the operation of trains operated on the network). We also report on platform lengths to illustrate the maximum length of train that may use each of the platforms at passenger stations on the network.

For the four capability measures it should be noted that small discrepancies in the totals are due to rounding.

Linespeed Capability (C1)

Definition

This is a measure of the length of running track in kilometres in the following speed bands:

- up to 35 miles per hour
- 40 to 75 miles per hour
- 80 to 105 miles per hour
- 110 to 125 miles per hour.

The measure includes running lines and loops but excludes sidings and depots. Where differential speeds apply to a section of track, the highest line speed is reported for that section.

Results

Tables 5.1 to 5.4 show linespeed capability for England & Wales, Scotland and the whole network including the breakdown by operating route for 2013/14 compared to previous years.

Commentary

In 2013/14 the length of operational lines on the total network increased by 17 track kilometres.

During the year there were many small lengths of track throughout the whole network which were added, removed or which experienced line speed changes. The significant track changes are highlighted below. In addition data cleansing throughout the year has accounted for some smaller changes.

Significant additions are:

- just over eight kilometres of new track on the South Wales Main Line due to redoubling the single line railway between Cockett and Duffryn
- just under five kilometres of new track on the East Coast Main Line due to the provision of the new flyover at Cambridge Junction (Hitchin)
- just under six and a half kilometres of new track due to remodelling of Nottingham and Mansfield Junction.

Significant linespeed increases include:

- just over 61 kilometres of track on the West Coast Main Line increasing from the speed band 40-75mph to 80-105mph
- just over 85 kilometres of track on the Midland Main Line increasing from the speed band 80-105mph to 110-125mph
- just over 35 kilometres of track between Edge Hill Junction and Manchester Victoria increasing from the speed band 40-75mph to 80-105mph
- although consisting of mainly small changes there is approximately eight kilometres of track on the South West Main Line increasing from the speed band 0-35mph to 40-75mph.

Table 5.1: Linespeed capability (km of track in each speed band) England & Wales

Speed Band (mph)	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
Up to 35	3,223	3,194	3,124	3,125	3,104
40 – 75	14,426	14,422	14,365	14,348	14,309
80 – 105	6,375	6,403	6,496	6,512	6,503
110 – 125	2,860	2,857	2,857	2,854	2,936
Total	**26,884**	**26,876**	**26,842**	**26,839**	**26,852**

Table 5.2: Linespeed capability (km of track in each speed band) Scotland

Speed Band (mph)	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
Up to 35	461	459	437	452	454
40 – 75	2,403	2,384	2,363	2,363	2,356
80 – 105	1,104	1,168	1,200	1,200	1,209
110 – 125	221	221	221	221	221
Total	**4,189**	**4,232**	**4,221**	**4,236**	**4,240**

Table 5.3: Linespeed capability (km of track in each speed band) Network-wide

Speed Band (mph)	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
Up to 35	3,684	3,653	3,561	3,577	3,558
40 – 75	16,829	16,806	16,728	16,711	16,665
80 – 105	7,479	7,571	7,696	7,712	7,712
110 – 125	3,081	3,078	3,078	3,075	3,157
Total	**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Table 5.4: Linespeed capability (km of track in each speed band) by operating route

Operating Route	*Speed Band (mph)*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
Anglia	0 - 35	253	251	240	247	248
	40 – 75	1,396	1,394	1,403	1,403	1,401
	80 – 105	626	626	626	626	626
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
East Midlands	0 - 35	189	186	180	180	175
	40 – 75	711	697	700	701	701
	80 – 105	538	554	554	554	471
	110 – 125	316	313	313	313	398
	over 125	0	0	0	0	0
Kent	0 - 35	192	192	186	187	188
	40 – 75	1,030	1,029	1,032	1,033	1,035
	80 – 105	533	533	525	525	524
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
London North Eastern	0 - 35	705	707	699	695	690
	40 – 75	3,211	3,224	3,221	3,221	3,227
	80 – 105	829	829	829	829	830
	110 – 125	933	933	933	933	933
	over 125	0	0	0	0	0

Table 5.4 Continued: Linespeed capability (km of track in each speed band) by operating route

Operating Route	*Speed Band (mph)*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*
London North Western	0 - 35	883	863	840	829	820
	40 – 75	3,697	3,694	3,604	3,607	3,547
	80 – 105	1,008	1,013	1,109	1,109	1,179
	110 – 125	1,119	1,119	1,119	1,119	1,119
	over 125	0	0	0	0	0
Scotland	0 - 35	461	459	437	452	454
	40 – 75	2,403	2,384	2,363	2,363	2,356
	80 – 105	1,102	1,168	1,200	1,200	1,209
	110 – 125	221	221	221	221	221
	over 125	0	0	0	0	0
Sussex	0 - 35	116	115	114	114	116
	40 – 75	754	754	754	754	751
	80 – 105	257	257	257	256	257
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
Wales	0 - 35	371	369	357	355	357
	40 – 75	1,539	1,542	1,542	1,523	1,532
	80 – 105	550	551	551	569	569
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
Wessex	0 - 35	168	167	171	173	173
	40 – 75	1,033	1,033	1,029	1,028	1,028
	80 – 105	880	885	883	883	884
	110 – 125	0	0	0	0	0
	over 125	0	0	0	0	0
Western	0 - 35	346	343	338	345	337
	40 – 75	1,055	1,055	1,080	1,078	1,087
	80 – 105	1,155	1,155	1,161	1,161	1163
	110 – 125	492	492	492	489	486
	over 125	0	0	0	0	0
Network Total		**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Gauge Capability (C2)

