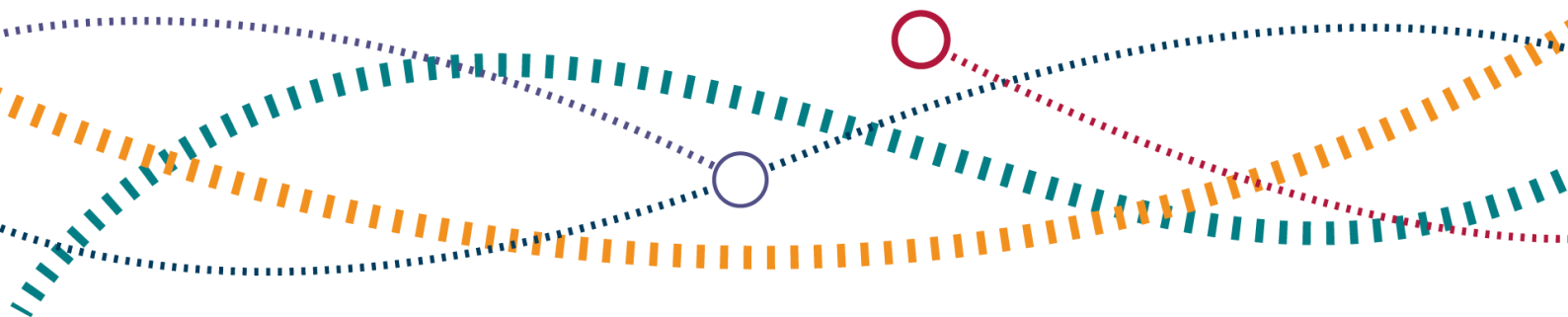




# The Impact of High Speed 2 on Network Rail planned work Targeted Assurance Review

07 December 2021



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# Acronyms and Abbreviations

ATO	Automatic Train Operation
Capex	Capital Expenditure
CP6	Control Period 6
CP7	Control Period 7
CRD	Client Requirements Document
DfT	Department for Transport
EE&AM	Enhancements, Engineering & Asset Management
ETCS	European Train Control System
HS2	High Speed 2 (the railway)
HS2 Ltd	High Speed 2 Limited (the company)
IT	Information Technology
NR	Network Rail
ORR	Office of Rail and Road
PR18	Periodic Review 2018
PR23	Periodic Review 2023
RFI	Request for Information
SRO	Senior Responsible Officer
TAR	Target Assurance Review

# Definitions

**Comprehensive Spending Review** – CSR is a governmental process carried out by HM Treasury to set firm expenditure limits and, through public service agreements, define the key improvements that the public can expect from these resources.

**Control Period** – Network Rail Control Periods are the five-year timespans in which Network Rail work to deliver the determined objectives as set in ORR's periodic review.

**High Speed 2** - HS2 is a new high-speed railway, linking up London, Birmingham, Manchester and Glasgow. It is currently under construction and due for completion from 2030.

**Periodic Review** – 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 PR18 final determination was published on 31<sup>st</sup> October 2018.

**Project Initiation Document** – A Project Initiation Document (or PID) was used by the Project team to define the scope, objectives and workplan for this review at the beginning of the project lifecycle.

**Rail Network Enhancements Pipeline** - sets out the approach for rail proposals that require government funding. This approach creates a rolling programme of investment, focused on outcomes that provide benefits for passengers, freight users and the economy.

**Targeted Assurance Review** – TARs are ORR-led 'deep dives' to gain an in-depth understanding into ongoing or emerging issues, risks and opportunities within Network Rail which could impact regulatory targets. They are a key element of assurance work within the Enhancements, Engineering and Asset Management team in ORR.

# 1. Executive Summary

## 1.1 Purpose

- 1.1 The purpose of this review was to understand if Network Rail (NR) has taken a reasonable approach to assess and manage the impact of High Speed 2 (HS2) on its core business, including;
- How has NR informed HS2 Ltd of additional costs (e.g. additional renewals to support HS2 services)?
  - How has NR agreed apportionment of cost (for HS2 integration works) between funders and what is the rationale?
  - How has NR identified and taken up any opportunities that arise from HS2 works to maximise their planned renewals funding activities?

