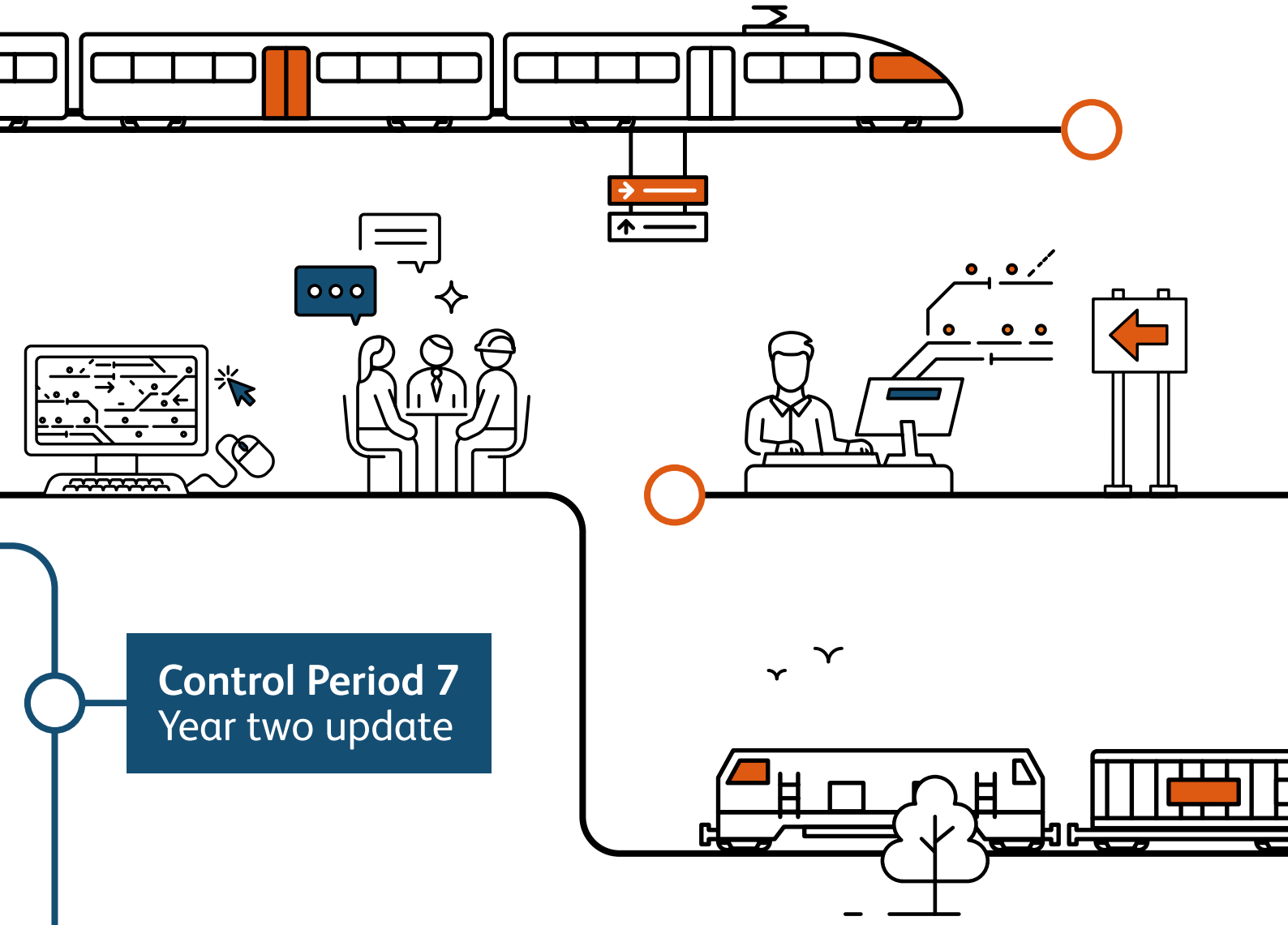
INDUSTRY PARTNERSHIP DIGITAL RAILWAY

NetworkRail

Our delivery plan for Digital Signalling



Control Period 7
Year two update

Foreword

Our Control Period 7 (CP7) Delivery Plan is the start of an ambitious journey to migrate the railway network from conventional signalling, which uses visual indications at fixed points to help drivers regulate their speed, to a digitally-signalled railway using the European Train Control System (ETCS), which relays information directly into a driver's cab and updates it based on the conditions ahead.

Migrating to ETCS brings numerous benefits to passengers and rail operators including a safer, more capable railway, and a reduced cost of replacing the old signalling equipment, making the new system more cost-effective.

