Independent Report

#35840 Conventional Signalling and Obsolescence Management

Office of Rail and Road | Network Rail

14 June 2023

→ **The Power of Commitment**

Client name		Office of Rail and Road | Network Rail					
Project name		Conventional Signalling and Obsolescence Management					
Document title		Independent Report | #35840 Conventional Signalling and Obsolescence Management					
Project number		12605336					
File name		12605336-RP-X-F01-ConventionalSignallingandObsolescenceManagement.docx					
Client Name		Office of Rail and Road | Network Rail					
Revision Number		F01					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S3	F01 QA3 - Gold	Redacted	Redacted		Redacted		14/06/23

Gutteridge Haskins & Davey Limited 05528602
Level 6, 10 Fetter Ln , London
Greater London, EC4A, 1BR, England
T 442030777989 | E Advisory@GHD.com | **ghd.com**

Contents

Table index

Figure index

Appendices

Abbreviations

Abbreviation	Description
ARL	Asset Remaining Life
ATP	Automatic Train Protection
COTS	Consumer Off The Shelf
CP	Control Period
DEAMs	Director Engineering & Asset. Management
ETCS	European Train Control System
FER	Financial Efficiency Rate
GW ATP	The legacy British Rail Automatic Train Protection system installed on the Great Western Main Line
LTDP	Long Term Deployment Plan
MCB-OD Mk1	Manually Controlled Barrier- Obstacle Detector: Mark 1
NR	Network Rail
NW&C	Northwest and Central
OMP	Obsolescence Management Plan
PR	Periodic Review
RFI	Request for information
ROC	Rail Operating Centre
SCO	Supply Chain Operations
SEU	Signalling Equivalent Units
SICA	Signalling Infrastructure Condition Assessment
SMART	Specific, Measurable, Achievable, Realistic, Time-bound
SoW	Scope of Works
SSI	Solid State Interlocking
W&W	Wales and Western

Definition of terms

Definition	Description
EULYNX	Is a European initiative by 13 Infrastructure Managers with a common goal of defining a modular signalling architecture with standardised interfaces.
Item	The subject being considered, this maybe an individual part, component, device, functional unit equipment, subsystem, or system. This may consist of hardware, software, people, or any combination thereof.
Obsolescence	Transition of an item from available to unavailable from the manufacturer in accordance with the original specification
Obsolescence issue	Effect when the item is obsolete or when there is certainty of when item will become obsolete
Obsolescence Management	A discipline used at all phases of an item's lifecycle to ensure an item and its sub-items can continue to fulfil their requirements of their expected useful life.
Obsolescence Risk	Measure of certainty as when an item will become obsolete, often expressed as the impact and likelihood of becoming obsolete.
Obsolete	No longer in production/available from the manufacturer in accordance with the original specification
Signalling Equivalent Unit	SEU is a count of the number of Signals, Points, Level Crossing Interfaces and Other assets that require specific control functions within the interlocking. This is used to assess the volume of an interlocking area. Further details can be found in Signalling Asset Policy – Module 5 system Definition – NR/L2/SIG/5021/05.

Disclaimer

This report has been prepared by GHD for Office of Rail and Road | Network Rail and may only be used and relied on by Office of Rail and Road | Network Rail for the purpose agreed between GHD and Office of Rail and Road | Network Rail as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Office of Rail and Road | Network Rail arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 2.2 of this report). GHD disclaims liability arising from any of the assumptions being incorrect

1. Executive Summary

1.1 Purpose of this report

This report provides evidence and a review of Network Rail's conventional signalling systems including management of obsolescence and alignment of signalling programmes with future modernisation. The report will inform ORR's PR23 work and support their existing knowledge.

1.2 Summary of review areas

GHD was appointed by ORR and Network Rail as the Independent Reporter to provide evidence and review that Network Rail is managing its conventional signalling programmes effectively. The study sought to understand strategy alignment to future modernisation, long term planning as well as how Network Rail manages obsolescence of its signalling assets.

Key requirement 1 summary

How do the processes and governance of obsolescence associated with Network Rail's signalling programmes work across Network Rail's national functions and regions? What are the differences across regions? The Independent Reporter found that there is a draft obsolescence management policy, and a separate draft obsolescence management strategy. The review found that the policy is not being used as a guide for the overall effort to manage obsolescence. The same can be said of the obsolescence strategy. The review also found that the signalling asset policy only briefly touches on obsolescence risk.

The process for managing obsolescence lacks ownership. The review found that obsolescence risk management is in an immature state and that enterprise risk is not well understood. There was very little evidence of how decisions on managing an obsolescence issue were taken. This limits the accountability and can make it difficult to assess the success of an intervention and prevents lessons being learned.

Regions are managing signal portfolios in a similar way except for the Eastern region. Eastern have a highly devolved structure compared with other regions, with more authority placed in the routes.

Overall, the Independent Reporter cannot identify that there is sufficient equipment and skills to meet the demand for conventional signalling over the next thirty years. There remain several opportunities to make improvements across processes and governance of obsolescence as set out in the recommendations below.

Key requirement 2 summary

What factors influence the deferral of maintenance, refurbishment and renewals into future years / control periods and how are these being managed by Network Rail regions to ensure the signalling management programme can be effectively delivered over the next thirty years. The Independent Reporter learned that a system is in place for the alignment of conventional signalling programmes to future works uses a combination of SICA and RailBI. Asset remaining life has been mapped to the regional and national signalling programmes over the next thirty years and beyond.

The mapping of work shows a bow wave of work to be delivered through Control Period (CP) 8, 9 and 10. the number of assets that are planned to be renewed beyond their current expected, end of life, is forecast to increase and is expected to peak nationally in 2037/2038.

Within this period over twenty-five percent of Signalling Equivalent Unit (SEUs) will have less than five years to end of asset remaining life.

Network Rail are working to a baseline delivery capacity of three thousand SEU renewals per annum. The ability to deliver three thousand SEU renewals a year is questionable at a national scale and the long-term forecast is based on unvalidated assumptions. A multitude of factors such as limited sources of material supply, an ageing asset base, and regional highlighted skill shortages will continue to challenge the Long-Term Development Plan (LTDP) assumptions. These assumptions and context are cited in the introductory of Section 3.2.

The level of work forecast by Network Rail for CP8 and CP9 has periods planned where the quantity of work that is required to be delivered, is beyond the national capacity of three thousand SEUs.

The Independent Reporter assesses on the balance of the evidence, our own analysis and reasoning, that the peak of ageing assets will likely be later than 2037/2038 and that there will be a higher than twenty five percent national SEUs which will have less than five years to end of asset remaining life. Essentially a larger and older asset base than forecast.

The Independent Reporter concludes that if it is possible to renew three thousand SEUs per year, there are still several years (from the end of CP8 to the middle of CP10) where it is forecast that the end of life significantly exceeds the delivery capacity. This will lead to deferrals.

While the Independent Reporter was given limited feedback on the different factors that influence deferral during discussions with the regions, we were unable to carry out a detailed exploration of these factors. This was due to a lack of visibility given to the review of the deferred renewal registers. The review consultations discussed deferral factors in the sessions held, and cited factors included financial constraints and supply chain constraints.

The conclusion is that signalling assets on the network are aging and that the rate of renewal is lower than the rate of assets reaching end of life. Failure to deliver the planned work will exacerbate the asset base and may compromise safety and reliability as well as increase reactive (unplanned) maintenance. Spare components pools for signalling systems will have to be carefully managed with the supply chain as the risk of shortages will increase.

Effective delivery of Network Rail's conventional signalling programmes (including, maintenance, refurbishment, and renewals) and strategies alignment to future modernisation needs to radically address the potential for CP8 & CP9 deferrals. There remain opportunities to make improvements across programme planning and alignment as set out in the recommendations below.

Finally, Network Rail acknowledges work needs to be replanned but in doing so assets will be in use for longer.

1.3 Recommendations

Table 1: Recommendations (source: GHD)

ID	Recommendation
R1	The critical aspects of signalling obsolescence need to be defined and incorporated into the asset policy in line with the recommendations below:
R1.1	There should be a representative with clear accountability and resources to manage, monitor, evaluate and coordinate obsolescence activities. The representative should be accountable for setting and enforcing the obsolescence strategy that will be followed by the whole organisation including the responsibilities of the Regions, Supply Chain Operations and Technical Authority [1].
R1.2	The relevant obsolescence management skills for those involved in the obsolescence management process should be defined for each role and suitable competency management in place with training provided where necessary.
R1.3	Based on the aims of the obsolescence strategy, key performance indicators should be used to demonstrate the effectiveness of the obsolescence management activities and feed into a continuous improvement process. The specific metrics should be defined by Network Rail, however, may consider including the percentage of asset types with an up-to-date management plan in place and the effectiveness of the plans.

[1] The scope of this report is only signalling assets, however, consideration should be given to whether it is appropriate that this representative is responsible for all obsolescence management within Network Rail.

ID	Recommendation
R2	Plans for identifying, managing, and mitigating the risk of obsolescence should be developed.
R2.1	A high-level assessment of obsolescence risk should be caried out against signalling assets classes (e.g. Interlocking, train detection etc.) to understand where the risk of obsolescence currently resides. This should consider the likelihood and impact of obsolescence and must consider items that are yet to enter obsolescence. This would need input from the regions, Technical Authority, and Supply Chain Operations.
R2.2	Obsolescence management plans should be implemented based on the principles and guidance of BS EN IEC 62402 for the highest risk items (as identified by **R2.1**).
R2.3	Decisions taken around obsolescence resolutions should be recorded including, what options were considered, the expected costs and risks associated with the different options. This record should be proportionate to the risk being managed and the cost of the resolution.
R3	Undertake scenario planning of varying Signalling Equivalent Unit renewal volumes and financial efficiency rates to understand the impact on network safety and reliability in future control periods if the predicted volumes and efficiencies are not achieved.
R4	The Director Engineering & Asset Management for each region should ensure that their deferred renewal registers are updated and maintained as per the standard, management of the risk arising from deferred renewals – NR/L2/HAM/02201 issue 6.
R5	Incorporate obsolescence risk into the asset remaining life data in an integrated way to be consistently considered during workbank planning.

2. Introduction

2.1 Review background and context

The High-Level Output Specification (or HLOS[2] which can be found **here**, published in December 2022) sets out the UK Government's requirements across a number of areas. These reflect and build on the PR23 objectives e.g. the UK Government wants Network Rail to maintain a strong standard of safety, deliver cost efficiency, and maintain focus on punctuality, reliability, and asset sustainability, including resilience to climate change. In addition the statement discusses requirements relating to security, system operation, stakeholder engagement, and financial management. The pertinence to this study is the understanding that the cornerstone of effective performance within Network Rail's remit, is effective asset management. It specifically states the need for an approach to asset management which particularly reflects those assets that have the greatest impact on how the railway performs for its customers. Specifically, Network Rail's management of signalling and control room decision making. Point 34 (D34) of the December 2022 statement notes that:

> "… continued adoption of digital signalling will improve asset sustainability; deliver increased capacity, safety, and reliability; and provide greater value for money. As set out in the Long-Term Deployment Plan, the Secretary of State agrees that replacing conventional signalling with digital signalling at the point of renewal represents the most cost-effective way to transition to a European Train Control System (ETCS)-controlled railway."

And;

> "… this principle should therefore be applied to signalling renewals in CP7, alongside planning for cab fitment commensurate with overall progress on expected ETCS rollout as planned by Network Rail, enabling a fully joined-up approach to implementing the expansion of digital signalling."

