Report from Sir Peter Hendy to the Secretary of State for Transport on the replanning of Network Rail's Investment Programme

November 2015

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Foreword

Britain's railway network is vital for economic growth, to create jobs and to enable housing development. Every year it enables millions of people to travel for work and leisure, and transports millions of tons of freight. Passenger numbers have doubled over the last 20 years and are currently rising at over four per cent every year.

In Europe, we have the safest major railway and are at the very top end of railway efficiency rankings, particularly for staff productivity; we have very low levels of public subsidy and we score highly for passenger satisfaction and perform well on punctuality.

Thus we have one of the fastest growing railways in Europe and the second most intensively used. Half of Europe's most congested rail infrastructure is now found in the UK. But decades of underfunding have left a network which undoubtedly needs more investment.

These are the reasons why Network Rail has an ambitious £38 billion programme to operate, maintain, renew and improve the rail network across the country. This investment will deliver real benefits for passengers and freight through more capacity, and faster and more reliable journeys.

Whilst the enhancement and investment programme in railway control period 5 (2014-19) is larger than any previous programme, for a variety of reasons the cost and timescales on a small number of significant enhancement projects have increased beyond expectation. These have included over optimism on costs and timescales, inadequate planning processes both within and outside Network Rail, and changes in scope during development and delivery. There has also been a fundamental change with the reclassification of Network Rail as a public body, curtailing more freely available access to Government backed debt resulting in the requirement for more disciplined capital rationing. These have all contributed to the funding challenge as has the realisation that some large projects should have been managed on a holistic basis rather than piecemeal. Dame Collette Bowe's review, published at the same time as this document, looks at these issues and draws conclusions for the Department for Transport (DfT), Network Rail and the Office of Rail and Road (ORR).

The core business plan for operating, maintaining and renewing the rail network has also needed to be updated as Network Rail is unable to achieve the savings assumed for the five year period.

It is against this backdrop that I was appointed Chair of Network Rail in July 2015 and asked by the Secretary of State to conduct a thorough review of the enhancement programme in England & Wales to see what can be delivered in an affordable and timely way within the funding period to 2019.

The review has systematically examined every element of the enhancement programme reviewing costs and timescales, and establishing robust estimates of both. This work has been subject to internal review within Network Rail, as well as an external assurance review by independent consultants. These have resulted in improvements to projects plans and there are opportunities for further improvement as we move forward.

The portfolio has also been reviewed against current DfT commitments for franchises and for new rolling stock, and prioritised to reflect the Government's commitments to maximise passenger and freight user benefits.

The resultant programme to 2019 has increased in cost. We promised the Chancellor of the Exchequer and the Secretary of State for Transport that we would do as much as possible to resolve the additional costs ourselves. In the current funding period, Network Rail is planning to release £1.8 billion of investment through the sale of non-core and lower value assets, including the sale of some of Network Rail's property assets. The Government has also been able to increase the limit on Network Rail's Government borrowing by a further £700 million. The result is that the vast majority of programmes and projects will go ahead for delivery by 2019. The remaining projects will be delivered after 2019 so that Network Rail remains within its funding envelope. As a result, the full programme is now expected to be delivered over a more realistic timescale. No infrastructure schemes have been cancelled.

Network Rail is already comprehensively revising the way it manages enhancement programmes. As the Bowe report recommends, this needs to be supplemented by much more rigorous sponsorship and change control processes, and by more effective joint working with the Government. This will require projects to be better developed before funding commitments are made and project delivery starts.

There are always some risks in such a huge programme being carried out on a railway which is far busier than ever before. Access to the railway for safe working has to be balanced with ever more intensive train services, including at weekends and holiday periods. Parts of the railway are up to 190 years old and it is not just the infrastructure from the Victorian era that gives surprises when works are carried out in places undisturbed for many years. Some of the signalling equipment dates from the 1960s and 1970s, and has wiring buried without drawings and, despite surveys, structures of all ages give unexpected problems when altered or disturbed.

An increasing number of planning consents are needed for individual works on the railway. Whilst I and Network Rail are acutely conscious of our magnificent railway heritage, and we are increasing our efforts to be good neighbours, these are not in Network Rail's control. We will need the co-operation of local authorities and other statutory bodies to enable this huge programme of crucial economic importance to go forward without further delay and cost.