## 1.2 Background

- 1.2 As part of our role in holding Network Rail to account, we initiated a Targeted Assurance Review (TAR) to assess NR is taking a reasonable approach to managing the impact of HS2 on its business.
- 1.3 HS2 is a new high-speed railway, linking up London, Birmingham, Manchester and Glasgow. Phase One of HS2 is currently under construction and is due for completion from 2030. Phase One of HS2 will see a new high speed railway line constructed from London to the West Midlands. It will then re-join the existing West Coast Main Line (WCML) where services will travel onwards to Liverpool, Manchester and Glasgow.
- 1.4 This assurance activity focussed on the impact of HS2 on remodelling works at Crewe Hub and the existing WCML, north of Crewe (excluding Scotland). HS2 services will run on existing infrastructure from Crewe to Liverpool, Manchester and Glasgow.

## 1.3 Findings

- 1.5 Both Crewe Hub and WCML (North) and are at an early stage of development. The projects are also in different stages of programme maturity WCML (North) is at a very early stage of development and is still

seeking development funding whilst Crewe Hub has been in development for over six years.

- 1.6 In the future ORR may undertake an additional TAR to further understand the potential impact of HS2 materials by rail on NR's assets and the risk and mitigations put in place.

### **Crewe Hub**

- 1.7 There was no central NR guidance on how to propose funding apportionment. However, principles have been agreed between NR and HS2 Ltd that appear reasonable.
- 1.8 The actual split of funding is yet to be agreed, in the future we would seek to review how this aligns to the agreed principles.

### **WCML (North)**

- 1.9 This is at a very early stage of development and it is essential that NR focus on developing the scope and works in time for CP7.

### **Funding**

- 1.10 The works considered in this TAR include both renewal and enhancement of Network Rail's infrastructure. We agree with Network Rail that there are choices for government in how this is funded, as listed below;
- CP7 M&R funding
  - Enhancements
  - Combination of the above
- 1.11 Note this report was written prior to the publication of the Integrated Rail Plan (IRP 18 Nov 21). The IRP confirms that the Crewe to Manchester section of the Western Leg of HS2 Phase 2b should proceed as planned.

## 1.4 Conclusions and Recommendations

- 1.12 ORR is satisfied that Network Rail are taking a reasonable approach to managing the impact of HS2 on its core business. Network Rail has provided comprehensive information to illustrate any additional costs incurred, cost apportionment and identifying any opportunities to maximise planned renewals.
- 1.13 However, the cost estimates are at an early level of development and ORR will require further assurance that these costs are justified and reasonable for our assessment of PR23. These costs will also be reviewed as part of NRs planned assurance process both internally and externally.

## 1.5 Next Steps

- 1.14 Regular engagement is required between Network Rail and ORR throughout CP6 and future Control Periods. This should include any changes to the planned works, cost apportionment and future opportunities.
- 1.15 A subsequent TAR may be required later in the Control Period to;
- continue to inform our understanding of the impact and integration on NR's core business of HS2 including any risk to Timetable changes.
  - Assurance that NR's CP6 & CP7 Operations, Maintenance and Renewals (OMR) forecasts (to inform PR23) consider the impact of HS2 and are based on a fair apportionment of funding.
  - Investigate specific issues related to the impact of HS2 on the network. For example, this could include the impact of transporting materials by rail on Network Rail's infrastructure.

## 2. Introduction

### 2.1 Purpose

2.1 The key objectives of the review were:

- To deliver a report that will inform our understanding of the impact and integration on NR's core business of HS2, including any risk to Timetable changes.
- Assurance that NR's CP6 & CP7 Operations, Maintenance and Renewals (OMR) forecasts (to inform Periodic Review 2023 (PR23) consider the impact of HS2 and are based on a fair apportionment of funding.

### 2.2 Background

2.2 We undertake Targeted Assurance Reviews (TARs) to gain in-depth understanding into ongoing or emerging issues, risks and opportunities within Network Rail (NR) which could impact regulatory targets

2.3 We will also use TARs to inform our evidence base for PR23.

2.4 TARs support our ongoing holding-to-account of NR and supplement our monitoring.

2.5 HS2 is a new high-speed railway, linking up London, Birmingham, Manchester and Glasgow. Phase One of HS2 is currently under construction and due for completion from 2030. Phase One of HS2 will see a new high speed railway line constructed from London to the West Midlands. It will then re-join the existing West Coast Main Line (WCML) where services will travel onwards to Liverpool, Manchester and Glasgow.

2.6 This assurance activity focussed on the impact of HS2 on the existing WCML, north of Crewe. HS2 services will run on existing infrastructure from Crewe to Liverpool, Manchester and Glasgow.