However, digital signalling is a step-change in how the railway operates, requiring people to work in different ways, and the fitment of new equipment on board trains as well as on track. All these elements need to be ready before we can switch over to ETCS.

We're already making steps towards this change. In the first year of the Control Period, we've awarded new framework contracts to four signalling partners to deliver digital signalling upgrades over the next 10 years, and we will work alongside them to develop their products so that they can work together consistently across the network. We've continued with work to design, procure materials for and to fit ETCS onboard equipment to the wide range of railway vehicles that use our network across passenger, freight, on track machine and charter and heritage sectors.

Our work on the East Coast Digital Programme, deploying ETCS on the south end of the East Coast Main Line continues, with a start of migration envisaged within the coming financial year. Other digital signalling schemes, such as the TransPennine Route Upgrade and the West Coast North Modernisation have started to mobilise and are working with their new signalling partners to develop their plans.

Working collaboratively, we've continued supporting activities designed to make migration to ETCS easier and more efficient, building in learnt experience from live deployments; clarifying specifications and areas of operational design, mobilising new training initiatives and continuing with programmes such as the Technical Authority's Target 190+ research and development programme, designed to further reduce the unit cost of signalling renewals.

ETCS remains a novel endeavour for the industry, and this, coupled with the need to conclude work from CP6, means it's taken us longer than planned to get started in some areas. We've reforecast certain enabling activity spend into future years, however, we are still on track to achieve the outcomes we expected within this Control Period.

The Industry Partnership Digital Railway (IPDR) team is managing the plan for transition to digital signalling and collaborating with numerous stakeholders to do so. IPDR is changing too, and has moved into the newly-formed strategic innovation body GBRX, which has been established to work through the rail sector's most challenging technological modernisations that exist at the crossroads of track and train, providing a foundation upon which wider rail reform can build.

Toufic Machnouk
Managing director, GBRX

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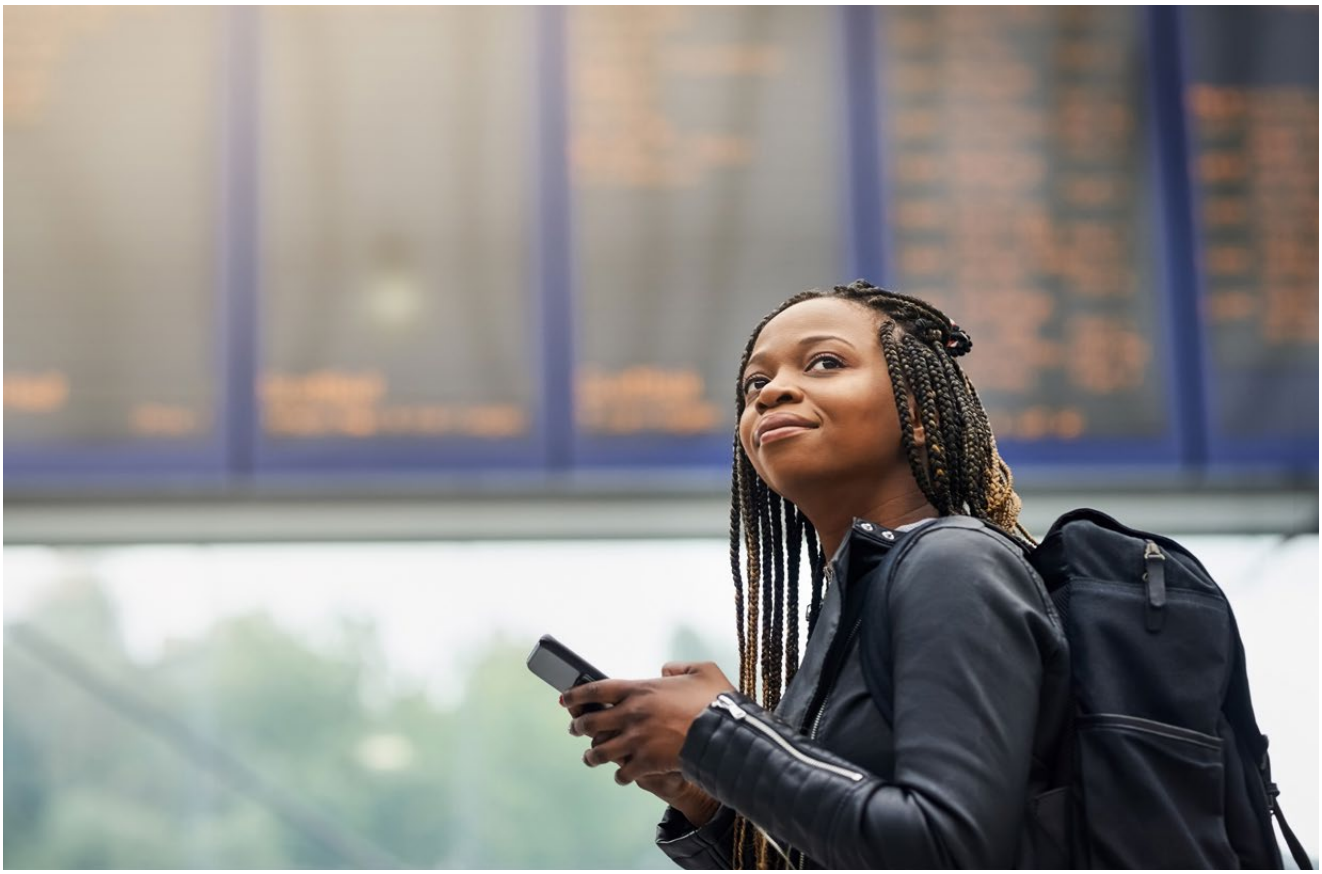