The huge programme has also stretched both Network Rail's internal resources and those of its contractors to the maximum. Signalling resource, needed in respect of replacement and renewal and as a necessary precursor to electrification, is in short supply. Network Rail and its suppliers need to redouble their efforts to recruit apprentices and engineers to complete these works. In addition, Network Rail needs to employ more senior staff in a very competitive market to effectively deliver works paid for by public funds.

The Government has demonstrated in its funding commitment that it is completely committed to modernising the nation's railways to enable sustained economic growth, job creation and to build homes. Network Rail will do its utmost to deliver the improvements set out in this report.

For the future, Government has commissioned a review of the future shape and financing of Network Rail from Nicola Shaw, working closely with me. She has already published a scoping document, with a report due by the Budget in 2016.

Lastly, I would express my thanks to all those, within and outside Network Rail, who have contributed so much over such a concentrated period to enable this report to be concluded.

Sir Peter Hendy CBE
25 November 2015

Summary

Network Rail's plans for the five years between 2014-2019 (known as Control Period 5 or CP5) include major plans to upgrade the railway infrastructure. This will deliver additional capacity through more frequent train services and longer trains, as well as faster journey times. The enhancement programme will deliver the Government's strategic objectives for the railway. They include completion of the Thameslink and Crossrail programmes, a significant volume of electrification, and investment in capacity particularly in the North of England, and a number of funds to support smaller investments.

What is the current situation?

Network Rail's funding for enhancement projects in England & Wales to be delivered in CP5 was £11.8 billion (in 2012-13 prices). When funding for CP5 was finalised in October 2013 by the Office of Rail and Road (ORR), a significant proportion of the enhancement portfolio was still in the very early stages of development. ORR recognised that the funding for these schemes could not be fixed at that stage of the process. It therefore introduced a process for further review during CP5 to agree updated cost estimates when programmes were sufficiently well developed. Any increases could have been met through Network Rail's ability to use the contingency in the existing funding or further borrowing.

In September 2014, Network Rail was reclassified as a public company. This restricted the ability to borrow more, which had been the historic means by which significant changes in expenditure on existing or new projects were funded. Network Rail now borrows direct from the Government with a defined borrowing limit for CP5.

In early 2014, Network Rail had flagged to ORR and DfT that it had concerns about delivering the overall savings in ORR's final determination for CP5. Since then, there have been further pressures on Network Rail's core business plan, which have resulted in increased costs for operation, maintenance and renewal of the rail network. As a result, Network Rail's total financing requirement was forecast to exceed the agreed borrowing limit for CP5.

So, in June 2015, the Secretary of State for Transport announced that he had asked for a proposal for replanning Network Rail's CP5 enhancements. The result should set out how the programme will be delivered in the coming years, recognising the Government's commitment to the programme of rail investment. The review of the investment programme in England & Wales has been based on:

- an assessment of the cost and deliverability of the enhancement programme;
- a review of the core business plan, including options for asset disposals; leading to
- an updated plan that can be managed within the borrowing limit.

The review has considered the enhancement programme and its impact on the borrowing limit in England & Wales. This report sets out the overall conclusions of this review, outlining the enhancement programme that will be delivered by March 2019. Enhancement projects in Scotland, which are funded by Transport Scotland and managed through the ScotRail Alliance, continue to be progressed.

What are the underlying causes of the cost and delivery issues?

While the vast majority of projects are being delivered on time and on budget, there are a small number of projects for which the forecast cost estimates are significantly higher than originally assumed, particularly the electrification projects and several projects where the scope was poorly defined at the outset.

There are two principal issues relating to the increased cost estimates that are being seen across the portfolio. Firstly, there was inadequate planning and scope definition of a number of projects in their early phases. Secondly, there was poor cost estimating, particularly on electrification projects. Network Rail has not carried out any electrification of significance for 20 years, so there was limited information to support cost estimates. It is clear that some of Network Rail's early cost estimates, particularly for electrification schemes, were inadequate. The impact of the cost increases has been further affected because the intended flexibility of the regulatory regime has changed following reclassification of Network Rail as a public body, curtailing more freely available access to Government backed debt resulting in the requirement for disciplined capital rationing.

The cost and deliverability challenges are restricted to a small number of programmes. Before adjusting for the impact of deliverability and affordability, around 80 per cent of the increase, relates to five programmes. These are electrification schemes which were still in development when ORR concluded its review of Network Rail's 2014-19 plan. The cost of schemes that were already well developed, represent around 10 per cent of the increase, with the majority of this relating to the Thameslink programme. The remaining 10 per cent includes activity that was rolled over from CP4 for delivery in CP5 and additional scope that the DfT has requested since the start of CP5.