Definition

This is a measurement of the length of route in kilometres capable of accepting different freight vehicle types and loads by reference to size (gauge). This measurement is reported against six standard gauges listed in the Railway Group Standard 'Requirements for the Application of Standard Vehicle Gauges', which are:

- W6 – the freight vehicle gauge for freight wagons
- W7 – a gauge for ISO 8' 0" (2438mm) high containers, up to 2438mm wide
- W8 – a gauge for ISO 8' 6" (2590mm) high containers, up to 2500mm wide
- W9 – a gauge for UIC-S containers 9' 0" (2743mm) high, up to 2600mm wide
- W10 – a gauge for up to ISO 9' 6" (2590mm) high containers, up to 2500mm wide
- W12 – a gauge for up to ISO 9' 6" (2590mm) high containers, up to 2600mm wide.

A definition of these individual freight gauges can be found in the Railway Group Standard referred to above. Reference to W6 in this report is actually to the W6A profile in the Standard.

Results

Tables 5.5 to 5.8 show gauge capability for England & Wales, Scotland and the whole network including the breakdown by operating route for 2013/14 compared to previous years.

Commentary

The changes in the extent of the network reported in the linespeed capability measure are also reflected in gauge capability. Gauge capacity is in route kilometres rather than track kilometres so these numbers are not directly correlated to the linespeed capability measure.

With regards to the existing track:

- 2 kilometres of track at Carmuirs has been restored from W8 to W9
- 3 kilometres of track on the Bat and Ball loop (Sevenoaks) has been corrected from W6 to W7
- 14 kilometres of track between Swinton Junction and South Kirby Junction via Moorthorpe has been gauge enhanced to W12
- 17 kilometres of track at Soham has been gauge enhanced to W10
- 25 kilometres of track between Castlefield Junction and Newton le Willows Junction and Lowton Junction via Ordsall Lane Junction has been gauge enhanced to W12
- 27 kilometres of track between Temple Hirst Junction and Sherburn Junction to Selby Potters siding (including Selby Canal Curve) has been gauge enhanced to W12
- 31 kilometres of track between Darlington South Junction and Shell Junction (Teesside) has been gauge enhanced to W12
- 33 kilometres of track on the South Yorkshire Joint Line from Dinnington Junction to Kirk Sandal Junction, Decoy South Junction and Potteric Carr Junction has been gauge enhanced to W12
- 127 kilometres of track between Canonbury Junction and Fletton via the Herford Loop has been gauge enhanced to W10
- 181 kilometres of track between Water Orton and Doncaster (including Litchfield to Wichnor Junction) via Toton and Beighton has been gauge enhanced to W12.

Other works include one kilometre of new chord at Hitchin to W12.

CP4 has seen an increase in W12 and W10 capability. The Gauge Capability Programme closed at the end of CP4 with the majority of gaps between 'baseline' and 'published' capability addressed; remaining foul sites will be addressed by normal track renewal processes.

Notable changes to Gauge Capability in CP4 include:

- 2009/10 – reductions in W9 and W8 capability as a result of recalculation for Sectional Appendix publication
- 2011/12 – Felixstowe to Nuneaton gauge enhancement work added 88 kilometres of W10
- 2012/13 – gauge to routes reduced in 2009 restored between Sheet Stores and Stenson, and between Lincoln Pyewipe Junction and Gainsborough Trent East. South Yorkshire Joint Line upgraded to W8.

Table 5.5: Gauge capability (km of route in each gauge band) England & Wales					
Gauge Band	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
W6	5,284	5,479	5,461	5,451	5,448
W7	2,313	2,258	2,188	2,120	2,126
W8	3,187	2,974	2,997	3,075	2,806
W9	1,057	1,023	947	947	771
W10 and W6	0	0	0	0	0
W10 and W8	74	114	163	162	178
W10 and W9	1,039	1,105	1,178	1,178	1,290
W12	130	135	135	136	448
Total	**13,084**	**13,088**	**13,069**	**13,069**	**13,067**

Table 5.6: Gauge capability (km of route in each gauge band) Scotland					
Gauge Band	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
W6	122	118	101	115	117
W7	942	933	896	896	897
W8	1,131	1,110	1,147	1,147	1,145
W9	303	358	359	359	360
W10 and W6	0	0	0	0	0
W10 and W8	0	0	0	0	0
W10 and W9	171	170	170	171	171
W12	0	0	0	0	0
Total	**2,669**	**2,689**	**2,673**	**2,688**	**2,690**

Table 5.7: Gauge capability (km of route in each gauge band) Network-wide					
Gauge Band	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
W6	5,406	5,597	5,562	5,566	5,565
W7	3,255	3,191	3,084	3,016	3,023
W8	4,318	4,084	4,144	4,222	3,951
W9	1,360	1,381	1,306	1,306	1,131
W10 and W6	0	0	0	0	0
W10 and W8	74	114	163	162	178
W10 and W9	1,210	1,275	1,348	1,349	1,461
W12	130	135	135	136	448
Total	**15,753**	**15,777**	**15,742**	**15,757**	**15,757**