Our CP7 Year 1 outcomes

Our March 2024 CP7 Delivery Plan followed almost three years of evolving planning and analysis as IDPR emerged from the Digital Railway Programme, and we considered, in partnership with our stakeholders, how to prioritise the various elements of our plan, working with funders and the regulator to determine the best approach to the non-infrastructure costs associated with digital signalling.

Delivery plan outcomes 2024-25:

Sustainable growth

- **Awarding the Train Control Systems Framework (TCSF) in April 2024** – expanding the GB signalling market to four ETCS signalling delivery partners with commitments to a pipeline of work for the next decade.
- **Establishing the market application readiness process with the trackside signalling delivery partners** – supporting their product development processes to comply with GB specifications for ETCS.

Efficiency

- **Scoping and procuring the first ETCS fleet modifications for passenger vehicles** – including those required for West Coast North Modernisation, TransPennine Route Upgrade Digital and the Brighton Main Line ETCS deployments and maturing longer-term commercial strategies for fleet modifications for the remainder of the Control Period.
- **Establishing and sharing best practices from experience on East Coast Digital Programme** – including through regular sessions and resources associated with a growing 'learning network' of industry partners involved in various digital deployments.

Safety

Train service delivery

- **Developing our testing facilities** – to manage and be ready to meet the demand from operators and signalling delivery partners to use the range of ETCS test facilities we have available nationally.

Customers & communities

- **Establishing structure and governance across the portfolio** – bringing together our funders, operators, The Office of Rail and Road (ORR), industry bodies, the supply chain and rolling stock companies through structured governance and engagement, so we can best co-ordinate, monitor and govern infrastructure, fleet modification and capability development.

People

- **Planning for the future** – Understanding the impact digital signalling will have on staff across the industry, and the plans we need to grow skills and capability, and to develop new ways of working.

Introduction to this document

Purpose and background

In March 2024, we published our Control Period 7 (CP7) Delivery Plan which set out our planned activities, outputs and expenditure between 1 April 2024 and 31 March 2029.

This document provides an update on our progress in delivering our CP7 Delivery Plan and provides an overview of our updated plan for years 2-5 of CP7, clearly identifying any key changes compared to our March 2024 delivery plan.

Financial values expressed in this document are in cash prices using the Office for Budget Responsibility's (OBR) November 2024 inflation forecast), unless otherwise stated.

Overview

The Industry Partnership Digital Railway (IPDR) team, now part of GBRX, manages and co-ordinates the activities required to migrate Britain's railway from a conventionally signalled network to a digitally signalled one, working closely with industry partners through the Digital Signalling Portfolio.

How we've updated our plan

We engage our stakeholders in the progress and development of our plan, and manage change to it, through our governance framework. This includes the Digital Signalling Portfolio Direction Board, which is attended by Network Rail region and programme teams, along with funders and the Office of Rail and Road (ORR), and supported by the cross-industry Digital Signalling Industry Champions' Council, and sector-specific stakeholder and industry groups.

Deployment scheme progress is monitored through project and programme boards which report, together with the stakeholder and industry groups, into the Digital Signalling Portfolio Progress Group, which includes representatives from Network Rail regions, Technical Authority and Route Services. The Portfolio Progress Group monitors delivery progress and benefit realisation against the portfolio's masterplan to inform the Portfolio Direction Board's decision-making.

2025 Spending Review

The 2025 Spending Review, covering the final three years of CP7 (i.e. April 2026 – March 2029), included consideration of Network Rail's OMR budget. The primary outcome is that a relatively small part of our budget has been recategorised under government accounting rules. In addition, we have received a £165m stretch to our plan (covering operational expenditure and income) across England and Wales over the three years.