What is being done to resolve the issues?

Network Rail has carried out an extensive review of the cost and deliverability of the enhancement programme. Cost estimates have been updated for each programme, including contingency for risk and uncertainty that reflects the current state of development. The delivery dates have also been updated to reflect the dates by which Network Rail expects to complete each programme. Network Rail has applied three levels of assurance in the review of the revised plan. The first level is the relevant Route Managing Director and Infrastructure Projects Delivery Director have appraised and approved each project / programme. The second level is the internal deliverability reviews of the key projects. The third level is independent assurance to Sir Peter Hendy by Nichols, covering both the initial deliverability review and the subsequent finalisation of the plan. Finally, the overall plan has been subject to review by the Network Rail Executive Committee and the Board.

In reviewing the plan, Network Rail has considered whether some of the enhancements portfolio should be rephased beyond the current control period. To maximise passenger benefits, Network Rail has worked with DfT to understand what changes there have been since the original business cases were developed for the enhancement programme. This has included the extent to which costs have already been incurred together with the extent to which rolling stock and franchising commitments have already been made. Opportunities for rephasing the enhancements portfolio have also been considered. This has enabled prioritisation of enhancements when considering whether Network Rail can afford to deliver the whole programme in CP5 within the available funding.

Network Rail has also reviewed the core business plan to assess the accuracy of its forecasts and to identify options for reducing the overall borrowing requirements. This has included an assessment of the extent to which it can reduce renewals activity below the previously planned levels while continuing to safely manage risk. It has also identified the extent to which it could raise capital from the sale of non-core assets.

How will the increased costs be funded?

In updating the business plan, Network Rail has sought to balance the level of expenditure required to manage the core business and the extent to which it can deliver the full enhancement programme within the available funding.

It has concluded that the core business can be managed within the borrowing limit that has been set for CP5. The principal change to achieve this will be a reduction in renewals activity, which Network Rail considers can be managed safely and does not create a backlog that cannot be caught up in subsequent control periods. While this change partially offsets increases in the rest of the core plan, the buffer between the forecast debt requirement and the borrowing limit is now small. Any further cost increases would need to be funded by additional borrowing, further asset sales or further deferral of renewals.

To fund the increased enhancement expenditure, Network Rail will address the funding shortfall by asset divestment totalling around £1.8 billion through divestment of non-core assets. This includes considering options for the sale of property assets (including retail units in managed stations and the commercial estate), spare capacity on the telecoms network and non-core rail assets such as depots.

While Network Rail and DfT consider it is right to sell assets to fund enhancements, there are clearly implications for the future funding of the railway. Less income from property means more will have to come from elsewhere. Given the importance to passengers and the wider economy of the enhancement programme, the overall conclusion is that this plan represents the best balance in delivering value for money.

In addition to the asset sales, DfT has agreed to increase Network Rail's borrowing limit by £700 million to provide further funding for the enhancement programme.

This additional £2.5 billion will enable delivery of the vast majority of projects committed to in CP5. However, this is not sufficient to fund all the schemes that Network Rail is capable of delivering in CP5. It has therefore worked with DfT to identify which projects should be completed in Control Period 6 (2019-24) (CP6). This includes projects that are still in the early stages of development (with development continuing but delivery will not be in CP5) and a number of the schemes in ring-fenced funds which will also now be delivered in CP6.

What does Network Rail now plan to deliver?

Network Rail will continue to deliver a very significant enhancement programme during the period to 2019. Most of the originally planned projects will still be delivered in CP5 with significant benefits for passengers and freight users. The key benefits that will be delivered in England & Wales are summarised on the following page, with more detail in the next section of this report. The benefits and scope of each programme are included in individual project summaries which will be published in early December. This includes a description of the scope, outputs, assumptions and risks relating to each programme, reflecting the impact of revised cost forecasts and delivery milestones.

As announced in September, work on electrification of Transpennine and Midland Main Line has restarted. The Transpennine line will deliver faster journeys and more capacity to help deliver a Northern Powerhouse. The upgrade will be developed and delivered across CP5 and CP6, with the scheme completed by 2022. Midland Main Line improvements across CP5 and CP6 will mean the route to Kettering and Corby will be electrified by 2019, and the route to Sheffield by 2023.

There are a small number of projects where the planned benefits are expected to be delivered slightly later than originally planned. Many of these programmes were in the early stages of development with incomplete scope definition when the original plan was produced.