Table 5.8: Gauge capability (km of route in each gauge band) by operating route

Operating Route	Gauge Band	2009/10	2010/11	2011/12	2012/13	2013/14
Anglia	W6	286	279	279	279	279
	W7	5	5	5	5	5
	W8	508	468	467	467	450
	W9	131	109	63	64	63
	W10 and W6	0	0	0	0	0
	W10 and W8	74	114	115	115	132
	W10 and W9	184	206	251	251	249
	W12	0	5	5	5	5
East Midlands	W6	247	246	247	247	247
	W7	225	225	162	150	150
	W8	227	227	247	259	158
	W9	0	0	0	0	0
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	42	42	42
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	101
Kent	W6	552	551	550	550	546
	W7	129	129	129	129	132
	W8	92	92	92	92	93
	W9	43	43	41	41	41
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
London North Eastern	W6	816	812	804	792	792
	W7	323	300	300	246	246
	W8	869	906	904	969	838
	W9	625	626	610	610	458
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	5	5	4
	W10 and W9	13	13	29	29	156
	W12	46	46	46	46	205
London North Western	W6	803	883	881	882	881
	W7	690	657	651	648	652
	W8	485	396	403	403	383
	W9	166	153	140	140	117
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	842	886	898	898	885
	W12	84	84	84	85	137

Table 5.8 Continued: Gauge capability (km of route in each gauge band) by operating route

Operating Route	Gauge Band	2009/10	2010/11	2011/12	2012/13	2013/14
Scotland	W6	122	118	100	115	117
	W7	941	933	896	896	897
	W8	1,131	1,110	1,147	1,147	1,145
	W9	303	358	359	359	360
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	171	171	171	171	171
	W12	0	0	0	0	0
Sussex	W6	342	342	340	341	342
	W7	88	88	88	88	88
	W8	40	40	40	40	39
	W9	41	41	41	41	41
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
Wales	W6	772	893	889	888	888
	W7	259	259	259	259	259
	W8	435	314	313	313	313
	W9	30	30	30	30	30
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
Wessex	W6	573	574	574	574	574
	W7	286	286	285	285	285
	W8	170	170	170	170	170
	W9	11	11	11	11	11
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
Western	W6	897	898	897	898	899
	W7	309	309	309	310	309
	W8	361	361	361	362	362
	W9	10	10	10	10	10
	W10 and W6	0	0	0	0	0
	W10 and W8	0	0	0	0	0
	W10 and W9	0	0	0	0	0
	W12	0	0	0	0	0
Network Total		**15,754***	**15,777**	**15,742**	**15,757**	**15,757**

Notes:
*Difference in total due to rounding.

Route Availability (RA) Value (C3)

Definition

The route availability (RA) measure is used to check the compatibility of the weight of trains with the strength of underline bridges.

The RA measure is a measurement of the length of track in kilometres capable of accepting different loaded vehicle types. The results are reported by individual RA value (since the Annual Return 2010).

For infrastructure, the RA number represents the lesser of the maximum single axle weight or the maximum equivalent load effect of a whole vehicle for the capability of the underline bridges on a route. The RA number for a route is specified in the National Electronic Sectional Appendix.

Vehicles are able to utilise the capability of the infrastructure where the vehicle RA is less than or equal to the route RA. If not, it is necessary to consider more detailed information on the loading characteristics of the vehicle and detailed information on the strength of individual bridges to check compatibility.

This measure includes running lines on our infrastructure but excludes sidings and depots.

Results

Tables 5.9 to 5.13 show the route availability for England & Wales, Scotland and the whole network including the breakdown by operating route for 2013/14 compared to previous years.

Commentary

Increases in RA together with network size alterations and the result of data cleansing as reported for the linespeed capability C1 measure are the principal reason for changes in RA tables.

The principal changes resulting from the increase in the extent of the network are the following:

- two kilometres of RA4 for the remodelling of the approaches to Blackfriars station
- one kilometre of RA6 for a new loop at Tir-Phil
- nine kilometres of RA7 for Gowerton re-doubling
- two kilometres of RA8 for works between Sleaford Station Junction and Greetwell West Junction.

The principal changes resulting from the reduction in the extent of the network are the following:

- one kilometre of RA8 for double tracking and change of boundary on the Thameshaven branch
- one kilometre of RA8 for modification of lines approaching London Bridge station
- two kilometres of RA7 for modifications on the Barnfurlong Sidings Junction to Ince Moss Junction line.

Table 5.9: Structures route availability (km of track) for England & Wales

Route availability band	March-10	March-11	March-12	March-13	March-14
(-1)	86	78	60	66	65
RA1	19	19	19	18	17
RA2	36	7	0	0	0
RA3	72	32	32	32	32
RA4	670	273	273	237	239
RA5	464	469	475	475	477
RA6	845	871	867	867	869
RA7	1,759	1,873	1,907	1,906	1,914
RA8	20,721	21,042	21,000	21,020	21,022
RA9	2,146	2,145	2,142	2,151	2,151
RA10	66	67	67	67	66
Total	**26,884**	**26,876**	**26,842**	**26,839**	**26,852**

Notes:
1. RA value not reported, line out of use, leased or status being checked.