The scale of each region's challenge in meeting the HLOS objectives (and the ability of ORR to regulate this) varies considerably across the country. An indicator of this is the number of Signalling Equivalent Units (SEUs) in each region.

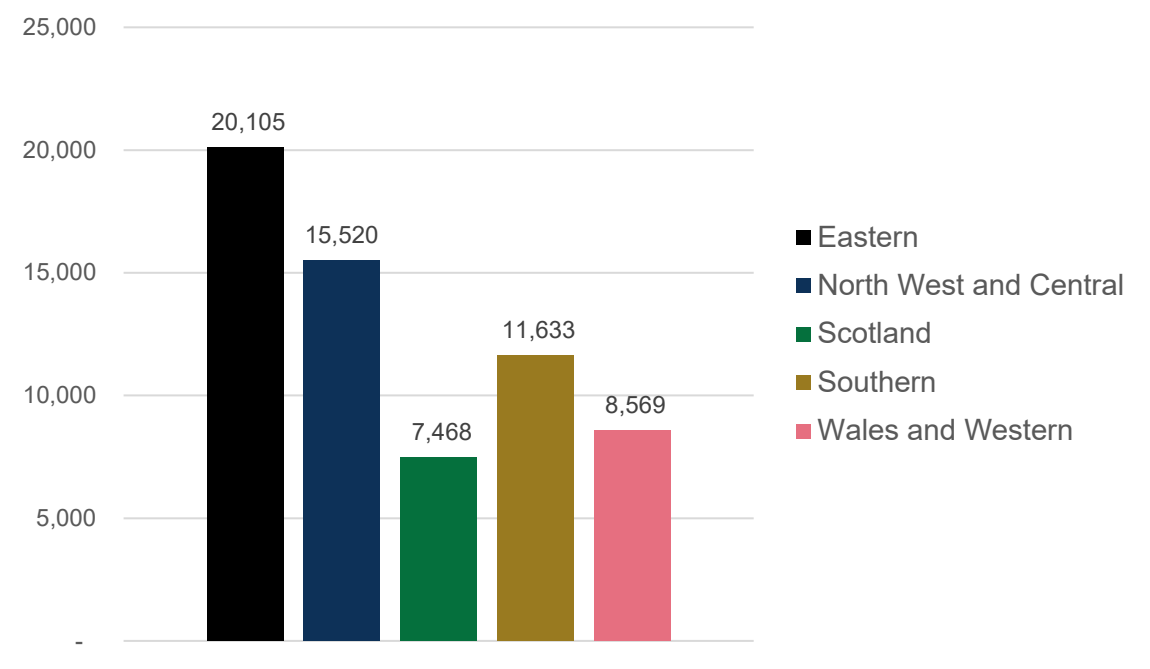

Figure 1: Number of conventional signalling equivalent units in each Region (source: EV83)

[2] This Statement fulfils the requirements of Schedule 4A of the Railways Act 1993 (as amended by Schedule 4 of the Railways Act 2005) by setting out for the Office of Rail and Road (ORR) what the Secretary of State wants to be achieved through the operations, maintenance and renewal of railway infrastructure activities (OMR) in England and Wales during the review period commencing 1 April 2024 and finishing on 31 March 2029: the High-Level Output Specification (HLOS) for Control Period 7 (CP7).

To support its analysis for PR23[3], ORR require an assessment of Network Rail's management of its conventional signalling systems including its management of obsolescence and planned interventions. ORR regularly meets with the five Network Rail regions to discuss how they manage their signalling systems. The statement of works for the independent report noted that ORR information is limited in certain areas and additional information is required to inform its PR23 work and support existing knowledge.

This independent report is therefore shaped by the importance that the regulator places on sound risk management of obsolescence, as well as Network Rail's alignment to future modernisation of these assets. These are the two key requirements that have been addressed in this report.

2.2 Independent Reporter's mandate and scope

GHD was appointed by the ORR and Network Rail as the Independent Reporter to assess whether Network Rail is delivering their conventional signalling programmes effectively. ORR set the following requirements and key requirements for the Independent Reporter. We outline these in the following section.

The requirements

– Requirement 1 or REQ1:
  - To evidence that Network Rail is delivering its conventional signalling programmes (including, maintenance, refurbishment, and renewals) effectively so that strategies are aligned to future modernisation.
– Requirement 1.1 or REQ1.1:
  - To evidence the asset remaining life of conventional signalling assets has been mapped to regional / national signalling programmes over the next 30 years.
– Requirement 1.2 or REQ1.2:
  - To evidence how conventional signalling programmes have been mapped to digital enhancements and the Long-Term Deployment Plan (LTDP).
– Requirement 2 or REQ2:
  - To evidence how Network Rail manages obsolescence of its signalling assets i.e. there is sufficient equipment in reserve or in the supply chain to sustain conventional signalling maintenance, refurbishment, and renewals to meet the demands of conventional signalling degradation over the next 30 years. We also considered the existing knowledge base and skillsets required in the context of an ageing assets base.

The key requirements

In addition to the overall objectives identified above, the ORR requires the Independent Reporter to provide evidence that includes consideration of both national function and regional factors, in the following key requirement areas.

– Key requirement 1 or KR1:
  - How do the processes and governance of obsolescence associated with Network Rail's signalling programmes work across Network Rail's national functions and regions? What are the differences across regions?
– Key requirement 2 or KR2:
  - What factors influence the deferral of maintenance, refurbishment and renewals into future years / control periods and how are these being managed by Network Rail regions to ensure the signalling management programme can be effectively delivered over the next 30 years.

The Independent Reporter full statement of works is available in the appendix.

[3] Note: Periodic reviews are one of the principal mechanisms by which the Office of Rail and Road (ORR) holds Network Rail (NR) to account and secures value for money for users and funders of the railway. The 2023 periodic review (PR23) will determine what Network Rail must deliver in control period 7 (CP7) and the funding it requires to do this.

2.3 Methodology and approach

The Independent Reporter's mandate is separated into two logical review areas:

– **Process and governance** comprised of REQ2 and KR1. See Section 3.1.
– **Programme planning and alignment** comprised of REQ1, REQ1.1 & REQ1.2 and KR2. See Section 3.2.

To enable the assessment for both review areas, evidence was gathered from Network Rail by the Independent Reporter through meetings and correspondence throughout the course of the commission. This allowed clarifications and additional information and evidence to be requested as the assessment progressed. Network Rail's engagement in evidence gathering included the Technical Authority, Route Services, and each of the five regions. The list of stakeholders engaged is provided in Appendix B and the register of evidence gathered is provided in Appendix C. The method used to assess each review area differs and is described below.

2.3.1 Process and governance

The Independent Reporter's approach distils the core elements of obsolescence management good practice, as identified in BS EN IEC 62402:2019 Obsolescence Management (the Standard) and uses these elements as the basis for assessing current Network Rail practice. These core elements of the standard against which the assessment is made are:

– Obsolescence management policy.
– Organisation characteristics.
– Appropriate obsolescence plans.
– Minimising and identifying obsolescence during design.
– Appropriateness of risk assessments.
– Obsolescence resolutions.
– Measurement and improvement of obsolescence management activities.

2.3.2 Programme planning and alignment

The assessment of this review area is primarily data led, through analysis of data provided by Network Rail.

Historical and forecast work activities have been assessed and evidence sought in relation to Network Rail decision-making.

The data gathered has been analysed by the Independent Reporter to provide insights in response to the Reporter's mandate.

2.3.3 Report structure

Each of the two review areas are presented as separate report sections, with an introduction to the layout provided at the start of the section. The following are common to both review areas:

– Where evidence (such as a document) is referred to in the text, a reference to the corresponding evidence register row (Appendix C) is provided using the notation [Evx].
– Throughout the report the Independent Reporter's findings are identified as numbered list items prefixed by **Fxx**, where **xx** represents the sequential number within the full list of findings.
– Recommendations made by the Independent Reporter are identified by the prefixed **Rx**.

3. Review areas

3.1 Process and governance

3.1.1 Introduction

This section addresses REQ2 and KR1 of the Independent Report's mandate through the assessment of Network Rail's practice against each of the core elements of BS EN IEC 62402:2019 Obsolescence Management. The core elements contained within this practice are:

- Obsolescence management policy.
- Organisation characteristics.
- Appropriate obsolescence plans.
- Minimising and identifying obsolescence during design.
- Appropriateness of risk assessments.
- Obsolescence resolutions.
- Measurement and improvement of obsolescence management activities.

For each core element Independent Reporter sets evidence out (where applicable) related to the following:

- A brief summary of good practice expectation.
- A narrative on the assessment of evidence.
- An identification by exception of regional differences.
- Element assessment conclusion and list of findings.

Conclusions reached in relation REQ2 and KR1 are provided at the end of the section, followed by the Independent Reporters recommendations.

The notations in table 2 are used where regional differences in practice are identified.

Table 2: Notation used to represent Network Rail regions (source: GHD)

Notation	Region
E	Eastern
Nc	North West & Central
Sd	Scotland
Sn	Southern
W	Wales & Western

3.1.2 Obsolescence management policy

An obsolescence management policy should guide the overall direction and effort to manage obsolescence. The policy should be enforced by management to ensure that obsolescence management is applied appropriately and consistently. The policy should therefore identify:

– Roles, responsibilities, and infrastructure from all disciplines of Network Rail for managing obsolescence.
– The obsolescence management skill level and training required for the infrastructure.
– The operational procedures related to obsolescence management which may be part of a life cycle management plan or support plan.

The Signalling Asset Policy NR/L1/SIG/50021 contains some brief information on obsolescence but does not identify the items that should form part of an obsolescence management policy. We therefore sought to understand how obsolescence policy was coordinated across Network Rail.

The Independent Reporter found that there is a draft obsolescence management policy (EV5), and a separate draft obsolescence management strategy (EV12). However, both documents were not executed by relevant governance delegates, and we found evidence that they were developed independently of each other. We would have expected the obsolescence policy to have been more explicit within the signalling asset policy. We also found further evidence of an accompanying obsolescence procedure (EV11). The procedure is referenced by the obsolescence management strategy and describes the process used when an obsolescence is identified. This is also a draft document that has not been formally issued.

When testing the adoption of the policy to manage risk, there were fundamental gaps across the regions. For example, the obsolescence procedure is a flowchart that describes the process to be followed and the different organisations that are responsible for the activities. We did not find evidence that the regions have adopted this process.

A policy should explicitly state ownership, that is who is responsible and accountable. Roles, responsibilities, and infrastructure are proposed in the draft policy; however, it lacks clarity on a lead individual or governance body for obsolescence.

It is clear the draft policy contains some relevant information in relation to common standards such as BSI, however, we assessed it is not being used as a guide for the overall effort to manage obsolescence. The same can be said of the obsolescence strategy. The signalling asset policy only briefly touches on obsolescence risk.

There is no definition for the obsolescence management skills or knowledge needed by the individuals carrying out the obsolescence management activities. There also appears to be no training or briefing of information for roles in obsolescence management.

3.1.2.1 Element conclusion and findings

The policy and its associated governance and process require a high level of development prior to the next control period.

Table 3: Obsolescence management policy findings (source: GHD)

ID	Finding
F1	There is no evidence that Network Rail satisfy the requirements of an obsolescence management policy as defined by the standard. There were three documents that were presented as evidence during the investigation: a draft obsolescence management policy (EV5); a draft obsolescence management strategy (EV12); and the Network Rail standard NR/L1/SIG/50021. These fell short of fully addressing obsolescence.
F2	Obsolescence management skills are not defined for different roles and the policy for training is not clear.