Separately DfT is reiterating its commitment to provide the agreed contribution directly to the Welsh Government for the Welsh Valleys Electrification Programme. Following the announcement to unpause TPE, we have included an assumed expenditure level for initial delivery of electrification in CP5 following completion of development in 2017.

Work to update the programme for Great Western Electrification is being concluded as this report is completed. The latest estimates for cost and delivery milestones have been reflected in this report although this is still subject to final review. Completion of electrification to Cardiff is planned to be completed in CP5 within the estimated total cost of £2.8 billion (in 2012-13 prices). The electrification beyond Cardiff is expected to be completed in CP6.

The updated cost estimates for each programme include contingency for risk and uncertainty reflecting the current state of development. Around 30 per cent of the programme is still in the development stage. Total contingency of around 20 per cent of the overall programme cost has been included. This is broadly consistent with the level that would be expected for complex infrastructure programmes.

Planned benefits to be enabled by infrastructure improvements

National
Freight-orientated schemes including running longer trains and more capacity for flows to/from the ports of Felixstowe and Southampton. Other schemes include Northern Ports and Thameshaven level crossing enhancements. These schemes also increase capacity from major ports.

East Coast Main Line
On the East Coast Main there will be more seating capacity with new trains replacing the current long distance fleets, together with improved service frequency and journey times. South of Peterborough, new trains and additional cross London connectivity on the Thameslink route.

North
Delivering the North West Electrification and Northern Hub benefits and developing the Transpennine Route Upgrade to provide significant improvements in frequencies and journey times. Passengers will benefit from electric trains to provide additional seating capacity on some routes, and an increase to six trains per hour between Manchester and Leeds. Reduced journey times on other routes.

Chilterns
Two trains per hour will operate between Oxford and London Marylebone via Bicester, with services to Oxford Parkway commenced earlier this year.

Midlands
Additional seating capacity between Walsall and Rugeley and an extra four trains per hour from north Worcestershire into Birmingham. There will be more seats and faster journeys between Leicester, Nottingham, Derby and Sheffield and London, and a sixth train per hour long distanceservice running between Kettering and London. Electrification of the Midland Main Line to Corby will be completed in December 2019. Extra capacity on the cross-London Thameslink Route.

Western (outer) and Wales
On the Great Western mainline and into Wales there will be more seating capacity together with improved service frequency, connectivity and journey times. Also capacity benefits on the routes from London to the Cotswolds and to the South West.

Anglia
Increased frequency of service between some local West Anglia stations.
On the Great Eastern Main Line suburban services will see a significant overall increase in peak capacity for passengers, as a result of Crossrail. Suburban passengers inwards of Shenfield will also have new direct cross-London opportunities.

Western Thames Valley
Inner suburban, 40 per cent increase in peak hour capacity into London Paddington and frequent cross-London direct services via Crossrail. The outer suburban services have a greater seating capacity of around 10 per cent as well as improvements in journey times.

Kent
Up to 20 per cent additional capacity during peak travel times on suburban routes, new station at Rochester.

Wessex
A capacity increase of approximately 20 per cent for peak services on main suburban routes into Waterloo. South West Main Line services will see around 5 per cent additional capacity through longer trains.

Brighton Main Line / Sussex
More capacity on Thameslink services to and from London Bridge and on Uckfield peak services.
A wider range of cross-London services.

We are currently working with DfT to update the CP5 enhancement delivery plan for each project and these will be published in early December. Experience of delivering complex major programmes suggests that there will be some slippage in the revised programme. Network Rail has therefore assumed that there will be overall slippage equivalent to the amount it expects to spend in ten weeks in the context of the five year control period. It has assumed that there will be some further savings that it can achieve which are not reflected in the individual schemes, including more effective management of the overall programme and further challenge of project scope.

What are the next steps implementing the revised programme?

The changes to the business plan will need to be reflected in our CP5 Enhancements Delivery Plan subject to agreement with ORR through the formal change control process. The draft updated Enhancement Delivery Plan entries will be published in early December. Alongside this, DfT will carry out a consultation with stakeholders on the updated plan.

Network Rail will also need to obtain ORR's agreement to the updated cost forecasts for enhancements through the Enhancement Cost Adjustment Mechanism (ECAM), which is the process by which ORR resets the enhancement cost assumptions included in its final determination for CP5. This will need to include adjustments for some programmes that have already been through the ECAM process. Consistent with the recommendations in the Bowe report, ORR, DfT and Network Rail are also considering a new approach to funding enhancement programmes to ensure that commitments are not made until the cost and scope of programmes are sufficiently well developed.