Table 5.10: Structures route availability (km of track) for Scotland

Route availability band	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
.(1)	3	3	3	10	11
RA1	0	0	0	0	0
RA2	0	0	0	0	0
RA3	118	38	37	37	38
RA4	0	0	0	0	0
RA5	939	934	934	934	934
RA6	7	7	7	7	7
RA7	210	223	228	77	77
RA8	873	899	882	890	891
RA9	4	4	4	4	4
RA10	2,035	2,124	2,126	2,277	2,278
Total	**4,189**	**4,232**	**4,221**	**4,236**	**4,240**

Notes:
1. RA value not reported, line out of use, leased or status being checked.

Table 5.11: Structures route availability (km of track) for Network

Route availability band	*March-10*	*March-11*	*March-12*	*March-13*	*March-14*
.(1)	89	81	63	76	76
RA1	19	19	19	18	17
RA2	36	7	0	0	0
RA3	190	70	69	69	70
RA4	670	273	273	237	239
RA5	1,403	1,403	1,409	1,409	1,411
RA6	852	878	874	874	876
RA7	1,969	2,096	2,135	1,983	1,991
RA8	21,594	21,941	21,882	21,910	21,913
RA9	2,150	2,149	2,146	2,155	2,155
RA10	2,101	2,191	2,193	2,344	2,344
Total	**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Notes:
1. RA value not reported, line out of use, leased or status of line being checked.

Table 5.12: Structures route availability (km of track) by operating route

	Gauge Band	2009/10	2010/11	2011/12	2012/13	2013/14
Anglia	.(1)	1	1	1	2	2
	RA1	1	1	1	0	0
	RA2	0	0	0	0	0
	RA3	57	27	27	27	27
	RA4	43	21	21	21	21
	RA5	0	0	0	0	0
	RA6	83	89	89	89	89
	RA7	415	431	431	431	432
	RA8	1,624	1,650	1,648	1,655	1,654
	RA9	50	50	50	50	50
	RA10	0	0	0	1	0
East Midlands	.(1)	1	7	3	3	3
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	0	0	0	0	0
	RA5	9	9	10	10	10
	RA6	0	0	0	0	0
	RA7	7	7	7	6	6
	RA8	1,734	1,725	1,726	1,726	1,723
	RA9	3	3	3	3	3
	RA10	0	0	0	0	0
Kent	.(1)	0	0	0	5	5
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	129	69	69	54	56
	RA5	0	0	0	0	1
	RA6	25	25	25	25	25
	RA7	29	56	56	56	56
	RA8	1,572	1,603	1,593	1,605	1,604
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
London North Eastern	.(1)	27	33	26	26	26
	RA1	0	0	0	0	0
	RA2	36	7	0	0	0
	RA3	10	0	0	0	0
	RA4	0	0	0	0	0
	RA5	5	5	11	11	11
	RA6	134	134	134	135	135
	RA7	164	194	194	193	193
	RA8	3,143	3,161	3,160	3,149	3,151
	RA9	2,094	2,092	2,090	2,098	2,098
	RA10	67	67	67	66	66

Table 5.12 Continued: Structures route availability (km of track) by operating route

	Gauge Band	2009/10	2010/11	2011/12	2012/13	2013/14
London North Western	.(1)	47	25	22	23	22
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	0	0	0	0	0
	RA5	0	0	0	0	0
	RA6	9	9	9	9	9
	RA7	495	492	494	494	493
	RA8	6,156	6,163	6,146	6,138	6,141
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
Scotland	.(1)	3	3	3	10	11
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	118	38	37	37	38
	RA4	0	0	0	0	0
	RA5	939	934	934	934	934
	RA6	7	7	7	7	7
	RA7	210	223	228	77	77
	RA8	873	899	882	890	891
	RA9	4	4	4	4	4
	RA10	2,035	2,124	2,126	2,277	2,278
Sussex	.(1)	0	0	0	0	0
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	261	110	110	89	89
	RA5	0	0	0	0	0
	RA6	45	28	28	28	28
	RA7	23	23	23	23	23
	RA8	797	965	963	984	984
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
Wales	.(1)	5	5	2	2	2
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	0	0	0	0	0
	RA5	380	384	385	384	385
	RA6	264	263	260	260	261
	RA7	192	192	192	192	200
	RA8	1,618	1,618	1,611	1,609	1,610
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0

Table 5.12 Continued: Structures route availability (km of track) by operating route

	Gauge Band	2009/10	2010/11	2011/12	2012/13	2013/14
Wessex	.(1)	3	3	3	3	3
	RA1	18	18	18	18	17
	RA2	0	0	0	0	0
	RA3	0	0	0	0	0
	RA4	196	32	32	32	32
	RA5	6	6	6	6	6
	RA6	135	175	175	174	175
	RA7	69	113	113	113	113
	RA8	1,655	1,738	1,738	1,738	1,739
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
Western	.(1)	2	3	2	2	2
	RA1	0	0	0	0	0
	RA2	0	0	0	0	0
	RA3	5	5	5	5	5
	RA4	41	41	41	41	41
	RA5	63	64	64	64	64
	RA6	149	147	147	147	147
	RA7	366	366	398	398	398
	RA8	2,423	2,419	2,415	2,416	2,416
	RA9	0	0	0	0	0
	RA10	0	0	0	0	0
Network Total		**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Notes:

1. RA value not reported, line out of use, leased or status being checked.
2. Historic data for Western was incorrect based on last years submission by CaRRT.