3.1.3 Organisation characteristics

The Independent Reporter reviewed Network Rail's organisational characteristics in relation to the obsolescence management policy. This design should include:

– Management responsibilities and who makes decisions.
– Obsolescence management organisation and authorities.
– End user / manufacturer management.
– Partnering agreements between organisations.

As described in section 3.1.2, the Independent Reporter found there is no individual or governance body given accountability for management of obsolescence. We note a role has been proposed in the draft policy, but this is yet to be adopted and embedded.

It is clear the governance of managing obsolescence activity has no definitive executive, nor organisational home. The Independent Reporter found there are several departments and individuals involved in the management of obsolescence from Route Services, the Technical Authority, and the regions.

A characteristic within the design which we sought to understand was the differences in how the regional organisations linked up with their supply chain. An observation was that regional autonomy is important in the respect that there is no governance representative or policy to manage obsolescence activities.

Within the regions there was a tacit understanding that the regional engineers and the routes each had responsibilities for managing obsolescence at different levels, although we found that this was not defined in any organisational trait. Within the regions there appears to be a clear understanding of the responsibilities for managing the tracking of obsolescence issues within the obsolescence registers and selecting obsolescence resolutions, although this was not defined in existing documentation.

Supply Chain Operations (SCO) are responsible for managing the agreements with suppliers as part of Route Services. We found evidence of those contracts and agreements in place between the SCO and key suppliers, who are indeed receiving notification of obsolescence. An observation from a review of the organisational characteristics of the regions, was that within Eastern region, the routes had the autonomy to manage obsolescence risk.

Table 4: Key regional differences of organisation characteristics (source: Network Rail)

Region	Key regional difference
	In Eastern region, the routes have autonomy to manage obsolescence.
	No differences found.
	No differences found.
	No differences found.
	No differences found.

3.1.3.1 Element conclusion and findings

Overall, organisational characteristics require a high level of development to align and implement the policy of managing obsolescence prior to the start of the next control period.

Table 5: Organisation characteristics findings (source: GHD)

ID	Finding
F3	There does not appear to be a single person or entity accountable for the implementation of the policies.

3.1.4 Obsolescence plans

An Obsolescence Management Plan (OMP) can ensure appropriate selection and timely implementation of relevant obsolescence activities. The plan should cover strategies that minimise obsolescence during design, identify the approaches for managing obsolescence, and assess risk for technologies. The OMP ideally should describe the activities for prevention, detection, and treatment of the effects of obsolescence through all phases of the item's lifecycle to achieve the optimum balance of an item's lifecycle costs, performance, availability, maintainability, and safety.

The draft policy proposed that rather than obsolescence plan per region, an OMP should be in place per equipment type. The Independent Reporter noted that there were no obsolescence management plans in place, either at regional level or equipment type level.

At a regional level there are some asset management strategies in Scotland (EV44), Southern (EV17) and North West & Central (EV63), which demonstrate an understanding of the risks posed by obsolescence. They provided some input into the design by specifying preferences of the technology to be used for certain asset types, however, they fall short of what is expected of an OMP based on the standard BS EN IEC 62402.

Part of the purpose of an OMP is identifying the items being considered. To some extent this is done by the obsolescence register (EV3). Given the lack of OMPs nationally, we sought to understand whether each region had an obsolescence register in place for each route, and a region-wide summary.

We noted examples of data not being maintained in most of the regions' obsolescence registers. There was inconsistency in application of appropriate selection and timely implementation, for example, evaluation of risk is undertaken differently across routes with some routes not assessing obsolescence risk.

Table 6: Key regional differences of obsolescence plans (source: Network Rail)

Region	Key regional differences
E	The obsolescence registers for East Midlands contained out of date information with a decommissioning planned for 2018 listed as an existing control measure. The registers contained several issues such as inconsistency in the region with some fields present but not completed (East Midlands and North East routes) and critical information such as quantity completed as "many" or "few" (Anglia route).
Nc	The obsolescence register has examples of work due to be carried out in 2020 in North West and references to CP5 work that may or may not happen. There were other examples in Central and WCML-S. The registers were inconsistent between the routes and some information was inaccurate such as total number of assets listed as "lots" or the number of spares listed as "inadequate".
Sd	The obsolescence registers appeared to be up to date although some items did not have a plan for managing the obsolescence issue and some information was inaccurate such as the total number or assets listed as "lots" or "few".
Sn	The obsolescence register in Wessex has items listed as being converted in 2016. It also noted that South East had items from 2021 still within the register. Routes remain as Wessex and South East rather than the current routes of Kent, Sussex, Wessex, and Network Rail High Speed. The information contained within the register was inconsistent within the region and some fields such as renewal plan / strategy were not completed.
W	There were no dates included in the obsolescence register for activities being carried out and due to a lack of document control we were not able to confirm if the information is up to date.

Region	Key regional differences
	The registers within the region are consistent however some important information such as quantities of equipment are inaccurate as the term 'lots' is used and plans for how some of the obsolescence issues are being managed are missing.

3.1.4.1 Element conclusion and findings

We conclude that without a plan on how obsolescence will be managed the default approach to obsolescence must be predominantly reactive based on definitions within the standard.

Table 7: Obsolescence plans findings (source: GHD)

ID	Finding
F4	Obsolescence management plans are not in place at either a regional level or nationally. This results in obsolescence management effort being mostly applied in a reactive approach once an item enters obsolescence rather than planning how the risk will be managed over an asset's whole life.
F5	Obsolescence registers produced by the routes are inconsistent and are not maintained. This makes it difficult to monitor and manage the associated obsolescence risk.
F6	Obsolescence registers are managed in Excel and not incorporated into other asset management tools.

3.1.5 Minimising and identifying obsolescence during design

Where possible, the risk arising from obsolescence should be reduced during design. Specifying an item in design that is approaching the end of production can mean that by the time the project is commissioned the item is already obsolete and an obsolescence issue will need to be managed for the remaining life of the asset. However, to make a change at this stage to an alternative can result in reduced costs over the life of the asset. Some of the considerations that can be given at the design stage are:

– Use of multiple sourcing of equipment.
– Monitoring obsolescence.
– Monitoring changes.

The standard, Signalling Asset Policy: Technology NR/L1/SIG/50021/02 provides a policy on technology to be used for signalling projects and is supported by the business process for selection of point operating equipment NR/L2/SIG/19809 which identifies point operating equipment to use in renewals and when managing obsolescence. This includes consideration of open standards such as EULYNX to reduce single supplier dependency. The Independent Reporter found that work to minimise obsolescence during design is more advanced than for other stages within the asset life cycle, with activities in place to use open standards such as EULYNX.

The regions do have single source suppliers for conventional signal products. Supply and demand challenges can arise when a supplier decides it is no longer viable to maintain supply of a particular product.

Obsolescence status from the supply chain is shared with the regions via the Signalling Technology Steering Group and this also feeds into the obsolescence registers. The Independent Reporter noted that considerations and evidence that point to monitoring obsolescence require attention.

Firstly, we saw evidence of a single source supplier list (EV69) which tracks items that are single sourced as well as the plans to manage. We note that this list is in draft, and work is being undertaken by the SCO to progress the activity. We assess that the regions are monitoring critical supply elements however this requires attention to expedite.

Secondly, the monitoring of obsolescence and the associated changes is carried out by the SCO within supplier contracts, however, these contracts do not cover all main suppliers and not all items are procured through main suppliers.

Thirdly, there is a requirement on product acceptance certificates (EV40) that Network Rail must be informed of products being discontinued, however, we did not find any evidence to suggest that this is commercially enforceable as this does not form a contract with the supplier.

Table 8: Key regional differences of minimising and identifying obsolescence during design (source: Network Rail)

Regions	Key regional differences
E	No differences found.
Nc	No differences found.
Sd	No differences found.
Sn	Southern region specifies in their asset policy (EV17) the preferred items to be used as part of an effort to manage obsolescence.
W	Provided verbal examples of how decisions on point obsolescence had fed into a local policy.

3.1.5.1 Element conclusion and findings

We conclude that mitigation of risk during design is more mature although there is distinct lack of reporting and monitoring of obsolescence issues.

Table 9: Minimising and identifying obsolescence during design findings (source: GHD)

ID	Finding
F7	Obsolescence risk management during design is more advanced than other areas of the asset life cycle with activities taking place to manage single supplier technology and use of common interfaces.
F8	The obsolescence status from the supply chain is shared with the regions via the Signalling Technology Steering Group who consider this status when specifying work and this also feeds into the obsolescence registers.
F9	The monitoring of obsolescence and the associated changes are carried out by the SCO within supplier contracts, however, these contracts do not cover all main suppliers. A clear omission and example are Frauscher, who supply axle counter technology.
F10	Equipment that is not covered by a main supplier or is a secondary item (supplied on a project by a major supplier but they are not the OEM) is not monitored as effectively as other items.
F11	Information relating to Product Acceptance Certificates is not commercially enforceable.

3.1.6 Obsolescence risk assessments

Risk assessments in the context of obsolescence management provide decision makers with the necessary guidance for decision making. This may inform approaches to proactive or reactive activities and how much effort to be spent treating obsolescence. Figure 2 shows the different activities with regards to managing obsolescence and how these can be implemented proactively or a reactively depending on whether the item has entered obsolescence.