We will consider the implications of this on our plan and deliverables and will reflect them in next year's Delivery Plan update, noting we don't expect our plans for year 2 to be impacted. Therefore, at this stage, we have not adjusted our planned income, expenditure, activities or outcomes in this document to account for the 2025 Spending Review. Whilst the 2025 Spending Review covers up to March 2030 for capital spend, capital spend in April 2029 – March 2030 will be determined through the Periodic Review process.

Our vision and strategy

In this section we provide an overview of our vision, strategy and outcomes and highlight any changes since our March 2024 CP7 Delivery Plan.

Our vision: simpler, better, greener

Simpler. We'll play our part in improving the service we give to customers, unifying the railway to make it easier for people to choose rail, growing passenger numbers and freight. We'll root out waste and duplication and stop doing things that don't add value.

Better. We'll continue putting passengers first and shifting more goods by rail, encourage local accountability and be more commercially minded. We'll create a new type of rail leader, invest in the skills and safety of our colleagues, help rebuild the railway with our partners and play our part in rail reform.

Greener. And by making rail simpler and better, we'll attract more people to the cleanest, greenest form of mass transport, while reducing our own carbon footprint.

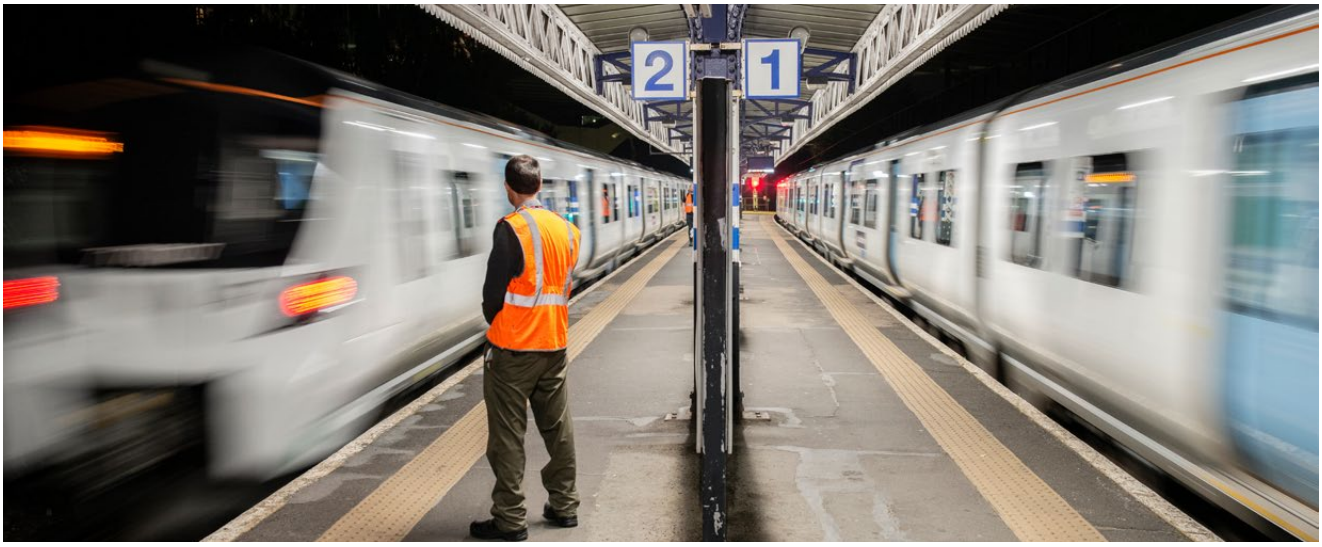
Our vision: the Digital Signalling Portfolio

In deploying ETCS through the Digital Signalling Portfolio, our vision is to deliver a railway network that works better for people.

Our mission is to bring the whole industry together, working collaboratively to create the conditions to enable the routes to deliver the transition to ETCS across the network, and to facilitate the confidence, capability and market competition to deliver an efficient, affordable and sustained pipeline of asset investment in signalling.

Our strategic objectives, through making the transition to ETCS-based signalling renewals, are to:

- reduce the cost of replacing outdated signalling equipment
- increase our capacity for undertaking signalling renewals
- adopt newer, industry-standard signalling technology, which offers a more capable railway with greater benefits to passengers and rail users.



Our strategic themes

We have six national strategic themes that underpin our vision for Network Rail, with our plans for CP7 aligned to each theme: safety, train service delivery, customers and communities, efficiency, sustainable growth and people.

Our devolved structure means that regions and functions can adapt their strategies to their unique circumstances and local stakeholder priorities, while contributing to the network-wide objectives. The contribution that ETCS makes towards these strategic themes is set out in the Annex.