Network Rail is already improving the processes for managing enhancements and is implementing a comprehensive Enhancements Improvement Programme. This includes improving industry processes for definition and development of enhancements, clarifying accountabilities and governance, improving the front end definition and early stage estimating of projects, strengthening sponsor and delivery capabilities, improving internal project governance and assurance, and incorporating safety by design. There will need to be more effective Network Rail sponsorship of enhancement programmes with better joint working between DfT and Network Rail. The programme aims to work across the whole industry, with a different cultural approach to how Network Rail works with others in the industry by being more formal and transparent about project definition, assurance, budget and scope approval, and subsequent change management, supported by appropriate governance and processes more clearly aligned to industry best practice.

More broadly, Network Rail has a programme to improve its capability across the whole organisation to provide increased confidence in its ability to deliver. Given the size and complexity of our business, it also needs highly capable leaders. They are generally being recruited from the private sector, as this is where relevant skills and experience can be found. Network Rail will also need to recruit enough people on appropriate private sector salary levels so that it can develop the strong senior management capability that is needed to deliver the required improvements.

What are the key assumptions and risks?

For each programme, the key assumptions and risks will be set out in the individual project descriptions to be published shortly. Key assumptions and risks underpinning the plan are outlined in the approach and findings section of this report. It also includes the specific examples of the challenges faced in delivering the enhancement programme. There are a number of risks that are not in Network Rail's control, which can have a significant impact on the cost and delivery schedule of projects.

There are three overarching risks that Network Rail needs to mitigate to deliver the enhancement plan.

- A number of programmes still need to obtain formal planning permission or consents. These can range from local authority planning permission, development consent orders to full Transport and Works Act orders. In addition, some projects will require us to get additional consents from other bodies such as English Heritage or Natural England. For example, we currently estimate the GWEP programme will require around 2,000 applications. Each of these involves a time consuming process and, given the level of stakeholder consultation, it is difficult to predict which creates a significant risk to delivery dates. Further, the risk of delay to programmes is increased when objections are raised as these can have significant impact on the consultation process. The case study on Aristotle Lane included in this report provides a real example of the potential implications with the final approval being obtained in May 2015 compared to an initial application in 2009.
- Engineering access to the railway is critical. The plan assumes that Network Rail will continue to work effectively with train operators to ensure that sufficient access is provided to safely enhance the railway.
- It is critical that Network Rail continues to attract and retain highly experienced people, who are in demand globally, to develop and deliver this major investment programme. There is therefore a major focus on recruitment and retention.

Conclusion

There are some tough savings challenges and difficult choices that have been made in respect of renewals which result in the core Business Plan being funded within the maximum borrowing limit. Network Rail will raise additional capital from the sale of non-core property and other assets and DfT has agreed to increase Network Rail's borrowing limit. These additional funds do not cover the full cost of the enhancement programme, which means there will be some projects that will be completed in CP6, recognising that there are some schemes that Network Rail is unable to deliver or that are not yet adequately developed. But Network Rail has been able to create a new baseline from which it can successfully deliver what will still be a massive investment programme for the railway.

Delivering for Customers

Introduction

Our railways have enjoyed strong and sustained growth during the last two decades, to the point where the number of passengers using the railways has doubled. This growth has been delivered at high levels of safety, performance and passenger satisfaction, underpinned by sustained investment in enhancements from successive Governments. It has also helped to transform the finances of the industry, to the point where the passenger network now generates enough income to cover its day-to-day operating costs, creating a 'virtuous circle' which is helping to sustain investment in the industry.

The trends that have fuelled this growth appear deep rooted and are set to continue over the longer term. As a result, the demand for travel into and between urban areas, their catchments, and our ports and airports is set to increase further. The rail network is best placed to meet this demand in an efficient and sustainable manner, so it is little surprise that delivering additional capacity is a key priority for both the rail industry and Governments.

However, our railways can contribute more than simply responding to growth in the market. Improving rail connectivity can create the necessary conditions to drive productivity higher, in effect bringing cities and their catchments closer together, opening up new markets, job opportunities, and improving the efficiency of supply chains. Investing in the rail network also encourages inwards investment, signalling to international companies that Britain is 'open for business'. A well-targeted programme of improvements can also help to re-balance the economy, rather than accentuate existing divisions. The further electrification of the network will also enable smoother, quicker, more reliable journeys.