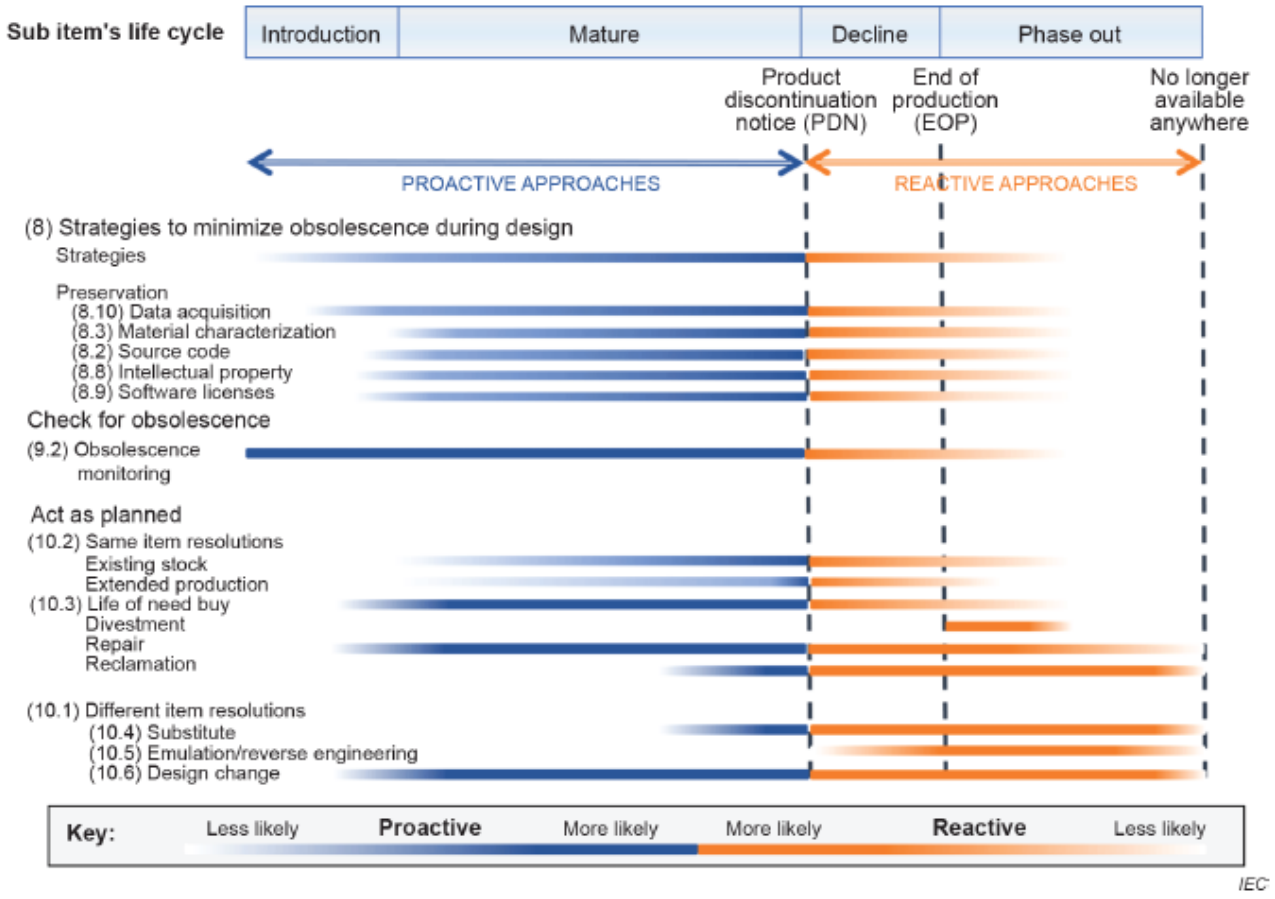

Figure 2: Example of proactive vs reactive approaches with resolutions (Source: BS EN IEC 62402)

An understanding of when impacts are likely and their magnitude can inform how obsolescence risks should be treated, for example, whether to target impact reduction, likelihood reduction or uncertainty reduction.

At a regional level, risk assessments are undertaken as part of the obsolescence registers. We found various instances whereby the assessments were not undertaken regularly and as noted in section 3.1.4, application of the assessment was inconsistent. It should also be noted that risk assessments were carried out once the item had entered obsolescence meaning that much of the opportunity to reduce the likelihood and impact of obsolescence had already passed. For some items, a reactive approach can be the most appropriate way to manage the risk, however, this should not be the default.

The obsolescence register is primarily collated in relation to the technology or asset class, and risk items are typically based on the availability of the product and spares. The register was devoid of items that identified risk around skillsets. This is of a particular concern given the speed of ETCS deployment, dual running of technology systems, and conventional signalling equipment that is nearing end of life.

The Independent Reporter discussed this with the regions during the consultations. We note that the availability of skills is a concern at regional level however this is not captured or assessed in the registers submitted.

A requirement under HLOS D38 states that:

> "The Secretary of State expects that the approaches that will be deployed promote appropriate pipeline visibility, facilitating investment in skills and employment, in line with levelling up objectives."

Table 10: Key regional differences of appropriateness of risk assessments (Source: Network Rail)

Region	Key regional differences
E	Eastern region commissioned an assessment of equipment in York Rail Operating Centre (ROC) by Siemens to gain a greater understanding of the system including the obsolescence status of the software and hardware. (EV16)
Nc	No differences found.
Sd	No differences found.
Sn	No differences found.
W	Wales and Western region commissioned an assessment of the Wales ROC by Siemens to gain a greater understanding of the equipment within the system including the obsolescence status of the software and hardware. (EV4)

3.1.6.1 Element conclusion and findings

Given the national volumes required over the course of CP7 and the various alliance contracts let, our review concludes that there is minimal national alignment of skillsets in relation to the ageing asset base. There are instances of regional preparations, however, the national picture is not evident in this study.

Table 11: Obsolescence risk assessments findings (source: GHD)

ID	Finding
F12	The risk of obsolescence is not assessed, rather obsolescence is managed once it has occurred, which represents a reactive only approach.
F13	As there are only limited risk assessments carried out to understand the risk of obsolescence, and there is no formal record of decision-making, Network Rail cannot be certain it has considered all appropriate risks in making obsolescence management decisions.
F14	Assessments of risk need to consider the risk of people and their skills becoming unavailable to maintain and modify an asset as well as the software and hardware becoming unavailable.

3.1.7 Obsolescence resolutions

Mitigations or resolutions is the collective term for the different types of activities that either treat the risk of obsolescence impact or overcome an obsolescence issue. Resolutions should aim to minimise the overall impacts of obsolescence, and the selection and implementation of resolutions will depend on numerous factors including:

– The reasons for obsolescence.
– The feasibility and potential cost of resolutions.
– The second order impacts on supportability or future requirements for the item.
– Potential timing of resolutions.
– Permanence of the issue or resolution.

Assessing the different resolution options and then implementing them is a large part of keeping the ageing signalling assets in service. It was demonstrated that there is an understanding of the different options available to resolve obsolescence once it has occurred and this is where most of the obsolescence management effort is focussed within the regions.

We would note that there are standalone examples where this is applied:

1. The SSI obsolescence phase 2 report (EV14) shows how the options to resolve obsolescence can be assessed detailing the factors analysed, the decisions taken, and the resources required. This report is proportionate to the level of risk that SSI obsolescence poses, and most decisions would not need this level of information.
2. A similar activity was carried out for MCB-OD Mk1 obstacle detector Spares Strategy (EV56) although it should be noted that this report failed to consider a wide range of options for resolving the obsolescence.

We conclude that the lack of processes and governance discussed in the preceding sections, also prevails in the inconsistency and application of resolution optioneering. Examples of resolutions implemented from records or discussions in each region are illustrated in the table below.

Table 12: Obsolescence resolution implementation examples by region (source: Network Rail)

Region	Key regional differences
E	– Renewal to release spares for other areas – Last time buy – Substitution – Repair / refurbishments
Nc	– Renewals. – Last time buy – Substitution – Repair / refurbishments
Sd	– Renewals – Last time buy – Substitution – Repair / refurbishments
Sn	– Renewal – Substitution – Repair / refurbishments
W	– Renewals – Reengineering – Life extensions works – Extending manufacture – Substitution – Repair / refurbishments

3.1.7.1 Element conclusion and findings

Overall there is very little record of the factors analysed and how decisions have been made with regards to resolutions. Without recording the reasons why a particular resolution was chosen it becomes difficult to determine whether more effective decisions are being made and to share best practise throughout the regions.

Table 13: Obsolescence resolutions findings (source: GHD)

ID	Finding
F15	There is very little record of the factors analysed and what decisions are based upon. There are examples of using various resolutions to manage obsolescence issues based on the specific factors that are to be considered.
F16	The SSI approach is a good example of how to assess the options available to resolve an obsolescence issue.
F17	Most obsolescence resolution decisions are not recorded which limits the understanding of how and why a decision was reached and limits the ability to share best practise across the business.

3.1.8 Measurement and improvement of obsolescence management activities

To objectively judge the success of Network Rail's obsolescence management activities requires metrics and measures to be defined, monitored, and analysed. Without such information and assessment, it cannot be determined how effectively obsolescence is being managed and whether the desired outcomes and outputs are being achieved.

The Independent Reporter found that there are no metrics defined to monitor the performance of obsolescence management or used to inform improvements. The lack of metrics demonstrates a lack of understanding in the current obsolescence status of signalling assets on the network and the level of obsolescence risk.

Metrics should be defined based on business need but may include, delay costs attributed to obsolescence, percentage of equipment that is obsolete or expenditure on proactive and reactive obsolescence. Some of this information could be derived from existing performance data. Additional metrics could be gathered from the obsolescence register but this is not currently happening.

3.1.8.1 Element conclusion and findings

We conclude that there are no metrics in place for monitoring the performance of obsolescence management.

Table 14: Measurement and improvement of obsolescence management activities findings (source: GHD)

ID	Finding
F18	There are no metrics defined for monitoring the performance of obsolescence management and therefore to inform improvement.

3.1.9 Summary conclusions

Decisions around obsolescence are typically being taken at the route level with obsolescence registers being the main tool to track the issues and risks. These registers are shared with the Technical Authority although they are not integrated with other tools that are used for renewal planning such as SICA and RailBI. This has potential to result in renewal issues not being managed as effectively as they could be.

Obsolescence management is carried out by both regional and central functions within Network Rail but there was not a clear executive or technical leader for the process. This will lead to inefficiencies and opportunities for improvement being lost.

A loss of the necessary skills can be a factor in obsolescence with concerns around how to manage the skills needed to continue to maintain and modify ageing technology, such as geographical interlockings, as the workforce with the required skills is retiring. Some of these skills can be managed within Network Rail, particularly around maintenance and there are regional examples of this being managed. However, some skills require working with the supply chain, particularly where there is proprietary technology involved and there was little evidence presented of how this is being managed.

As well as skills needed to keep technology working, there are skills and experience needed within the regions, Technical Authority and Route Services specifically on obsolescence management. There was no evidence of training being mandated or available to those that had responsibilities to carry out activities as part of the obsolescence management process.

The expected life of signalling assets is becoming shorter with mechanical and relay-based systems typically lasting much longer than electronic systems. This can be reduced further still when combined with COTS equipment that will typically be supported for less time than signalling specific equipment. Based on this, there is a need for up-to-date information on product discontinuation, options of alternative equipment or abilities to emulate the obsolete equipment, and the use of standard interfaces. This challenge appears to be understood although there does not appear to be a joined-up approach to managing this. This is a separate challenge to the need to extend the life of equipment that is already over 30 years old and having appropriate measures and activities in place to manage the different technology profiles.

The Supply Chain Operations have central contracts in place with major suppliers for the supply of services and equipment. These contracts require the suppliers to provide updates on the obsolescence of equipment. There needs to be assurance that all the necessary information is provided such as the availability of skills and secondary items such as computer hardware and software not controlled by the supplier which is an integral part of their system. An example of this would be a maintainer's workstation that is running on a stand-alone PC using Windows software. However, this does not cover all major suppliers with Frauscher as an example of a major supplier not currently under a central contract.

Product acceptance certification process has a requirement to inform Network Rail of product discontinuation, but this is not enforceable. If products are going to be accepted but not covered under a central contract, other considerations for monitoring obsolescence should be in place.

There was very little evidence of how decisions on managing an obsolescence issue were taken. This limits the accountability and can make it difficult to assess the success of an intervention and prevents lessons being learned.

Once a resolution has been implemented, the only measures are performance based. However, if a decision is taken, such as buying spares to maintain a system for another five years, there is no measure if the system was maintained for an additional five years and no assessment if the right number of spares were purchased.

Addressing requirement 2: To evidence how Network Rail manages obsolescence of its signalling assets i.e. there is sufficient equipment in reserve or in the supply chain to sustain conventional signalling maintenance, refurbishment, and renewals to meet the demands of conventional signalling degradation over the next 30 years. We also considered the existing knowledge base and skillsets required in the context of an ageing assets base. Based on the findings above the obsolescence risk management process is in an immature state and that enterprise risk is not well understood. The Independent Reporter cannot identify that there is sufficient equipment and skills to meet the demand for conventional signalling over the next 30 years.