Table 5.13: Gauge - Length of track (km) by operating route

	Route Availability	RA0	RA1	RA2	RA3	RA4	RA5	RA6	RA7	RA8	RA9	RA10
	Gauge Band											
Anglia	W6	1	0	0	27	9	0	41	299	56	19	0
	W7	0	0	0	0	0	0	0	0	10	0	0
	W8	0	0	0	0	12	0	48	108	638	31	0
	W9	1	0	0	0	0	0	0	0	126	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	24	205	0	0
	W10 and W9	0	0	0	0	0	0	0	0	614	0	0
	W12	1	0	0	0	0	0	0	0	5	0	0

Table 5.13 Continued: Gauge - Length of track (km) by operating route

	Route Availability	RA0	RA1	RA2	RA3	RA4	RA5	RA6	RA7	RA8	RA9	RA10
	Gauge Band											
East Midlands	W6	3	0	0	0	0	10	0	7	500	0	0
	W7	0	0	0	0	0	0	0	0	374	0	0
	W8	0	0	0	0	0	0	0	0	498	0	0
	W9	0	0	0	0	0	0	0	0	0	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	85	3	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	265	0	0
Kent	W6	5	0	0	0	56	1	25	56	1,027	0	0
	W7	0	0	0	0	0	0	0	0	279	0	0
	W8	0	0	0	0	0	0	0	0	173	0	0
	W9	0	0	0	0	0	0	0	0	125	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
London North Eastern	W6	13	0	0	0	0	11	135	183	902	105	2
	W7	0	0	0	0	0	0	0	0	499	2	0
	W8	7	0	0	0	0	0	0	10	1,279	405	15
	W9	1	0	0	0	0	0	0	0	136	1,056	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	10	0
	W10 and W9	0	0	0	0	0	0	0	0	35	447	1
	W12	5	0	0	0	0	0	0	0	299	73	49
London North Western	W6	15	0	0	0	0	0	9	86	1,507	0	0
	W7	0	0	0	0	0	0	0	237	1,042	0	0
	W8	0	0	0	0	0	0	0	83	685	0	0
	W9	1	0	0	0	0	0	0	87	160	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	6	0	0	0	0	0	0	0	2,465	0	0
	W12	0	0	0	0	0	0	0	0	282	0	0
Scotland	W6	11	0	0	0	0	32	7	0	30	0	74
	W7	0	0	0	11	0	319	0	31	310	0	656
	W8	0	0	0	27	0	578	0	46	388	0	651
	W9	0	0	0	0	0	5	0	0	120	4	557
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	43	0	340
	W12	0	0	0	0	0	0	0	0	0	0	0

Table 5.13 Continued: Gauge - Length of track (km) by operating route

	Route Availability	RA0	RA1	RA2	RA3	RA4	RA5	RA6	RA7	RA8	RA9	RA10
	Gauge Band											
Sussex	W6	0	0	0	0	89	0	28	1	613	0	0
	W7	0	0	0	0	0	0	0	22	161	0	0
	W8	0	0	0	0	0	0	0	0	81	0	0
	W9	0	0	0	0	0	0	0	0	129	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
Wales	W6	0	0	0	0	0	348	231	138	547	0	0
	W7	0	0	0	0	0	0	4	60	407	0	0
	W8	2	0	0	0	0	1	26	2	654	0	0
	W9	0	0	0	0	0	36	0	0	2	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
Western	W6	3	0	0	5	41	64	129	301	1,074	0	0
	W7	0	0	0	0	0	0	18	53	674	0	0
	W8	0	0	0	0	0	0	0	44	655	0	0
	W9	0	0	0	0	0	0	0	0	12	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
Wessex	W6	3	18	0	0	32	6	175	101	725	0	0
	W7	0	0	0	0	0	0	0	12	558	0	0
	W8	0	0	0	0	0	0	0	0	422	0	0
	W9	0	0	0	0	0	0	0	0	33	0	0
	W10 and W6	0	0	0	0	0	0	0	0	0	0	0
	W10 and W8	0	0	0	0	0	0	0	0	0	0	0
	W10 and W9	0	0	0	0	0	0	0	0	0	0	0
	W12	0	0	0	0	0	0	0	0	0	0	0
Network Total	**W6**	**54**	**18**	**0**	**32**	**227**	**472**	**780**	**1,172**	**6,981**	**124**	**76**
	W7	**0**	**0**	**0**	**11**	**0**	**319**	**22**	**415**	**4,314**	**2**	**656**
	W8	**9**	**0**	**0**	**27**	**12**	**579**	**74**	**293**	**5,473**	**436**	**666**
	W9	**3**	**0**	**0**	**0**	**0**	**41**	**0**	**87**	**843**	**1,060**	**557**
	W10 and W6	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	W10 and W8	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**290**	**13**	**0**
	W10 and W9	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3,157**	**447**	**341**
	W12	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**851**	**73**	**49**

Electrified Track Capability (C4)

Definition

This is a measure of the length of electrified track in kilometres in the following bands:

- overhead line at 25kV A.C.
- overhead line at 1,500V D.C.
- third rail 650/750V D.C.

The measurement includes the length of running track, including loops but excluding sidings and depots.

Lengths of track with dual electrification are separately identified. In addition, line that is not energised and permanently earthed is counted as non-electrified.

Results

Tables 5.14 to 5.17 show electrification capability for England & Wales, Scotland and the whole network including the breakdown by operating route for 2013/14 compared to previous years.