Improvements for Passengers

This section sets out that the vast majority of visible and tangible capacity and connectivity benefits for the passenger will be delivered as planned in CP5. As each section notes, there are a number of schemes that will see completion and delivery of outputs slightly later than planned, but even in these cases, on some impacted routes there will be other earlier benefits for passengers, and, in some cases, those benefits have already been delivered.

Whilst the railway is a national network, Network Rail recognises there is a keen interest from each region on the progress of schemes of particular local interest. For this reason the remainder of this section is divided into regional sections, each reporting on the current status of plans for that area.

A map to show the regional basis on which this section has been divided.

The North of England passenger services

This section covers the rail network across the whole of the North of England, from the Scottish border southwards to the Midlands. Network Rail will work with the successful bidders for the Northern and Transpennine franchises and other existing operators in the area, to deliver significant improvement in train services across this region.

These changes will facilitate the growth of the northern economy through:

- Connecting businesses across the North of England
- Getting people to work in the major cities
- Connecting to international markets

Passengers in the North of England will benefit from the following outputs in CP5:

- Electric trains releasing diesel trains to provide additional seating capacity
- Additional seating on trains through the operation of longer trains into Leeds, Liverpool, Manchester and Sheffield
- An increase from five to six trains per hour (tph) between Manchester and Leeds extending an existing service West of Huddersfield and reallocating station stops between services
- A new railway called the Ordsall Chord allowing services to operate between Manchester Victoria and Manchester Piccadilly, with the opportunity for new through services to Manchester Airport
- Increased capacity on routes across the North of England providing the opportunity for additional services in conjunction with the successful franchise bidders
- The opportunity to reinstate the direct connection between Bolton and stations north of Preston to Scotland by direct service
- A significantly improved environment and interchange with Metrolink at Manchester Victoria station
- The opportunity to access Rotherham Parkgate from the Sheffield Supertram network.

As announced in September, Network Rail is pushing forward with developing the scheme to upgrade and electrify the Transpennine route.

Passengers are already benefiting from reduced journey times between Liverpool and Manchester. The opportunity for reductions in journey time will be provided in CP5 on three further routes, with the actual journey time realised subject to rolling stock, the plans of the new passenger franchise holders and detailed timetable planning.

- Manchester - Preston
- Manchester - Bradford Interchange
- Manchester - Stalybridge

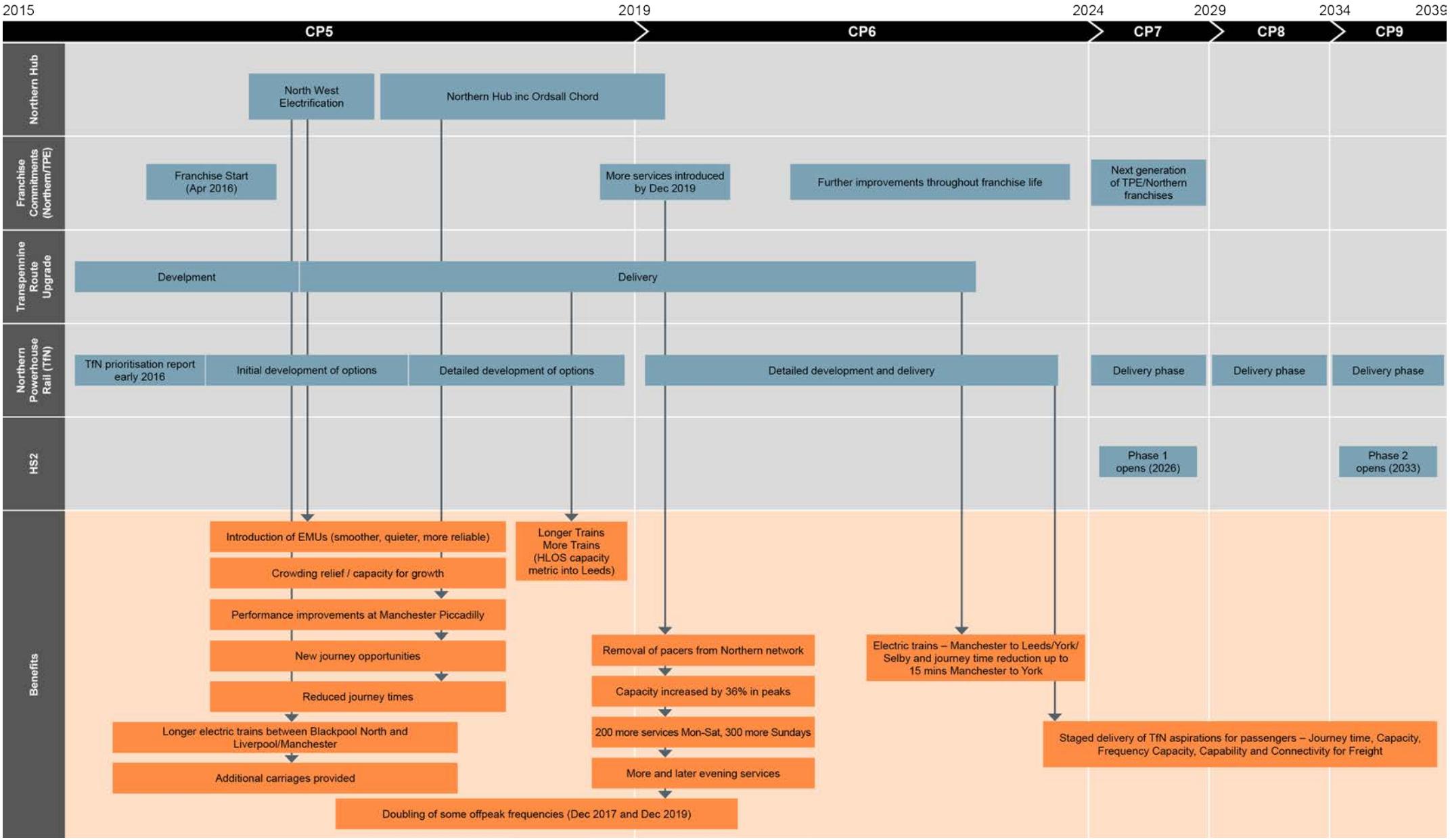
Further details of the specific schemes that deliver these improvements will be shown in the updated Enhancement Delivery Plans. The relevant schemes are:

- North of England Programmes (LNW)
- Transpennine Route Upgrade (which incorporates Transpennine Electrification) (TRU)
- Transpennine Route Upgrade Intermediate Interventions
- Tram Train Pilot

The schemes to electrify Oxenholme to Windermere and Bolton (Lostock Jn) to Wigan are currently at an early stage of development. Network Rail will confirm the delivery dates on completion of GRIP 3.

The diagram on the following page sets out our plan for scheme delivery across the area and the passenger benefits that will come online as a result of these schemes.

North of England projects and passenger benefits



The Midlands passenger services

This section covers the rail networks in the West and East Midlands and beyond, from the Welsh borders in the west to Lincolnshire in the east, together with the Midland Main Line (MML) from St Pancras International to the East Midlands. Also included are the Chiltern lines from London Marylebone to Aylesbury and the West Midlands via Banbury, plus the East West Rail route being developed from Oxford to Bedford.

Passengers across the Midlands will experience substantial improvements in their rail services during CP5, with additional capacity on key routes, improved journey times between key towns and cities in the region and visible improvements to stations.

As announced in September, Network Rail is delivering the upgrade and electrification of the Midland Main Line. This will see electrification to Kettering and Corby in 2019 and to Derby, Nottingham and Sheffield in 2023.

Passengers using Birmingham New Street station are already experiencing the significant improvements from the Birmingham New Street Gateway project with the opening of the new concourse and atrium. This redeveloped station opened by the Queen recently provides:

- Capacity for the strong growth in numbers of passengers using the station
- Improved access to Birmingham city centre from the station
- Provision of an appropriate gateway for those arriving in the city of Birmingham.

In CP5 passengers travelling into Birmingham will also experience:

- Additional seating capacity on trains as electric trains between Walsall and Rugeley release the existing diesel trains to other services (subject to the operational plans of the train operator, the potential for approximately 1700 extra seats in the three-hour morning peak, or an increase of four per cent)
- An extra four tph from north Worcestershire into Birmingham.

The Network Rail projects that deliver these improvements include:

- Provision of additional track on the Redditch branch which is already complete
- Extension of electrification from Longbridge to Bromsgrove
- Extension of electrification from Walsall to Rugeley Trent Valley.

Network Rail will undertake infrastructure works to enable services to stop at the new Kenilworth station, which is a third party funded scheme.

Passengers using trains on the Midland Main Line will see the impact of service changes through the completion of the Thameslink Programme and will see significant improvements in longer distance journeys. Taken in conjunction with an appropriate rolling stock solution this will provide:

- More seats to address growing demand
- Faster journeys between Leicester, Nottingham, Derby and Sheffield and London
- A sixth long distance train per hour running between Kettering and London
- The opportunity to improve journey times between Birmingham and Yorkshire via Derby.