Key requirement 1 summary: How do the processes and governance of obsolescence associated with Network Rail's signalling programmes work across Network Rail's national functions and regions? What are the differences across regions? Based on the findings above the process for managing obsolescence is in an immature state with a lack of ownership. Regions are managing signal portfolios in a similar way except for the Eastern region that has a more devolved structure with more authority in the routes.

3.1.10 Recommendations

Table 15: Recommendations for process and governance (source: GHD)

ID	Recommendation
R1	The critical aspects of signalling obsolescence need to be defined and incorporated into the asset policy in line with the recommendations below:
R1.1	There should be a representative with clear accountability and resources to manage, monitor, evaluate and coordinate obsolescence activities. They will be accountable for setting and enforcing the obsolescence strategy that will be followed by the whole organisation including the responsibilities of the regions, Supply Chain Operations (SCO) and Technical Authority [4].
R1.2	The relevant obsolescence management skills for those involved in the obsolescence management process should be defined for each role and suitable competency management in place with training provided where necessary.
R1.3	Based on the aims of the obsolescence strategy, key performance indicators should be used to demonstrate the effectiveness of the obsolescence management activities and feed into a continuous improvement process. The specific metrics should be defined by Network Rail, however, may consider including the percentage of asset types with an up-to-date management plan in place and the effectiveness of the plans.
R2	Plans for identifying, managing, and mitigating the risk of obsolescence should be developed.

[4] The scope of this report is only signalling assets, however, consideration should be given to whether it is appropriate that this representative is responsible for all obsolescence management within Network Rail.

ID	Recommendation
R2.1	A high-level assessment of obsolescence risk should be caried out against signalling asset classes (e.g. Interlocking, train detection etc.) to understand where the risk of obsolescence currently resides. This should consider the likelihood and impact of obsolescence and must consider items that are yet to enter obsolescence. This would need input from the regions, Technical Authority, and Supply Chain Operations (SCO).
R2.2	Obsolescence management plans should be implemented based on the principles and guidance of BS EN IEC 62402 for the highest risk items (as identified by R2.1).
R2.3	Decisions taken around obsolescence resolutions should be recorded including what options were considered, the expected costs and risks associated with the different options. This record should be proportionate to the risk being managed and the cost of the resolution.

3.2 Programme planning and alignment

3.2.1 Introduction

This section addresses REQ1, REQ1.1 & REQ1.2 and KR2 of the Independent Reporter's mandate primarily through data led analysis, and considers the following topics:

– Tools and process.
– Application and evidence of the asset remaining life of conventional signalling assets and whether it has been mapped to regional / national signalling programmes over the next 30 years.
– Planning and evidence in terms of how conventional signalling programmes have been mapped to digital enhancements and the Long-Term Deployment Plan (LTDP).
– Delivery and evidence of the principles of effective delivery and whether the strategies align future modernisation.
– Factors influencing deferral.

Conclusions reached in relation REQ1, REQ1.1 & REQ1.2 and KR2 are provided at the end of the section, followed by the Independent Reporter's recommendations.

3.2.2 Tools and process

To evidence the asset remaining life (ARL) of conventional signalling assets, and whether it has been mapped to regional and national signalling programmes over the next 30 years, we looked at applied ARL and how the information is collated and assessed.

To understand and evidence this requirement, signalling condition within the infrastructure owner is assessed through the Signalling Infrastructure Condition Assessments (SICA) process:

– This provides a structured approach through sampling assets within an interlocking area. It answers a set of objective questions regarding physical condition, operating environment, reliability, and maintainability. Each element of the system such as signals, or interlocking is then assessed separately and a condition score for each element is determined by averaging the condition score of each asset sampled.
– SICA is carried out at two levels of detail, primary SICA assessments (SICA1) are suitable for areas with a high remaining life and are at a simplified level of detail. The more detailed secondary (SICA2) assessments are targeted at assets closer to anticipated point of life expiry. The timing and detail of condition assessments reflects the previously assessed condition, typically every five years, with more detailed and frequent assessments undertaken on those assets in the poorest condition.
– A weighted average of condition scores is then used to determine subsystem scores and derive target renewal dates as the best time for an asset renewal intervention to allow continued safe operation.

Previous assessments of ARL across the signalling workbanks relied on a large proportion of SICA1 assessments. An assessment has also been undertaken by Independent Reporter on SICA[5]. Our study found that there is a much larger dataset of SICA2 and repeat SICA2 assessments. We note Network Rail has been able to track and measure actual rates of change more accurately. A recent Network Rail analysis of how these SICA scores vary with subsequent assessments showed many existing target renewal dates were revised to later dates throughout asset lives, suggesting that original target renewal dates from SICA scores were inaccurate. It can be expected that some assets will degrade at rates different than initially assessed, however, when target renewal dates are often revised on a large scale this presents a significant challenge in accurately forecasting a long term workbank.

To understand and evidence this requirement, RailBI is the primary tool used in forecasting the long term workbank plans:

[5] Note previous SICA report by IR: https://www.orr.gov.uk/sites/default/files/om/sica_report.pdf

– RailBI uses target renewal dates (including those that have been revised) from SICA scores to provide a long term forecast of signalling interventions. This means the available data on remaining life is used as a key driver in developing future signalling workbanks. Rail BI enables the alignment of conventional signalling and future modernisation works as both are included and forecast within the tool. However, as the potentially inaccurate target renewal dates from SICA scores are used as a primary building block in developing the Rail BI workbanks, this raises challenges about the accuracy of the forecasts into the longer term.
– Route engineers can review the target renewal dates in Rail BI and apply more detailed recent knowledge, producing revised target renewals dates according to asset knowledge and engineering judgement beyond what is captured in the SICA scores. Although this is typically the case for years in the current or following Control Periods only and not the longer term.

Beyond commentary in Rail BI and the deferred renewals registers, which are discussed later in the report, there was no clear evidence of these decisions being recorded in a manner that would enable future learning or reflection.

3.2.2.1 Topic conclusion and findings

We conclude that the ARL identified by the SICA process is mapped to future work through RailBI. There are, however, limitations to the SICA tool, feedback provided suggested that SICA is a mid-life tool rather than an end-of-life tool and that it is more suited to how mechanical and electro-mechanical equipment fails progressively over time rather than how electronic equipment fails in a more abrupt manner.

Table 16 Tools and process findings

ID	Finding
F19	SICA is used to measure and record the asset remaining life of signalling assets within an interlocking area
F20	RailBI incorporates the target renewal dates from SICA into workbank planning

3.2.3 Application

The review sought to understand and evidence the mapping of the ARL of conventional signalling assets, to regional and national signalling programmes over the next 30 years. Essentially, how the information is applied. Figure 3, below, reflects the Rail BI workbank and policy of life extension until ETCS re-signalling is planned for delivery. The analysis (see overleaf) shows:

– A peak in CP8, CP9 and CP10, which aligns with the target renewal dates from SICA scores.
– The time left until the target renewal date of a subsystem is its ARL. ARL represents an average of signalling condition across the relative regions' subsystems that are approaching their target renewal dates. These subsystems are typically where the greatest condition-related risks exist and would be expected to have renewals planned with a greater level of confidence.

The proportion of signalling systems with fewer than five years ARL can be used as a leading risk indicator and in part to consider the sustainability of the overall workbank. In reviewing data provided on ARL we observed that:

– Figure 4, below, shows that the peaks in a percentage of the asset base with fewer than five years ARL (at a regional and national level) align with the Long-Term Deployment Plan and Rail BI workbank.
– Where there is a peak in accrued activity volumes in CP8, CP9 and CP10, there is a correlating reduction in the percentage of asset base with less than five years ARL in the same control periods.
– This occurs at a point where the change in ARL reflects the move to a technology with shorter expected lives, albeit with lower costs to renewal.

3.2.3.1 Topic conclusion and findings

Actual renewals are affected by several factors, however, we conclude that the map of applied asset remaining life data does imply that this is being fed into a thirty-year period and mapped to various enhancement and renewals components.

Table 17: Application findings (source: GHD)

ID	Finding
F21	Our analysis shows that the Rail BI workbank and policy of life extension until ETCS re-signalling is planned and mapped for delivery with a peak in CP8, CP9 and CP10 aligning with the target renewal dates from SICA scores.
F22	The proportion of signalling systems with fewer than five years of asset remaining life peaks alongside peak volumes in CP8, CP9 and CP10. This is mapped and applied.

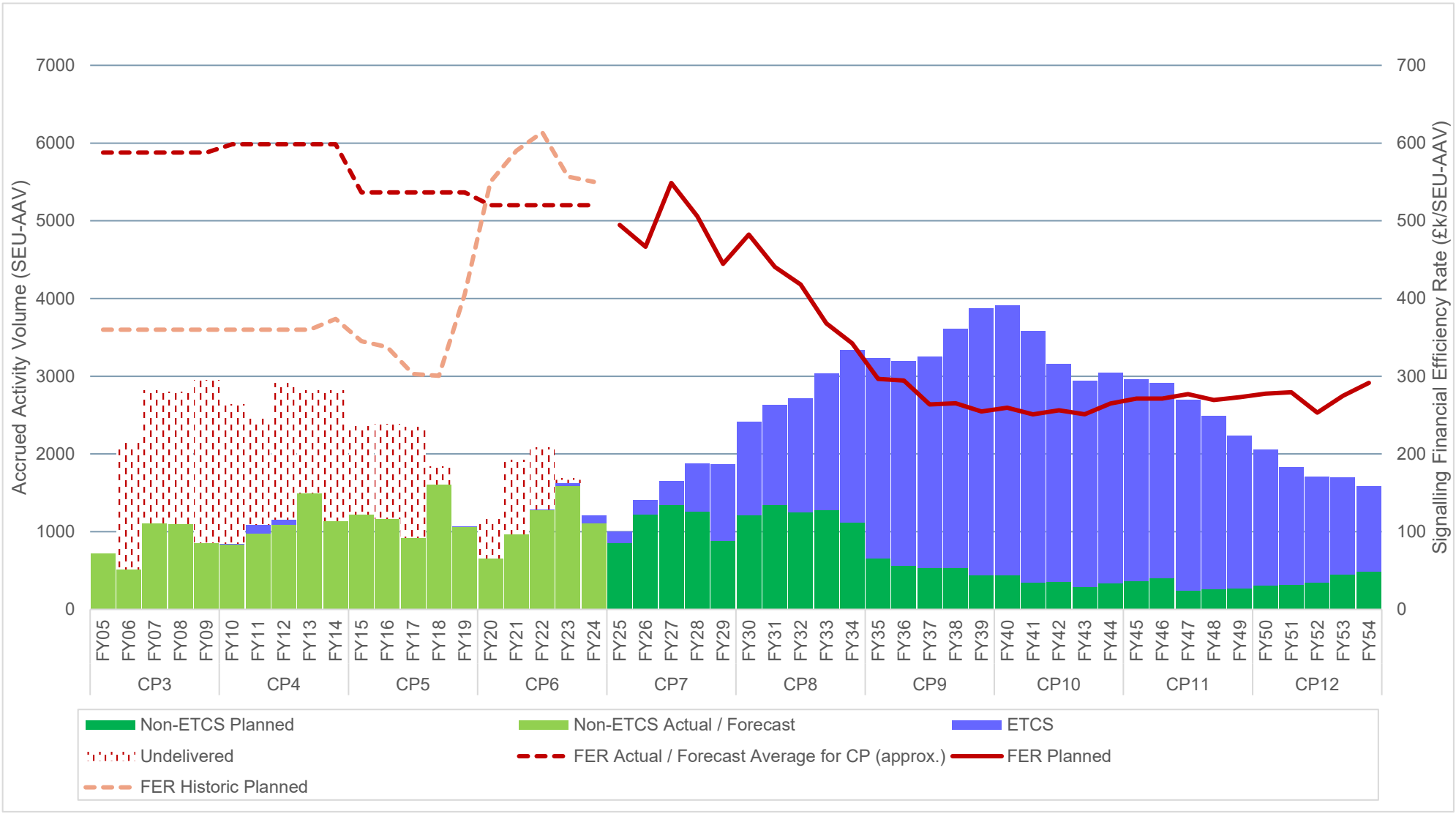

Figure 3: Signalling Equivalent Units - Accrued Activity Volumes CP3 - CP12 (Source: Rail BI reflecting regions' strategic business plan CP7 Submission)