## 2.3 Scope

- 2.7 The scope of the TAR considered Network Rail's CP6 & CP7 OMR forecasts including the relevant workbanks. Also, larger programmes of work were included e.g. Crewe Hub.
- 2.8 The TAR considered the impact of the HS2 Phase 1 on Network Rail's existing infrastructure, on the WCML from Crewe north.
- 2.9 The following areas were excluded from scope:
- (a) The TAR did not assess the impact of HS2 on NR's core business costs. It reviewed if NR is taking a reasonable approach to determining these costs.
  - (b) This TAR did not consider the impact of HS2 on NR's train performance outputs.

## 2.4 Methodical Approach

- 2.10 As part of our role in holding Network Rail to account, we initiated a TAR to assess if NR is taking a reasonable approach to managing the impact of HS2 on its business.
- 2.11 During the first phase of the review, the TAR was discussed with Network Rail's Senior Regulation Lead who was also the key contact for the review. We then arranged an initial engagement meeting with other key stakeholders within Network Rail to introduce the TAR process and set-out the objectives of the review. At this engagement meeting we agreed the deliverables, timescales and key contacts for the review.
- 2.12 Following the meeting, a Request for Information (RFI) was issued that formally requested specific information from Network Rail. See appendix A for details of the RFI.
- 2.13 We had a follow up meeting where Network Rail produced a summary of the information they proposed to submit and how each document corresponded to the RFI.
- 2.14 Network Rail then submitted evidence to the Sharepoint site. The information was reviewed and analysed and queries were dealt with in correspondence.

- 2.15 The draft report was shared with Network Rail and DfT for review and comment before it was finalised and issued
- 2.16 Throughout this process Network Rail were very engaged and worked collaboratively to assist in the production of this document. We would like to thank all those involved for all their hard work and contributions to this TAR.

# 3. Findings

## Funding principles

- 3.1 Within the Protective Provisions Agreement (PPA) <sup>1</sup> there are three types of work for which NR can be reimbursed for, these include;
- HS2 works (on network works) – which include alterations to the existing network and NR assets
  - HS2 related works - additional works during the construction of HS2 which affect the safe and reliable operation of the existing network
  - NR wider works - any works required elsewhere on the existing network specifically to allow HS2 trains to operate as intended
- Capacity and journey time works could be included but HS2 Ltd do not believe that anything is required in these areas that meet the HS2 Sponsors requirements.
- 3.2 No additional funding is provided for existing network renewals (the exception being Crewe Hub) where the work would be undertaken as business as usual.
- 3.3 Power supply upgrades are not funded as HS2 services in Phase 1 & 2a do not create a requirement. However, Phase 2B will necessitate an enhancement due to longer trains but NR will deliver the performance obligations agreed with ORR for the existing network without additional funding or scope from HS2 Ltd. This is an agreement between HS2 Ltd and SoS that assumed performance levels were at the planned exit-CP5 levels.
- 3.4 Crewe Hub is the exception, because HS2 Ltd will contribute to the renewals programme. HS2 requires some layout changes and it is more efficient to deliver as part of the wider programme.

## Readiness Works

- 3.1 Crewe Hub is a Programme of works split into several projects which include signalling renewals, track, OLE, station upgrade, grade-separated junctions and works at 15 level crossings (an ATO/ETCS overlay through

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<sup>1</sup> The scope of what HS2 Ltd is authorised to fund is embedded in a framework of documents of which the PPA is one. This provides an agreement with parties such as NR.

Crewe station is not currently in scope, but the business case is being progressed where funders will need to make the final decision). The current funding is approximately £1.4bn

- 3.2 NR have identified additional readiness works commencing in CP7 which are currently estimated at circa £2.5bn.
- 3.3 The readiness works have been identified based on infrastructure that HS2 services will use, its current condition, capability and planned replacement dates.
- 3.4 The projects have been identified as follows<sup>2</sup>;
- Crewe to Carlisle – from the WCML (North) programme
  - Crewe area – from the Crewe Hub programme
- 3.5 The two programmes of WCML (North) and Crewe Hub are explored in more detail below. It is worth noting that the projects are in different stages of programme maturity WCML (North) is at a very early stage of development and is still seeking development funding whilst Crewe Hub has been in development for over six years.