Commentary

There has been rationalisation of track asset and the associated electrification asset, as well as data validation and updates, resulting in 29 kilometres net overall loss in capability of the network-wide asset base compared to 2012/13, before taking account of the new electrification schemes. These factors have affected the electrification capability reported for 25kV AC overhead assets as shown in Table 5.17.

Historically network size alterations as reported for the linespeed capability measure were the principal reason for changes in electrification data. However, Network Rail entered a period of significant network electrification in 2013/14.

In 2013/14, 58 kilometres of new electrification was bought into service as part of the North West Electrification Programme in England and Wales and in Scotland 44 kilometres was commissioned between Springburn and Cumbernauld as part of the wider Edinburgh to Glasgow Improvement Programme. This has resulted in a 73 kilometre net gain in capability across the network of 25kV overhead assets (when new electrification is taken into account) as shown in Table 5.16.

There have been no material changes to the third rail 650/750V DC network in 2013/14.

Across CP4 there has been a relatively modest increase in 25kV AC overhead line (OHL) capability while the third rail 650/750V DC electrification system capability has remained broadly static.

As noted earlier, 2013/14 saw the completion of the first significant phases of Network Rail's electrification programme for CP4 and CP5. Other notable changes to the electrification capability during CP4 were as follows:

- 2009/10 – completion of the West Coast Route modernisation project which was the principal contributor to the increase in OLE
- 2010/11 – the opening of the Airdrie – Bathgate line added 45 kilometres of new OHL
- 2011/12 – the Paisley corridor improvements and North London Line works added new OHL
- 2012/13 – works were completed at Paisley Canal and Paisley corridor (circa 19 kilometres).

Table 5.14: Electrification capability (km of electrified track) England & Wales

	March-10	March-11	March-12	March-13	March-14
25 kV AC overhead	6,761	6,757	6,739	6,750	6,777
Third rail 650/750V DC	4,475	4,470	4,469	4,473	4,476
Dual AC, overhead/third rail DC	37	37	35	34	35
1500V DC overhead	39	39	39	39	39
Total electrified	11,312	11,303	11,282	11,296	11,327
Non-electrified	15,572	15,573	15,560	15,543	15,525
Total	**26,884**	**26,876**	**26,842**	**26,839**	**26,852**

Table 5.15: Electrification capability (km of electrified track) Scotland

	March-10	March-11	March-12	March-13	March-14
25 kV AC overhead	1,255	1,302	1,495	1,514	1,560
Third rail 650/ 750V DC	0	0	0	0	0
Dual AC, overhead/third rail DC	0	0	0	0	0
1500V DC overhead	0	0	0	0	0
Total electrified	1,255	1,302	1,495	1,514	1,560
Non-electrified	2,934	2,930	2,726	2,722	2,680
Total	**4,189**	**4,232**	**4,221**	**4,236**	**4,240**

Table 5.16: Electrification capability (km of electrified track) Network-wide

	March-10	March-11	March-12	March-13	March-14
25 kV AC overhead	8,016	8,059	8,234	8,264	8,337
Third rail 650/ 750V DC	4,475	4,470	4,469	4,473	4,476
Dual AC, overhead/third rail DC	37	37	35	34	35
1500V DC overhead	39	39	39	39	39
Total electrified	12,567	12,605	12,777	12,810	12,887
Non-electrified	18,506	18,503	18,286	18,265	18,205
Total	**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Table 5.17: Electrification track capability (km of electrified track) by operating route

	Gauge Band	2009/10	2010/11	2011/12	2012/13	2013/14
Anglia	AC OHL	1,451	1,449	1,453	1,457	1,456
	AC / DC	15	15	13	13	13
	DC	21	21	20	20	20
	DC OHL	0	0	0	0	0
	None	788	787	783	786	787
East Midlands	AC OHL	347	346	343	343	341
	AC / DC	0	0	0	0	0
	DC	0	0	0	0	0
	DC OHL	0	0	0	0	0
	None	1,406	1,405	1,405	1,405	1,404
Kent	AC OHL	9	9	2	9	9
	AC / DC	11	12	11	11	11
	DC	1,647	1,644	1,644	1,645	1,646
	DC OHL	0	0	0	0	0
	None	89	89	87	80	80
London North Eastern	AC OHL	2,024	2,021	2,019	2,019	2,016
	AC / DC	0	0	0	0	0
	DC	9	9	9	9	9
	DC OHL	39	39	39	39	39
	None	3,608	3,624	3,614	3,611	3,616

Table 5.17 Continued: Electrification track capability (km of electrified track) by operating route

	Gauge Band	2009/10	2010/11	2011/12	2012/13	2013/14
London North Western	AC OHL	2,827	2,828	2,817	2,817	2,851
	AC / DC	9	8	8	8	8
	DC	292	292	290	292	293
	DC OHL	0	0	0	0	0
	None	3,580	3,562	3,555	3,547	3,513
Scotland	AC OHL	1,255	1,302	1,495	1,514	1,560
	AC / DC	0	0	0	0	0
	DC	0	0	0	0	0
	DC OHL	0	0	0	0	0
	None	2,933	2,931	2,726	2,722	2,680
Sussex	AC OHL	1	1	1	1	1
	AC / DC	2	2	2	2	2
	DC	1,032	1,032	1,032	1,032	1,032
	DC OHL	0	0	0	0	0
	None	91	91	89	89	89
Wales	AC OHL	0	0	0	0	0
	AC / DC	0	0	0	0	0
	DC	0	0	0	0	0
	DC OHL	0	0	0	0	0
	None	2,459	2,462	2,450	2,447	2,458
Wessex	AC OHL	0	0	0	0	0
	AC / DC	0	0	0	0	0
	DC	1,475	1,473	1,474	1,475	1,475
	DC OHL	0	0	0	0	0
	None	606	610	609	609	609
Western	AC OHL	103	104	104	104	103
	AC / DC	0	0	0	0	0
	DC	0	0	0	0	0
	DC OHL	0	0	0	0	0
	None	2,945	2,941	2,968	2,969	2,970
Network Total		**31,073**	**31,108**	**31,063**	**31,075**	**31,092**