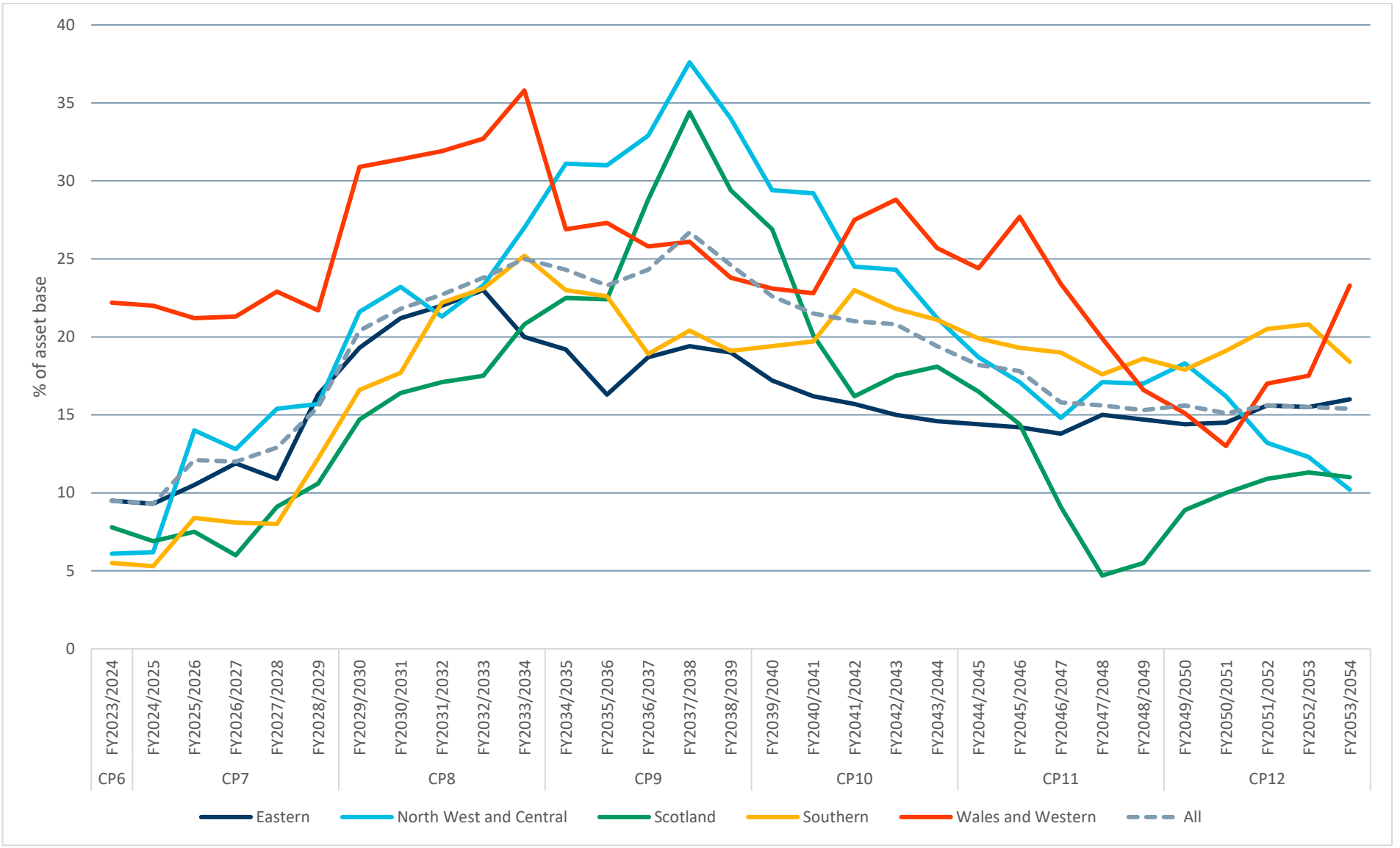

Figure 4: Percentage of Asset Base with fewer than 5 years ARL by Region (source: Rail BI)

3.2.4 Planning

The review sought evidence of how conventional signalling programmes have been mapped to digital enhancements and the Long-Term Deployment Plan (LTDP). Table 19 overleaf, illustrates that the percentage change of ETCS schemes grew across CP7. This trend develops from a small proportion, to almost fifty percent of all SEUs by the end of the Control Period. We note that ETCS is the predominant renewal type from CP8 onwards.

Table 19 also illustrates how the quantity of ETCS renewals delivered each year significantly increases from less than a hundred per year at the end of CP6 to almost 3,500 by the end of CP9. Table 19 also illustrates how the quantity of ETCS renewals delivered each year significantly increases from fewer than a hundred per year at the end of CP6 to almost 3,500 by the end of CP9.

The trend depicts that renewals are being led by train fitment and then aligned with target renewal dates. In consultation with the regions we evidenced considerations related to the ability for the supply chain to deliver, as well as the criticality of the route being embedded into the planning. The evidence further highlights the significant change in forecast volumes for CP8 across all regions, with the Eastern region representing a 238% increase (Table 20 overleaf) between CP7 and CP8. There are very few cases where the percentage change at a regional level is less than 10% and only two cases where the percentage change at a national level is less than 5%. In both cases this is due to the significant changes of regional volumes averaging out at a national level.

3.2.4.1 Topic conclusion and findings

We conclude that digital enhancements and the output of the Long-Term-Deployment-Plan have been planned and mapped in RailBI.

Table 18: Planning findings (source: GHD)

ID	Finding
F23	The use of SICA ensures asset remaining life of conventional signalling assets is a foundation in forecasting regional and national signalling programmes. Through Rail BI, remaining asset lives forecast the timing of digital enhancements and alignment to the Long-Term Deployment Plan. The known limitations of SICA target renewal dates means it does not provide full confidence in accurately forecasting the long term workbank presented in Rail BI. The current forecast can be used with a certain degree of confidence in identifying the trend for and increase volumes and an ageing asset base. However, because of the limitations it is not possible to state with full confidence when the peaks of this trend will occur or how long they will last.

Table 19: Percentage change of forecast national ETCS SEU-AAVs by financial year (source: Rail BI)

	CP6			CP7						CP8				CP9					CP10
Year	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40
SEU-AAV	16	41	98	145	187	311	617	989	1,196	1,284	1,462	1,756	2,219	2,577	2,637	2,719	3,077	3,431	3,469
% Change																			1%

*Table 20: Percentage change of forecast Regional SEU-**DAVs for all signalling interventions, including major enhancements per Control** Period (source: Rail BI)*

	CP6		CP7		CP8		CP9		CP10		CP11		CP12	
Region	SEU	Perc % Change	SEU	Perc % Change	SEU	Perc % Change	SEU	Perc % Change	SEU	Perc % Change	SEU	Perc % Change	SEU	Perc % Change
E	2,286	-	1,714	-25%	5,796	238%	5,482	-5%	5,152	-6%	2,824	-45%	1,727	-39%
Nc	1,384	-	1,806	30%	3,117	73%	4,355	40%	4,631	6%	3,604	-22%	3,323	-8%
Sd	823	-	551	-33%	1,263	129%	1,641	30%	2,658	62%	2,181	-18%	1,023	-53%
Sn	1,241	-	1,536	24%	2,250	46%	3,017	34%	2,816	-7%	2,592	-8%	3,210	24%
W	623	-	707	14%	1,612	128%	2,288	42%	2,066	-10%	2,255	9%	475	-79%
National	6,357	-	6,315	-1%	14,039	122%	16,782	20%	17,323	3%	13,456	-22%	9,758	-27%

3.2.5 Delivery

The principles of effective delivery and the strategies that align future modernisation, and Network Rail's associated required volumes, is a factor that the Independent Reporter analysed. A key factor analysed was the sustainability of the work to be delivered based on the evidence presented.

Figure 3, in section 3.2.3, indicates historic volumes of planned works were undelivered through CP3 to mid CP6. This is understood to be due to a more expensive unit rate, as measured by Financial Efficiency Rate (FER), than anticipated for these control periods, where the FER did not fully account for add-ons. Add-ons are items that are needed on a site-by-site basis but sit outside the SEU rate this includes items such as insulated block joint recoveries, signal box demolition, asbestos removal etc. Therefore, historical works that incurred add-ons led to the available budget delivering less than forecasted volumes.

It is understood work has since been undertaken to account for add-ons in the forecast FER for CP7 to CP12. The forecast volumes in CP7 through to CP12 increase to a level significantly beyond anything delivered in the last 15 years. This is driven in part by an increasingly efficient FER, however, it has not been possible to validate the forecasted efficiencies during this review.

Principles included in the Signalling Long Term Deployment Plan state the maximum volumes of works deliverable for digital and conventional signalling schemes are 3,000 SEU per annum and 1,800 SEU per annum respectively. The plan states the values for conventional volumes are based on NR experience, whereas ETCS volumes are estimated to increase due to a reduction in lineside infrastructure to 3,000 SEUs from a total of ten delivery teams each having a capability of 300 SEU per year.

Analysis Figure 3 highlights there is not a single financial year where 1,800 SEU AAV of conventional signalling schemes were delivered between CP3 and CP6. This suggests that the estimate of 1,800 SEUs are deliverable for conventional signalling schemes, as part of the Long-Term Deployment Plan, may not be accurate or achievable.

Appendix B of the Long-Term Deployment Plan provides further detail of assumptions made to have a delivery capability of 3,000 SEUs of ETCS per year:

– Proposed ETCS deployment would not be as complex in the same way as conventional signalling programmes as the existing infrastructure should support ETCS fitment without substantial remedial work.
– Delivery teams will be able to concurrently commission one project each year whilst developing the project to be delivered the following year.
– Access is available and would be limited to white periods, mid-week nights with minimal blockades / long weekend possessions.
– Standard scopes / designs would be available for ETCS implementation e.g., similar to original Modular Handbook.
– Remits and funding are available to support timescales e.g., development to support delivery in later control periods.
– Industry buy-in is achieved e.g., network change and common approach to driver training.
– Supply chain resource is available.

These assumptions appear optimistic and have not been validated that they can be achieved. Table 20 shows the averaged SEUs – Delivered Activity Volumes (SEU-DAV) forecast by region for each Control Period from CP6 to CP12, inclusive of conventional signalling programmes and ETCS. This highlights a significant increase in volumes across all regions following CP6, peaking in CP8, CP9 and CP10.

3.2.5.1 Topic conclusion and findings

The Independent Reporter concludes that if it is possible to renew 3,000 SEUs per year, then there is still several years from the end of CP8 to the middle of CP10 that this limit is exceeded. This is a known issue and has been caused by renewals initially planned for CP7 being deferred during business planning work but not yet replanned in CP8 and CP9 to avoid these peaks. However, if work in CP8 and CP9 is delayed this will have an impact on the quantity of assets that are life expired but remain in use on the network and a subsequent impact on safety and reliability.