ETCS represents a major leap forward, creating a 21st century transformation of the railway defined by our Victorian pioneers.

Migrating to ETCS through renewals supports delivery of our six national strategic themes by providing a path to a safer, higher performing and more resilient railway, offering the opportunity to address the cost, deliverability and technology challenges we would otherwise have if we were to continue to deploy conventional signalling.

Through effective strategic portfolio organisation and governance, we're developing the necessary resources, capabilities and capacity required to deliver this transformation. We're delivering the work necessary to allow ETCS to become business-as-usual, growing the supply-chain and wider industry capability and capacity to deliver the benefits of ETCS to passengers and rail users over the decades to come.

Safety	**Everyone home safe, every day.**
Train service delivery	**Delivering reliable and punctual train services.**
Customers & communities	**Dependable partner with customer service at the heart of everything we do.**
Efficiency	**Run a safe, reliable and efficient railway.**
Sustainable growth	**To serve the nation with the cleanest, greenest mass transport.**
People	**Become a high performing, service led organisation.**

Our expenditure

Introduction

In this section we provide an overview of our CP7 year 1 expenditure (based on a forecast as at February 2025) and our planned expenditure for years 2–5 of CP7, highlighting any changes from our March 2024 CP7 Delivery Plan.

Key programmes

Key digital signalling activities in CP7, summarised in Table 1 below, include:

- £0.3bn investment in ETCS signalling renewals, funded through regional plans in CP7[1]
- £0.8bn of fleet modifications across passenger, freight, charter and on track machine fleets to enable the deployment of ETCS signalling
- £0.2bn of enabler and capability-building activity, to make the transition to ETCS easier and more efficient.

Table 1: Network Rail-wide spend for ETCS in CP7 (£m in cash prices).

ETCS portfolio spend in CP7 (£m)	March 2024 delivery plan	March 2025 delivery plan
ETCS Signalling renewals		
Eastern	233	^252
North West & Central	305	‡10
Southern	7	7
Wales and Western	*0	†4
Scotland		
Network ETCS renewals total	**545**	**273**
IPDR enabling activity		
Fleet modification	812	816
Enablers / capability development	115	111
Total ETCS funding allocated to IPDR in plan	**927**	**927**
Technical Authority supporting activity – including R&D	47	45
Route Services supporting activity - training capability development	25	25
Network Rail-wide total	**1,544**	**1,270**

^ Includes the rollover of some ECDP scope from CP6 into CP7, offset by efficiency targets in the region
‡ West Coast North Modernisation reprofiled; digital delivery now focused on key ETCS enabling works in CP7
* Rounded down to zero, but there is a nominal amount for early development in Western
† Includes rollover of some digital signalling scope from 2023/24 omitted from our March 2024 figures

[1] We are still predominantly deploying conventional signalling technology in CP7, particularly where signalling assets need replacing before the industry can modify affected trains with ETCS onboard equipment. The proportion of such conventional renewals is planned to fall in CP8 as part of the long-term transition to digital.

ETCS signalling renewals

On Eastern, the East Coast Digital Programme (ECDP) will continue throughout the Control Period to progressively deploy digital signalling to the south end of the East Coast Main Line and to migrate the Northern City Line to 'no signals' operation. Towards the end of the Control Period, development work will commence on a separate scheme to apply ETCS to the south end of the Midland Main Line.

The variance to our March 2024 figures is the result of some rollover of ECDP scope from CP6, offset by an efficiency target from the region.

On North West and Central region, the West Coast North Modernisation is continuing to develop its roadmap for ETCS deployment with industry partners, building on its conventional renewals activities, and drawing on learning from ECDP and other live deployment schemes. This work to date has resulted in a reprofiling of the digital delivery activity. The focus in CP7 will be on key ETCS enabling works to support the start of ETCS deployment in CP8. We will continue to provide visibility of such changes as part of ongoing discussions with the industry.

This plan also provides some funding for early development of schemes on the Midland Main Line, on the Brighton Main Line and from Paddington to Hayes on the Great Western Main Line, that will progress in CP8. The increase in Wales and Western expenditure reflects separate ETCS activity continuing from CP6, as part of the close out of that scheme.

IPDR-led enabling activities

Expenditure on IPDR-led enabling activities remains broadly in line with our March 2024 submission.

There's been some change to the phasing of fleet-related spend through CP7; as an industry we're still learning how to undertake vehicle fitment most effectively, and some activities have taken longer than planned as we have clarified requirements and refined our approaches. We expect these activities to gather pace in future years as we, along with partners and operators gain further experience and build further capability.