## WCML (North)

- 3.6 Traction power use on the WCML is due to have reached full capacity prior to the introduction of HS2 and demand will continue to increase when HS2 services run. To accommodate this increased demand, an additional grid supply point, feeder stations and cabling are required to avoid degraded performance when HS2 services are being introduced.
- 3.7 To minimise disruption to passengers and to take advantage of planned disruptive access, the works have been expedited over the next 10 years (the programme originally planned delivery over 10-20 years). To achieve this NR are exploring new technologies and early operator engagement to work in a collaborative way.

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<sup>2</sup> Source NR HS2 TAR data file

- 3.8 Circa £18m<sup>3</sup> is required to progress to Outline Business Case. No funding source is currently secured.
- 3.9 If the works are not taken forward, then there will be regular disruption to passengers while planned works are carried out post HS2 and long diversions or rail replacement buses for large portions of their journey.
- 3.10 Indicative quantities of key asset renewals required over the next 10-20 years include<sup>4</sup>: 2500+ Signalling Equivalent Units, 120+ S&C units, 250+km OLE re wiring, 250km+ Along route track, civils and drainage works.
- 3.11 The most significant cost driver is the re-signalling of Warrington, Preston and Carlisle to ETCS Level 2 (30-40%), then power works (15-20%) and track (also 15-20%). Unit rates (based on workbanks for signalling, power and S&C and proportional uplifts for other asset types, with some benchmarking for power) have been used to develop high level cost estimation at this stage.
- 3.12 As the Programme is at an early stage of development an Optimism bias amount has been included at 66% (in line with Green book<sup>5</sup> guidance).
- 3.13 WCML North is at an early stage of development and the estimate although at a very high level is in line with industry standards.

## Crewe Hub

- 3.14 Crewe is a Programme of works split into several projects, these are <sup>6</sup>:
- Independent Lines and Basford Hall signalling renewal. Required to complete in 2023, NR asset condition renewal, with an interface to the Core and Southern Connection.
  - Core Station Area. This is a multi-disciplinary project, comprising of signalling renewals and recontrol (in the station area), track, OLE, enhancements, which may include station upgrade.
  - HS2 Crewe Southern Connection. A multi-discipline, grade-separated junction to the south of Crewe, where HS2 Phase2a joins the WCML.

<sup>3</sup> Source NR WCML North Programme - Strategic Outline Business Case

<sup>4</sup> Source NR WCML North Programme - Strategic Outline Business Case

<sup>5</sup> The GREEN BOOK – Central Government Guidance on Appraisal and Evaluation

<sup>6</sup> Source Crewe Area Funding Contribution Apportionment Dec 2020

- HS2 Crewe Northern Connection. A multi-discipline, grade-separated junction to the south of Crewe, where HS2 Phase2a joins the WCML.
- Crewe area wider signalling renewals, which includes the renewal of Winsford to Weaver (currently unfunded).
- Level Crossings 15No requiring closure and/or upgrade.

3.15 ATO/ETCS overlay is proposed to be delivered through Crewe station. Currently unfunded beyond GRIP 3.

3.16 The most significant cost driver is Crewe station area. This cost is apportioned between HS2 and NR Renewals funding. Risk is calculated at P80 (42%).

## Crewe Hub Funding Apportionment

3.17 The Projects can be categorised into three areas<sup>7</sup>:

**1. NR funded - Regulatory Settlement** (Independent Lines and Basford Hall signalling renewal, Crewe area wider signalling renewals, Level Crossing)

**2. HS2 Ltd Funded – Business Case Justification** (Crewe Southern Connection, Crewe Northern Connection, Costs associated with building the HS2 mainline)

**3. Jointly Funded by HS2 Ltd and NR** (Crewe Core (station area), Possessions, Programme / Project overheads, NR High Speed S&C approval)

3.18 It has been agreed between all parties that there will be a pragmatic percentage split which would consider who is driving the requirement and who benefits.

3.19 Post GRIP 3 there will be a panel of representatives (from each organisation) who will agree the percentage split based on agreed principles. There has been no early agreement on the percentage split.

<sup>7</sup> Source Crewe Area Funding Contribution Apportionment Dec 2020

# 4. Conclusion and Recommendations

## 4.1 Conclusion

- 4.1 The evidence gathered during this TAR has provided assurance that Network Rail has taken a reasonable approach to determining HS2 costs at an early stage in the development of these works.
- 4.2 We now have a good understanding of how decisions relating to HS2 costs have been arrived at, the process/documentation for apportioning HS2 costs and the process that NR uses to identify and take up any opportunities that arise from HS2 works to maximise their planned renewals funding activities.
- 4.3 Documentation is comprehensive and current e.g. Client Requirements Documents (CRD) for Crewe Hub illustrates extensive stakeholder consultation.