Effective delivery of Network Rail's conventional signalling programmes (including, maintenance, refurbishment, and renewals) and strategies alignment to future modernisation needs to radically address the potential for CP8 & CP9 deferrals.

Finally, multiple other factors such as limited sources of material supply, an ageing asset base, and regional highlighted skill shortages also challenge the LTDP assumption.

Therefore, the significant peak of work currently forecast for CP8, CP9 and CP10 is likely to be unachievable.

Table 21: Delivery findings (source: GHD)

ID	Finding
F24	Historical evidence suggests the significant peak of work currently forecast for CP8, CP9 and CP10 is likely to be unachievable. There is a risk in developing longer term plans that rely so significantly on forecasted efficiencies of FER and an optimistic ETCS delivery capability of 3,000 SEU per annum.
F25	The quantity of work planned for CP8 and beyond needs to be replanned to smooth the curve but the increase from CP7 and CP8 by 122% and continued growth until CP10 is predicated on the efficiencies of ETCS renewals.

3.2.6 Factors influencing deferral

NR/L2/HAM/02201 issue 6 - Management of the Risk Arising from Deferred Renewals defines the business process to mitigate the risks arising from a re-scheduled prioritised renewal or an incomplete delivery of the scope of a renewal. The standard requires any work not planned or delivered by the "need" date to be recorded as a deferred renewal in a deferred renewals register. Rail BI also has the capability to record reasons behind changes made to the forecast plan.

If a signalling subsystem is planned for renewal later than two years from its target renewal date, this is an asset policy exceedance and an indicator of potential risk to safety and performance. Regions may exercise engineering judgement and plan to renew subsystems earlier than two years from target renewal because of technical drivers for system renewal, deliverability needs, or drivers that have not accounted for in the SICA target renewal date. It is understood more detailed reviews of renewals have shown that the schemes planned in CP7 are critically required, even if this is not necessarily reflected by the original SICA target renewal dates.

Where a deferred renewal has been identified, the regional engineers are required to undertake an appropriate risk assessment and instigate the required mitigations. The risk assessment should consider the safety, performance, financial, asset management, and reputational risks associated to the deferral and record this assessment in the deferred renewals register. NR/L2/HAM/02201 also includes an escalation process for unmitigated risks and a requirement for regular review by the Director of Engineering and Asset Management (DEAM).

The registers provided by Scotland region and East Coast Route did not demonstrate clear evidence of the NR/L2/HAM/02201 issue 6 risk assessment being completed and recorded. The East Midlands route register included a clear structure that aligned to the risk assessment requirements of NR/L2/HAM/02201 issue 6, although the risk assessment was incomplete for more recent entries in the register. Deferred renewals registers of other routes and regions were not received in time to be reviewed for this report. Without a record of why renewals have been deferred and the assessed risks and mitigations for them, the rationale for decision-making is not clear and it is not possible to reflect if they were appropriate. Furthermore, it does not allow others to assess and revise the decisions at a future point, for example, if a different role became responsible for the decision making or if new information came to light that could be used in the decisions making.

Table 22: Key regional differences for the deferral registers (Source: Network Rail)

Region	Key regional differences
E	– East Cost route: Structure of register did not align to requirements of NR/L2/HAM/02201 issue 6, with no information included on reasons for deferring.

Region	Key regional differences
	– East Midlands route: Register structure clearly aligned to risk assessment requirements of NR/L2/HAM/02201 issue 6. Required information included for historical entries, however, more recent entries not fully populated with reasons and associated risks of deferred renewals. – Other routes did not provide the deferral register
Nc	– No Information provided.
Sd	– Scotland: Structure of register did not align to requirements of NR/L2/HAM/02201 issue 6, however, unstructured information is included on reasons behind deferred renewals, including risks and mitigations where applicable.
Sn	– No Information provided.
W	– No Information provided.

Form workshops held with each region, cost is understood to typically be the primary driver of deferral, as well as condition, performance, and engineering judgement. The Signalling Decision Support Tool presents data from FMS, Ellipse and SSADS in an Oracle BI interface, ranking the relative reliability and condition of interlockings to support decision making.

3.2.6.1 Topic conclusion and findings

While we were given feedback on the different factors that influence deferral during discussions with the regions, we were unable to carry out analysis due to a lack of visibility of the deferred renewal registers. During discussions the factors discussed included financial constraints and availability of supply chain.

Table 23: Factors influencing deferral findings (source: GHD)

ID	Finding
F26	There is a Network Rail process for managing deferred renewals, however, there is no evidence that this is adhered to across all routes and regions.

3.2.7 Summary conclusions

Addressing requirement 1 (including 1.1 – 1.2): To evidence that Network Rail is delivering its conventional signalling programmes (including, maintenance, refurbishment, and renewals) effectively so that strategies are aligned to future modernisation. Asset remaining life has been mapped to the regional and national signalling programmes over the next 30 years and beyond in the RailBI tool using the SICA data as the input for asset remaining life. However, due to the quantity of renewals planned in CP7 and beyond, the number of assets that are going to be renewed beyond their current expected end of life is increasing and is expected to peak nationally in 2037/2038. Over 25% of SEUs will have less than five years to end of asset remaining life and this will peak at over 35% in North West & Central region.

The current level of work planned for CP8 and CP9 has periods where the quantity of work to be delivered is beyond the national capacity of 3,000 SEUs. It is acknowledged that work needs to be replanned but in doing so assets will be in use for longer. This will mean that the peak of ageing assets will likely be later than 2037/2038 and higher than 25% nationally and 35% in the worst affected regions.

The ability to deliver 3,000 SEU renewals a year is also contested as this is based on assumptions that have not been proven to be true or that, if true, could deliver the volumes forecast.

Digital enhancements have been input into RailBI based on rolling stock availability, route priority and supply chain availability. This gives an indication to the regions of when ETCS is expected so they can plan renewals and life extension works that align to the digital enhancements.

Key requirement 2 summary: What factors influence the deferral of maintenance, refurbishment and renewals into future years / control periods and how are these being managed by Network Rail regions to ensure the signalling management programme can be effectively delivered over the next 30 years. There was little data to analyse the reasons for deferrals, however, these are primarily driven by financial constraints. Decisions on what work is deferred or reduced and what must be delivered are taken using professional judgement supported by the decision support tool, stakeholder engagement and route priorities. The current level of work for CP8 and CP9 has periods where the quantity of work to be delivered is beyond the national capacity of 3,000 SEUs. It is acknowledged that work needs to be replanned but in doing so will results in assets aging for longer. The driver for deferral of works is generally financial, however, the decision as to which scheme to defer isn't always clear. There has been very little documentary evidence available as to why individual schemes have been delayed.

3.2.8 Recommendations

Table 24: Recommendations for programme planning and alignment (source: GHD)

ID	Recommendation
R3	Undertake scenarios planning of varying Signalling Equivalent Unit renewal volumes and Financial Efficiency Rates to understand the impact on network safety and reliability in future control periods if the predicted volumes and efficiencies are not achieved.
R4	The DEAMs for each region should ensure that their deferred renewal registers are updated and maintained as per the standard, Management of the risk arising from deferred renewals - NR/L2/HAM/02201 issue 6
R5	Incorporate obsolescence risk into the asset remaining life data in an integrated way to be consistently considered during workbank planning.

Appendices

Appendix A

Statement of works

Independent Reporter Framework

Statement of Works

	COMMISSION INFORMATION
Project Name:	Conventional Signalling and Obsolescence Management
Bravo Contract Number:	#35840
Network Rail Contact:	Michael Chu
Network Rail Department:	Planning & regulation
Date Raised:	25/01/2023
SoW Number:	[insert SoW number – C&P only]
Network Rail PO Number:	[insert NR PO# when available]
Commission Value:	[insert the SoW value after this has been agreed with the supplier]
Supplier Name:	[insert the name of the selected supplier after appointment]
Main Supplier Contact:	[name and email address of the main supplier contact]

This Statement of Work (SoW) is the contractual vehicle for defining, authorising, and commissioning a piece of work to be undertaken under the Independent Reporter Framework. The SOW has six sections:

– Commission Information
– Commission Overview
– Scope of Services and Deliverables
– Knowledge Transfer
– Commercial Details
– Performance Measurement

This SoW is entered into under and in accordance with the terms of the Independent Reporter Framework dated 1 February 2020 between Network Rail, the Office of Rail and Road, and the Supplier and includes and incorporates any special Terms and Conditions and any other amendments captured in this SoW. Any dispute surrounding this SoW will be resolved in accordance with the Terms and Conditions outlined in the Framework Agreement. Ownership and use of any Intellectual Property Rights shall be in accordance with the Framework Agreement Terms and Conditions. Change control procedures are to be applied as set out in the Terms and Conditions of the Framework Agreement.

COMMISSION OVERVIEW	
2.1 Background	Periodic reviews are one of the principal mechanisms by which ORR holds Network Rail to account and secures value for money for users and funders of the railway. The 2023 periodic review (PR23) will determine what Network Rail must deliver in control period 7 (CP7) and the funding it requires to do this. As part of our analysis for PR23 we require an assessment of Network Rail's management of its conventional signalling systems including its management of obsolescence and planned interventions. ORR regularly meets with NR regions to discuss how they manage their signalling systems. However, our information is limited in certain areas and this commission will inform our PR23 work and support our existing knowledge.

2.2 Business Objectives and Priorities	The commission will support ORR's work on PR23 and its review of Network Rail's signalling systems including its obsolescence management processes. This Independent Reporter (IR) commission is needed: – to evidence if Network Rail is delivering its conventional signalling programmes (including, maintenance, refurbishment, and renewals) effectively so that strategies are aligned to future modernisation. The commission should evidence how: – the asset remaining life of conventional signalling assets has been mapped to regional / national signalling programmes over the next 30 years; and – how conventional signalling programmes have been mapped to digital enhancements and the Long-Term Deployment Plan (LTDP). – to evidence how Network Rail manages obsolescence of its signalling assets. We require: – evidence that obsolescence risk is managed appropriately, i.e., there is sufficient equipment in reserve or in the supply chain to sustain conventional signalling maintenance, refurbishment, and renewals to meet the demands of conventional signalling degradation over the next 30 years. The reporters' findings will be used by ORR to support our views in our PR23 determination.
	3 .0 SCOPE OF SERVICE AND DELIVERABLES
3.1 Key requirements	In addition to the overall requirements set out in section 2.2 we require the independent reporter to provide evidence in the following areas: 1. How do the processes and governance of obsolescence associated with Network Rail's signalling programmes work across Network Rail's national functions and regions? What are the differences across regions; and 2. What factors influence the deferral of maintenance, refurbishment and renewals into future years / control periods and how are these being managed by Network Rail regions to ensure the signalling management programme can be effectively delivered over the next 30 years. We would expect both national function and regional factors to be considered when addressing the above areas.
3.2 Key skills	Bidders will need to demonstrate how they meet the key following skills and experience: – have access to suitable tools and software to provide the detailed analysis – technical experience and application of signalling – capable of producing a reliable and efficient method for analysis and assessment – the ability to work collaboratively with key stakeholders at all levels
3.3 Key deliverables	Timescale for delivery: 8 weeks: March 2023 to April 2023. – A final report by early April that evidence Network Rail has sufficient and appropriate capability, processes, and governance to manage its conventional signalling management programmes across its organisation (including national functions and regions) – A draft report (for comment by Network Rail and ORR) by the end of March* covering the finding and recommendations as per final report requirements – A presentation of draft findings and any recommendations to be discussed at a meeting with Network Rail and ORR – Weekly progress update reports (and / or meetings where appropriate) highlighting risks and key issues for escalation *Note: ORR requires the initial findings by the end of March to inform the draft determination for CP7.
3.4 Proposed approach	[Demonstrate and detail the proposed approach for the project, covering all areas of the projects scope and clearly state the requirement(s)
3.5 Schedule & timings	Contract Start Date: 6th March 2023 Contract End Date: 5th May 2023