Network Change

Definition

A Network Change is a change which is likely to have a material effect on the operation of the network or on trains operated on the network.

Network Changes can either be physical (e.g. changes to the layout, configuration or condition of the network) or operational (e.g. the introduction of a speed restriction on a section of track or a change to the way Network Rail maintains track). Operational changes are only classed as Network Changes if they last, or are likely to last, for more than six months.

Reporting Method

This information is taken from the internal processes used for monitoring the establishment of Network Changes and covers the period from 1 April 2013 to 31 March 2014.

Results

Table 5.18 provides the number of Network Changes consulted, established and withdrawn in the past year.

Commentary

Summary numbers of permanent Network Changes consulted and established during 2013/14 are detailed for each route in Table 5.18.

In 2013/14 there were a total of 235 permanent Network Changes, 223 established changes and 17 withdrawn changes. By way of comparison, in 2012/13 there were 155 permanent changes, 127 established changes and 11 withdrawn changes.

Where the previous Infrastructure Capability Programme (ICP) Short Term Network Changes have resulted in a permanent change of capability, the corresponding Network Change consultation is reflected in the numbers reported here.

In the Kent, London North Western (LNW) and Western Routes the number of Network Changes has fallen from the previous year. This is a result of the CP4 workbank having completed the majority of required Network Changes earlier in the control period.

Conversely, the number of Network Changes has increased in the majority of the routes as a result of more enhancement and renewals works being carried out in the final year of the control period.

The combined number of Network Changes for London North East (LNE) and East Midlands (EM) has increased by 74 permanent and established Network Changes from 2012/13, partly because of the Network Optimisation programme (a specialist programme dedicated to the process of rationalising assets), for which 22 Network Changes were issued in 2013/14.

Table 5.18: Network Changes (2013/14)

	Permanent Network Changes	*Established*	*Withdrawn*
Anglia	9	6	1
LNE/EM	81	66	7
Kent	8	10	2
LNW	29	48	1
Scotland	41	32	2
Sussex	18	15	1
Wales	19	14	2
Wessex	17	17	1
Western	13	15	0
Total	**235**	**223**	**17**

Notes:

Major projects can also generate Network Changes, where this is the case, details of these can be found on our website using this link

Discrepancies between actual and published capability

Definition

This information is taken from the Discrepancy Register, which is published alongside the National Electronic Sectional Appendix (NESA). The Discrepancy Register was established as part of the Infrastructure Capability Programme (ICP) to provide a comprehensive list of the differences between our published and actual capability.

Results

There are three discrepancies remaining from the ICP, as detailed in Table 5.19.

Commentary

This is the fifth year in which this data has been published in the Annual Return.

CP4 started with a sizeable number of capability discrepancies, brought to light by the verification activity supporting the publication of capability measures such as gauge (in some cases for the first time) in the Sectional Appendix. These discrepancies were summarised on a Discrepancy Register which was then used to track the progress to their resolution. An industry consultation exercise led to these discrepancies being temporarily addressed through the issuing of Short Term Network Change Notices which committed restoration by various end dates to 'short', 'medium' or 'long' timescales. The number of discrepancies fell to a handful each year, reported in successive Annual Returns.

Gauge recovery work has proceeded through CP4, bolstered by the CP4 enhancement programme.

For the reasons set out in Table 5.19 three of the discrepancies identified as part of the ICP remained to be cleared at the end of CP4 and have not been fully resolved through the establishment of Network Change or the restoration of the original capability.

Two of these are previously reported gauge discrepancies (Tapton Junction to Sheffield North and Thornhill Junction to Leeds, Holbeck East) on sections for future electrification, where it would be wasteful to restore for W8 gauge and then revisit for electrification: extensions to these Short Term Network Changes (STNCs) will be consulted when timescales for completion of the works have been confirmed.

A further section (Smethwick-Stourbridge) has had the STNC expire without the former capability status being reinstated. In this case a sizeable engineering effort will be needed to recover gauge capability (through Old Hill tunnel) and a new STNC will be consulted, with works to take place in CP5.

We are taking action to resolve these discrepancies. Pending resolution, current operative capability of the network is stated in the National Electronic Sectional Appendix.

Ongoing Short Term Network Change proposals

Definition

This information is taken from the internal processes used for monitoring STNCs issued in connection with the ICP and the Network Change process.

Results

Table 5.20 provides the number of STNCs for each operating route, and the dates by which they are due to expire.

Commentary

In Scotland the number of STNCs has decreased from previous years. This is due to a large amount of the network capability STNCs being restored and a reduction in STNC extensions.

For eight out of ten of the routes, the number of STNCs has decreased due to expiring STNCs or the issue being resolved.