## 4.2 Risks

However, there are some risks to note;

- 4.4 Post-efficient renewals costs in NW&C are due to be 19% higher than CP6 if HS2 readiness is funded.<sup>8</sup>
- 4.5 Post-efficient renewals costs will be 31% higher in NW&C than CP6 if HS2 readiness is not funded.<sup>9</sup>
- 4.6 It should be noted that this TAR did not consider the impact of HS2 on NR's core business costs (Operations and Maintenance) or the impact of HS2 on NR's train performance outputs. There may be other areas that ORR needs further assurance on in the future.
- 4.7 WCML (North) - No funding source is currently secured for the development activity.

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<sup>8</sup> Source NR HS2 TAR Data File

<sup>9</sup> Source NR HS2 TAR Data File

- 4.8 ATO/ETCS overlay proposed to be delivered through Crewe station is currently unfunded beyond GRIP 3.
- 4.9 Based on the existing Train Service Specification (TSS) assumptions in the configuration states (which may change) by 2030 NR expect about 90% of the NR network over which HS2 services will eventually run to be in use (Old Oak Common to Existing Network via Handsacre Jn)<sup>10</sup>. If the works proposed for Crewe Hub and WCML (North) are not taken forward in CP7 then there will be regular disruption to passengers while planned works are carried out post HS2 and long diversions or rail replacement buses for large portions of their journey.
- 4.10 NR has confirmed that although HS2 services can run, there will be implications if they run<sup>11</sup> on the current infrastructure. Additional costs for readiness works will be included in the HS2 Readiness line not the PR23 submission.
- 4.11 NR originally proposed all additional works as an addition to their proposed costs to maintain and renew the network in CP7. It is now considering funding these works as an enhancement, via DfT's RNEP governance. Our view is the works are a combination of maintenance, renewal and enhancement, so there are choices for government in how this is funded.
- CP7 M&R funding
  - Enhancements
  - Combination of the above
- 4.12 The HS2 readiness works provide an opportunity for increased resilience to the infrastructure which will also benefit Anglo-Scot services provided by Transpennine Express and freight operators.

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<sup>10</sup> Source: NR HS2 configuration states summary

<sup>11</sup> Source: HS2 TAR response to ORR



## 4.3 Recommendations

- 4.13 We will continue to engage with Network Rail throughout the remainder of CP6 to monitor and assess the impacts of HS2 on its core business as part of the ongoing PR23 process and obtain updates at each key milestone, next being advice to DfT in spring 2022.
- 4.14 Our recommendation is that NR provides a plan by 31 Mar 2022 on its proposals to seek funding in relation to Crewe Hub and WCML (N) programme alongside the expected benefits and consequences. We expect this to include the effect on Network Rail's core OMR plans for CP7, considering factors such as:
- Whole Life Costs.
  - Deliverability
  - Customer experience
  - Safety
- 4.15 In addition Network Rail should provide further assurance on the potential impact of other aspects of HS2 (such as materials by rail) on NR's assets and the risk and mitigations put in place

## 5. Appendix A

5.1 The below table provides further details of the RFI submitted to Network Rail.

**Table 5.1 Request for Information**

RFI Ref	Request Title	Request Description
HS1	CP6 & CP7 renewals workbanks	Network Rail to provide an extract of the CP6/7 workbanks to identify works which have been impacted by HS2.
HS1a	Accompanying commentary	Network Rail to provide <b>accompanying commentary</b> to assist understanding of the workbanks.
HS2	Documentation	Network Rail to provide Client Requirements Document (CRD), Cost apportionment process and <b>any other</b> documentation to explain how decisions relating to HS2 costs have been arrived at including the process that NR uses to identify and take up any opportunities that arise from HS2 works to maximise their planned renewals funding activities.
HS3	Key contacts	Network Rail to include <b>key contacts</b> for ORR to engage with going forward including Crewe Hub, WCML(North) and Phase1.
HS4	Access to information	Network Rail to provide a list of supporting documentation (where necessary) on how ORR should <b>access information</b> going forward in relation to the requests detailed in this TAR
HS5	Supporting documentation	Any other information which Network Rails deems appropriate to <b>support</b> this TAR.



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