Table 2 sets out our rephased activity and expenditure for enabling activities (and a comparison with the March 2024 delivery plan forecast is provided in the Annex on p13).

Following the award of the Train Control Systems Framework in April, we have revised our spend forecasts for market application readiness, working with each of the successful signalling delivery partners to understand their baseline plans, and will continue to monitor these over the year ahead.

In addition to modification of fleets, we're developing a range of technical capabilities to enable and support deployment across the network, alongside new processes, tools and competences to broaden the capability across industry to transition to ETCS.

Our plan for enabling activities led by IPDR is set out in Table 2 below:

Table 2 - IPDR enabling activity expenditure in CP7 (£m, cash prices).

	March 2025 delivery plan					
Enabling activity funding	2024/25[2]	2025/26	2026/27	2027/28	2028/29	CP7 total
Fleet modifications	55	119	162	229	251	**816**
Enablers / capability development	9	27	25	23	26	**111**
Total expenditure	**64**	**146**	**187**	**252**	**277**	**927**[3]

[2] CP7 year 1 expenditure is based on a forecast as at February 2025.
[3] Numbers subject to rounding.

Digital signalling portfolio activities in other parts of our Delivery Plan

Our research and development programmes led by Technical Authority, which started in CP6, have undergone a review at the start of CP7 to prioritise the key elements that will support our renewals and enabling activities to maximise efficiency of the rollout of ETCS.

This includes the Synthetic Environment, which will improve our scheme development, testing and simulation processes, and the Speed Management Programme, which is researching how to reduce train over-speeding risk by the provision of real-time speed management information. The Programme is developing a National Speed Database, information from which could also be used for ETCS trackside deployments.

These activities have therefore started later than originally envisaged whilst this review has taken place. However, the reviews are now complete and both programmes have mobilised their early development and procurement activities. This delay will not affect our ability to deploy ETCS within this Control Period.

The development of training capability in maintenance and operation of ETCS, now known as Digital Learning for Digital Railway (DL4DR), is underway with learning scenario development ongoing as part of the first phase of work, and remains on track to start providing training for the ECDP programme in 2025/26, before rolling out to other deployments later in CP7.

Risks, uncertainty and opportunities

This section summarises IPDR's high-level risks and opportunities for the remainder of CP7:

- **Changes to fleet strategy** – our fleet fitment plans are based on our current knowledge, developed with industry partners, of which vehicles will require modification to support future schemes. Changes to where fleets run, as leases are renewed, service patterns are changed and vehicles are cascaded, or as new vehicles are introduced onto the network, can change our assumptions around which vehicles are required to be fitted. We work with funders, operators and with colleagues in System Operator to gain advance sight of such plans, and hold limited risk provision to cater for such changes.
- **Changes to ETCS specifications** – ETCS is based on European specifications which will change over the course of the Control Period, driving change to National Technical Specification Notices, and to Railway Industry Standards. These standards changes can correct specification errors, and improve the operation of trackside and onboard ETCS systems. Our GB-specific requirements for ETCS can also change as we learn more from early deployments, such as ECDP, but rolling out these types of changes can take time and cost money. To mitigate this, we work with colleagues in Europe and at standards bodies such as the Rail Safety and Standards Board, and through the System Authority team to understand and manage the impact of specification changes on our plans.
- **Building capability and sustained investment to manage parallel deployments** – the bulk of the GB network is conventionally signalled, and whilst the industry experience of how to build, operate and maintain an ETCS railway is growing, the pool of people with that experience is limited. As we invest through CP7 in more digital signalling we need to grow ETCS awareness, skills and capability across industry, through targeted activities and a sustained pipeline of investment. We have initiatives planned through the Control Period, such as in market application readiness, in training and through the portfolio to develop this capability, and are dependent on continued investment in digital signalling in future Control Periods.
- **Rail reform** – future change to industry structure through reform will provide an opportunity to take a more integrated approach to decision-making around rolling stock and operational readiness, enabling better alignment of vehicle modification, business readiness activities and infrastructure deployments.
- **Buying new with ETCS** – we know that in most instances it is more cost-effective to fit ETCS equipment to vehicles at build, rather than to retrofit. Where the opportunity arises, we can work with vehicle owners and operators to align vehicle renewals decisions with ETCS deployments.

Delivery for the year ahead (2025-26)

Summary of our CP7 year 2 targets

Our 2025/26 goals and other key outcomes are set out below. We'll monitor delivery against these throughout the year through our business and executive level monitoring and through Digital Signalling Portfolio governance.