Table 5.19: Discrepancies between actual and published capability identified by the Infrastructure Capability Programme

Route	Line of route	Section	Capability measure	Published status	Current status
LNE	LN804	Tapton Junction to Sheffield North	G	W6a W7(S) W8(S)	STNC extension is in consultation, to ease available clearances using a routing restriction via Down Passenger Loop, and integrate remaining clearance with electrification
LNE	LN860	Thornhill Junction to Leeds, Holbeck East Junction	G	W6a* W7(S) W8(S)	A new STNC will be consulted to ease available clearances resulting from works and provide remaining clearance simultaneous with electrification
LNW	MD435	Smethwick Junction - Stourbridge	G	W6a W7 W8(S)	Was subject to Short Term Network Change which has expired and will be reissued with easements. Old Hill Tunnel will see W8 clearance in 2016 through track lowering

Notes:

G = Gauge capability.

T = Track and route mileage.

W6a* refers to the existing wagon types listed in the header notes to Table D5 – Route Clearance of Freight Vehicles.

W7(S) refers to specific wagon/container combinations which are permitted to run, but the section does not offer full W7 gauge.

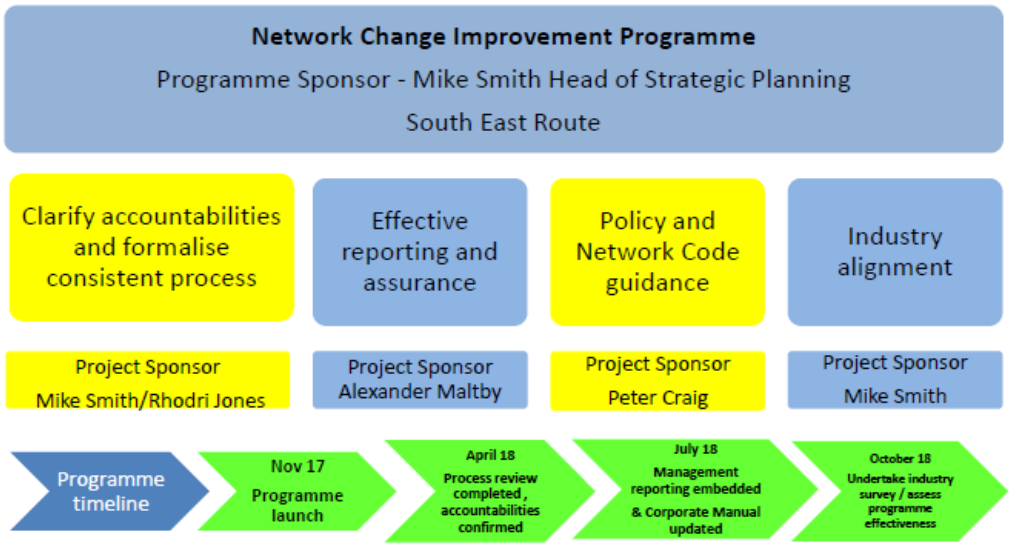
W8(S) refers to specific wagon/container combinations which are permitted to run, but the section does not offer full W8 gauge.

Table 5.20: Number of Short Term Network Changes

	Total	2014	2015	2016	2017	2018
Anglia	2	1	0	0	1	0
EM / LNE	7	4	2	1	0	0
Kent	6	3	1	1	1	0
LNW	4	1	1	1	1	0
Scotland	32	12	17	3	0	0
Sussex	5	0	0	2	3	0
Wales	2	0	1	1	0	0
Western	2	1	1	0	0	0
Wessex	5	1	1	2	1	0
Network Total	**65**	**23**	**24**	**11**	**7**	**0**

Appendix E

Network Change Improvement Programme update (20th September 2018)



Programme status summary – 20th September 2018				
Project	**Clarify accountabilities and formalise consistent process** (Mike Smith/Rhodri Jones)	**Effective reporting and assurance and training** (Alexander Maltby)	**Policy and Network Code Guidance** (Peter Craig)	**Industry alignment** (Mike Smith)
Status Summary	Complete	Partially complete	Complete	Ongoing
	Minor alteration in process to update the sectional appendix being tested in LNW route. If seen as beneficial LNW route NC rep will discuss with other routes	Need to clarify 2nd tier assurance process with the Network Capability Standard Owner	Complete	Recommendation for annual survey to be discussed at Network Capability Steering Group
Summary of outputs and forecast completion dates	• Summary of accountabilities for key individuals involved in NC (Complete) • Process map (Complete) • Guidance notes & Sharepoint site (complete updated on ongoing basis, owned by NCC forum) • Escalation process (Complete) • Examples of projects subject to / not subject to NC (Complete) • Frequently Asked Questions (Updated on ongoing basis, owned by NCC forum) • Sectional Appendix update process (pending LNW review note above)	Standard training guidance (Complete)	Commercial manual updated including Roles & Responsibilities summary/RACI and Process Map (Complete)	RIRG recognised as opportunity for industry feedback via Network Change as "standing item" (Complete)
		Standard Network Change reporting process agreed. Periodic report to be submitted to each route HoSP and RIRG to agree format of report on a route by route basis. (Complete)	Review Network Capability Standard (Complete, update not required)	"Effectiveness test "of NC process embedded in BAU (1/11/18)
		Alignment to GRIP training and sponsor training process (Complete)		