Appendix B

Stakeholders engaged

Stage	Stakeholder & Discipline	Date
Phase 1A – Initial Regional Engagement	Scotland Region NR Southern Region NR Northwest & Central NR Eastern Region NR Wales & Western	20th March 20th March 20th March 20th March 20th March
Phase 1B – Reviewal of Obsolescence & ARL data	NR Central (Dan Paxton) NR Central (Paula McKenzie Persson)	20th April 5th April
Phase 2A – Further Network Rail Engagement	Scotland Region (Lynsey Hunter) NR Southern Region (David Fleming & Paul Percival) NR Northwest & Central (Imtithal Aziz) NR Eastern Region (Adam Lowery, Adrian Moss & Dan Heeley) NR Wales & Western (Dave Corkett, Ian Ettle, Matt Redstone	25th April 21st April 21st April 21st April 21st April
Phase 2B – Mapping of asset life & obsolescence to future works	NR Central (Dan Paxton)	12th May

Appendix C

References

Ref	Doc Name	Description	Date received
EV1	2387RAMD01 SICA Functional Specification	SICA Functional Specification	27/03/2023
EV2	Appendix A Data Loggers	Data Logger OMP appendix	30/03/2023
EV3	Critical Obsolete Assets -20-08-20	Obsolescence Register	30/03/2023
EV4	Draft CS RI Healthcheck Report WROC v1.1	Wales ROC Health check report	12/04/2023
EV5	Draft Obsolescence Policy - 10 January 2023	Obsolescence Policy Draft	30/03/2023
EV6	NR/L1/SIG/50021/06 Future Control, Command and Signalling Policy	Standard	27/03/2023
EV7	NR/L2/SIG/13251 Signalling Infrastructure Condition Assessment (SICA) Handbook	Standard	27/03/2023
EV8	Re: Signalling Obsolescence RFI-1 Initial Request	Email response from Paula McKenzie Persson	30/03/2023
EV9	RFI1 - Initial Request DAP	responses to RFI 1	27/03/2023
EV10	SICA3 Manual	SICA User Manual	27/03/2023
EV11	Signalling Obsolescence Management Process (to be) v3	Obsolescence Process flowchart	27/03/2023
EV12	Signalling Obsolescence Management Strategy	Signalling Obsolescence Management Strategy	27/03/2023
EV13	SSADS-Export Western	Export from SSADS tool	12/04/2023
EV14	SSI Obsolescence Phase 2 Report - Interim Issue 01	SSI Obsolescence report	23/03/2023
EV15	Template Obsolescence Management Plan Network Rail EXAMPLE Dataloggers	Template OMP	30/03/2023
EV16	Health check - York ROC SoW v1.0	Scope for York Roc Health check	13/04/2023
EV17	NR-SR-SEP-001	Southern Region Signalling Equipment Policy	12/06/2023
EV18	Primary-KT-BopeepJunction-07022023	SICA method and the software	11/04/2023
EV19	SICA3 manual	The assessment method/software operator is using. Signalling Infrastructure Condition Assessment	11/04/2023
EV20	Southern Region Asset Renewals Strategy v2.1	Train fitment plan for ETCS	11/04/2023
EV21	Southern Region SICA Application_	Review of existing signalling infrastructure condition assessment	11/04/2023

Ref	Doc Name	Description	Date received
EV22	06a - 22_23 P13 PA	Signalling Product Acceptance Brief	13/04/2023
EV23	Alstom Support Report Q3 22	Customer Support Report Signalling Equipment	13/04/2023
EV24	Aster TC ID	Track Circuit ID's	13/04/2023
EV25	EC Extract of SICA Plan 22-23	SICA Plan	13/04/2023
EV26	EM 2023 SICA WORKBANK	SICA Workbank	13/04/2023
EV27	PHOTO-2022-07-04-16-56-25	Signal Box Brochure Installations	13/04/2023
EV28	PHOTO-2022-07-04-16-56-26	Signal Box Brochure Installations	13/04/2023
EV29	PHOTO-2022-09-22-07-28-02	Signal Box Brochure Installations	13/04/2023
EV30	Resonate Q3 22-23 October 22 - December 22 Report	Signalling Equipment Support Services Contract Status Report	13/04/2023
EV31	Siemens Q1 21 22 April - June 21 - NR Products - Obsolescence Report July 2021 (002)	Obsolescence Report July 2021	13/04/2023
EV32	Siemens Q3 22-23 October 2022 - December 2022 Report	Supplier Report Template for Signalling Support Contracts (Siemens)	13/04/2023
EV33	SPX - Flow Q3 2022 SESS Report Rev 00	Supplier Report Template for Signalling Support Contracts (SPX)	13/04/2023
EV34	SIGBOX BROCHURE-1	Signalling Box Brochure	13/04/2023
EV35	Eastern Region Info Request Email	Email Response from Eastern Adrian Moss	13/04/2023
EV36	Health Check - York ROC SoW v1.0	Health Check scope of work – YORK ROC	14/04/2023
EV37	SME & Asset Population	Regional Subject Matter Expert (SME) Support	14/04/2023
EV38	IMG_2196	Depot Sand Pits	14/04/2023
EV39	IMG_4017	Depot Sand Pits	14/04/2023
EV40	Certificate of Acceptance Template 7.2 (4)	Template of the PA certificate	18/04/2023
EV41	Asset Performance Strategy v1.3	NW&C Regional Signalling Asset Performance Strategy	17/04/2023
EV42	Critical Obsolete Assets -20-08-20 (1)	Obsolescence Register	17/04/2023
EV43	TSG Terms of Reference v3.0	Signalling Technology Steering Group slides	17/04/2023
EV44	Asset Management Strategy - Signalling v2	Signalling Asset Strategy CP7 Draft Submission	23/04/2023

Ref	Doc Name	Description	Date received
EV45	Inverness a	Notes for an interlocking area that are showing an obsolescence concern	21/04/2023
EV46	Inverness b	Notes for an interlocking area that are showing an obsolescence concern	21/04/2023
EV47	Oyne and Gartly Project Requirements Document DRAFT	Capital Delivery draft document of a SICA analysed level crossing life expired obsolescence risk	23/04/2023
EV48	Perth	Notes for an interlocking area that are showing an obsolescence concern	21/04/2023
EV49	PSICA-SC-Inverness - a-10052018	Site SICA outputs/ assessments.	21/04/2023
EV50	PSICA-SC-Inverness - b-10052018	Site SICA outputs/ assessments.	21/04/2023
EV51	PSICA-SC-Yoker-19112018	Site SICA outputs/ assessments.	21/04/2023
EV52	SSICA-SC-Perth-17032021	Site SICA outputs/ assessments.	21/04/2023
EV53	Yoker	Notes for an interlocking area that are showing an obsolescence concern	21/04/2023
EV54	157912 - Padd Train Detection - VM Option Selection - FURTHER for QA 14.._	Value Management Option Selection Workshop Report	23/04/2023
EV55	Draft OBS-002 ATP_REV1	GW ATP Obsolescence Plan	23/04/2023
EV56	MCBOD Mk1 OD Spare Strategy December 2018 v1	MCB-OD RADAR spares strategy	24/04/2023
EV57	NR/L1/SIG/50021/ Signalling Asset Policy	Signalling Asset Policy Standard	26/04/2023
EV58	NR/L1/SIG/50021/02 Signalling Asset Policy - Technology	Signalling Asset Policy Technology Standard	26/04/2023
EV59	NB208	Notice Board 208 - SSI Obsolescence	26/04/2023
EV60	AMCL Review of Network Rail's Whole Lifecycle Costing Framework	previous independent report	23/03/2023
EV61	Sussex SICAs 2023	Summary of SICA Assessments due this year	27/04/2023
EV62	SSADSA ERD & SICA data 20_04_2023	Summary of SICA Assessments	27/04/2023
EV63	NWC Signalling Regional Asset Management Strategy Ver2.1	Signalling Renewals Asset Management Strategy	25/04/2023

Ref	Doc Name	Description	Date received
EV64	Siemens - NR Tech Subgroup 280421	Siemens Obsolescence Management Strategy and work done for NR	25/04/2023
EV65	Bombardier - EBI Track Steering Group v0.1	Alstom/Bombardier EBI Track obsolescence Strategy and status	25/04/2023
EV66	Arentis Limited - NR RAMS Slides	Product Brochure	25/04/2023
EV67	Alstom APSL 2021 Feb_18_SSI_NR_V4	Alstom SSI Current Status and Future (Upgrade to ETCS) Roadmap	25/04/2023
EV68	SSADS ERD & SICA data 20_04_2023	List of Interlocking and Level Crossing assets and next assessment dates	25/04/2023
EV69	Single Source supplier list v0.2 26.04.23 NR FC	List of assets with single supplier source	25/04/2023
EV70	SSICA_LX_WN_Athelney LC_23052022	Site SICA outputs/ assessments.	25/04/2023
EV71	Supply Chain Obsolescence Status Database - 14 May 2021	Obsolescence Status of assets	27/04/2023
EV72	SBP long term workbank volume	Long term workbank volume (2018-2078)	27/04/2023
EV73	Signalling DST_Site Summary - Manchester DU	Site Summary from Decision Support Tool	27/04/2023
EV74	NR Central Email volume of work table	Email Response from Daniel Paxton	27/04/2023
EV75	NR central email describing volume of work	Email Response from Daniel Paxton	27/04/2023
EV76	renewals summary document for initial network plan - V4	Evidence in support of the renewals funding case for CP7 Outlines demand for renewal	27/04/2023
EV77	Signalling templated summary 2022-04-09	CCS-Signalling Requirements for CP7 reassessed view of remaining asset lives	27/04/2023
EV78	AzLM ISDN LTB - Route Spend to Date 26 April 2023	Last time buy data	03/05/2023
EV79	0001-0044517868 AzLM ISDN Obsolescence White Paper	Obsolescence resolution performance evidence	03/05/2023
EV80	2023-02-14-Signalling volume over time R6	Current state of the asset and future asset workbank	11/05/2023

Ref	Doc Name	Description	Date received
EV81	CP7 SPRINT 2 Enhancements Workbank v1-1	List of enhancements provided by Capital Delivery Eastern	14/05/2023
EV82	RFI3 - Regions request_	Eastern's reply to the RACI	10/05/2023
EV83	EV83 CP7 Asset assurance template - Signalling_v2-RALextract	Signalling Asset Assurance of Regional plans	15/05/2023
EV84	20230515_531_5943_LIVE_DATA_AT_DATE_GENERATED_R6_raw_workbank_(4435v28ECWW)_v2_seu_dav_by_regions	Editable graph of volume over 30 years (CP6-12) in the asset workbank most closely aligned to the CP7 SBP submission	15/05/2023

ghd.com

The Power of Commitment