Specific activities for the year ahead will include:

- **infrastructure deployments** – continued delivery and development of ETCS deployment schemes in routes and regions, particularly on East Coast Digital Programme and West Coast North Modernisation
- **market application readiness** – our trackside signalling partners will continue to develop standardised products to comply with the GB application requirements for ETCS, and we'll begin to test and prove these products to make sure they work in a consistent way in advance of getting rolled out across the country as part of infrastructure schemes
- **fleet fitment and business change** – we will continue to develop first in class fitment activities for certain of Northern and CrossCountry's passenger fleets, in support of West Coast North Modernisation and Transpennine Route Upgrade. We'll continue the national freight programme's fleet fitment and business readiness activities, and develop fitment requirements and sourcing strategies for On Track Machine and charter fleets. Alongside this we'll put in place the commercial arrangements with operators across different sectors to allow them to develop the required business change activities associated with infrastructure schemes
- **network systems** – we'll continue to test the first onboard products through our national test facilities and plan for the progressive transition of network enablers, such as DRACAS and the Online Key Management System into business-as-usual
- **establishing and sharing best practices and assessing efficiency opportunities** – we'll mobilise a series of 'solve once' workstreams, aimed at developing policy, guidance and best practice in specific areas to make future deployments easier, and continue to embed lessons and best practice from existing deployments, alongside efficiency initiatives such as our T190+ Research & Development programme.

Annex

A. Benefits contributions

Table A1. Summary of ETCS benefits contributions by strategic theme.

Strategic theme	ETCS Level 2 benefit	Description
Safety	Safety	• The ETCS onboard calculates the permitted speed and braking profile of the train in real time so that the train remains within the safety envelope defined by the signalling system. ETCS can reduce the frequency of trains passing signals at danger, and can reduce the instances of overspeed, compared with conventional signalling. • The ECDP has modelled a significant reduction in risk for track and maintenance staff, due to less need to be trackside, improved communication, and remote maintenance opportunities. • The ECDP has modelled a very significant reduction in risk for third parties related to safety at level crossings.
Train service delivery	Performance & capacity	• While the performance and capacity benefits of ETCS have not been quantified yet at a network level, ETCS offers significant performance opportunities, dispensing with signal positioning and sighting limitations and, through automatic train protection capability, allowing trains to run safely closer together. • The ECDP has modelled improvements in system capability through reduced headways, which could be used to increase utilised capacity, performance, or a combination of both, for passengers and freight users. • The ECDP modelled a reduction in delay minutes through increased system reliability and improved punctuality for passengers through more trains running on time compared to conventional signalling. • ETCS allows functionality such as bidirectional signalling to be implemented more easily, where infrastructure allows, and at reduced cost. • With ETCS in a no-signals configuration, the relationship between block length and train braking is removed allowing the block lengths to be optimised for capacity/performance. • Through the portfolio we'll seek to measure and capture the benefits realised through schemes such as the ECDP to allow us to improve our benefits forecasting information and the realisation potential for future deployments.

Efficiency	Signalling unit and whole life cost reduction	• ETCS signalling provides both a lower unit and whole life cost than that of the alternative conventional multi-aspect signalling. • Learning from international cost benchmarking for the LTDP has led to the planning rate for renewal with ETCS in CP7 being £315k per SEU, compared to conventional costs of around £420k/SEU[1]. • The T190+ Programme is aiming to reduce the equivalent renewal cost of an ETCS SEU to £190k or less[1]; this is dependent on a sufficient rolling programme of delivery to enable all trackside signalling delivery partners to gain delivery experience.
Customers & communities	Other	• Deploying ETCS technology aligns with the recommendations of the ORR Signalling Market Study, facilitating new entrants to the market and greater competition within signalling. • By committing to and supporting a long term plan to deploy ETCS, we can provide continuity to our signalling delivery partners, enabling them to invest in developing a digital skills pipeline improving capability in the UK workforce.
Sustainable growth	Decarbonisation	• Decarbonisation of the rail system: ECDP analysis shows the whole life carbon footprint of ETCS signalling on ECML(S) is c. 40 % less than that of conventional signalling due to the reduction in the volume of lineside infrastructure required. • Decarbonisation of the transport sector: an improvement in the performance of the service offering will encourage modal shift in passengers and freight users from road and air.
	Deliverability	• ETCS signalling requires less lineside infrastructure than that of conventional. This fundamental change results in the potential to deliver greater volumes of signalling renewals due to the reduced access needs. • Conventional re-signalling capability has at best delivered 1,800 SEUs per year, whereas it is estimated that no signals ETCS renewal capability is around 3,000 SEUs per year.

[1] Network average cost, at 2017/18 prices.

B. CP7 financial summary

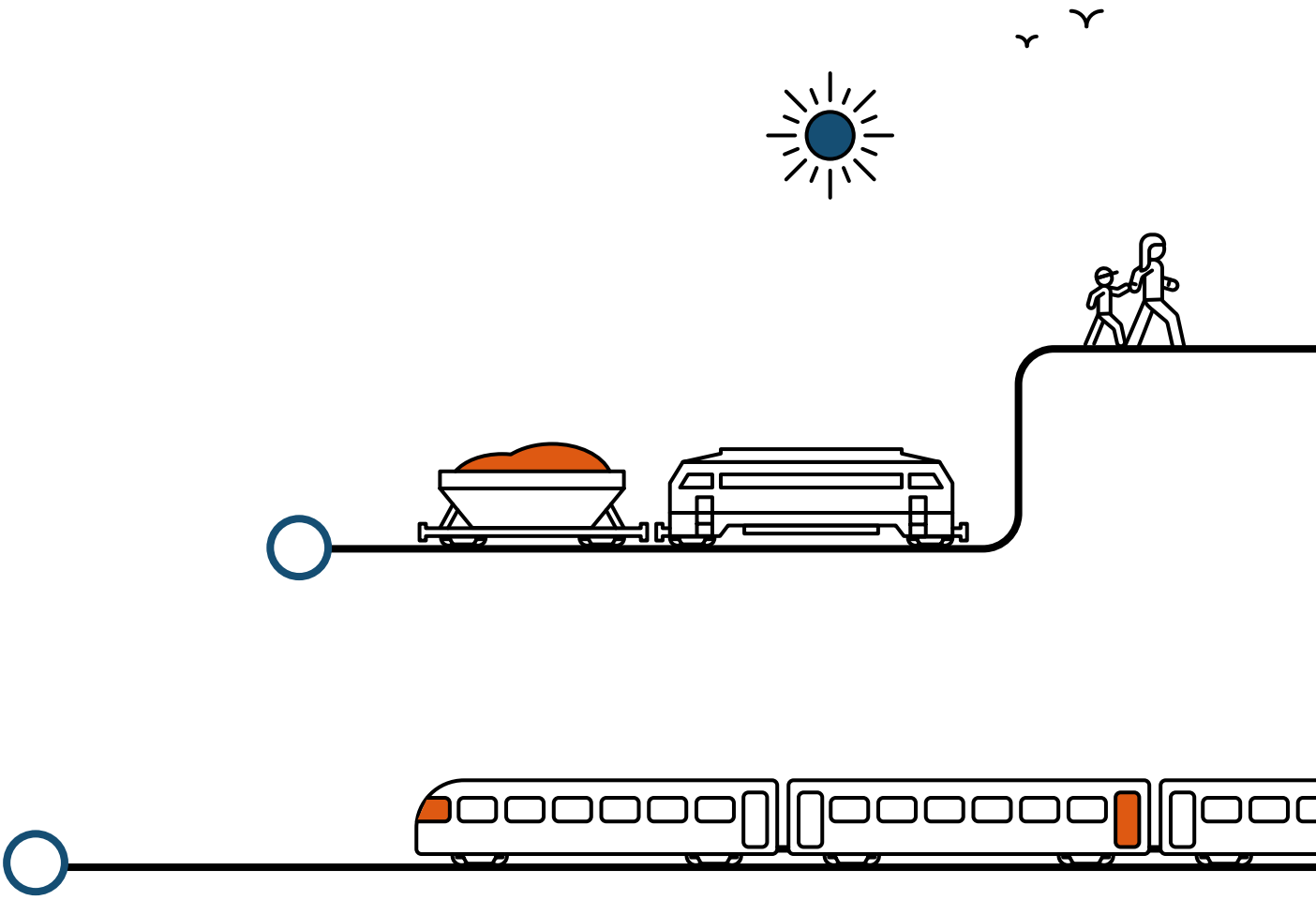
CP7 expenditure on enabling activities led by IPDR

Table B1. CP7 expenditure (March 2025 CP7 Delivery Plan update and March 2024 CP7 Delivery Plan).

	March 2025 Delivery Plan					
£m in cash prices	2024/25[1]	2025/26	2026/27	2027/28	2028/29	**CP7 Total**
Fleet modifications	55	119	162	229	251	**816**
Enablers / capability development	9	27	25	23	26	**111**
Total expenditure	**64**	**146**	**187**	**252**	**277**	**927**

	March 2024 Delivery Plan					
£m in cash prices	2024/25	2025/26	2026/27	2027/28	2028/29	**CP7 Total**
Fleet modifications	39	149	189	230	205	**812**
Enablers / capability development	25	24	22	22	22	**115**
Total expenditure	**64**	**174**	**210**	**252**	**227**	**927**

[1] CP7 year 1 expenditure is based on a forecast as at February 2025.



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