The Network Rail works that contribute to these benefits include:

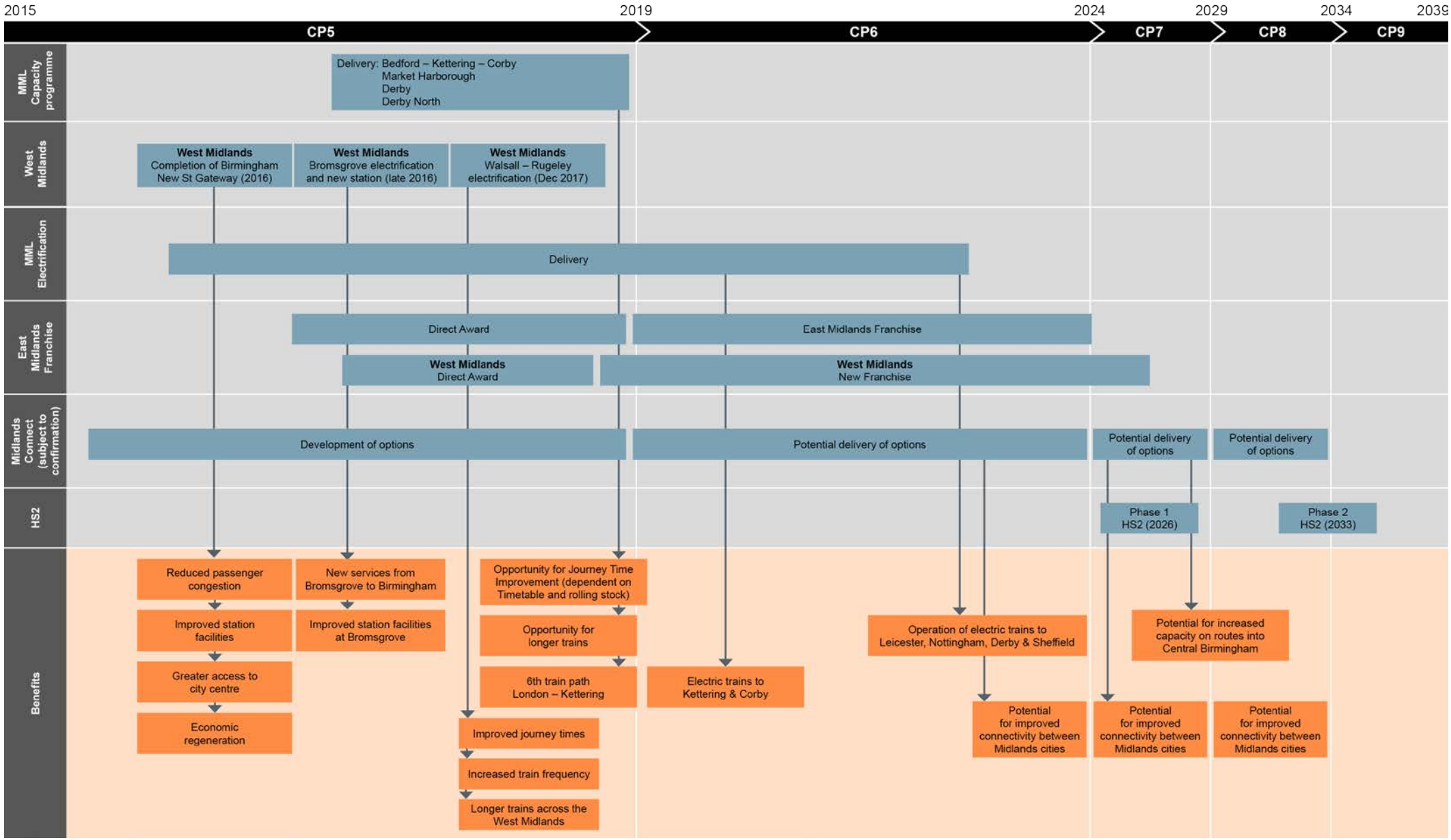
- Additional track between Bedford and Kettering
- Provision of a second track between Kettering and Corby
- In partnership with the Local Enterprise Partnerships straightening the line through Market Harborough to allow trains to run through more quickly
- A simplification of the track and signalling at Derby station to improve speeds and separate trains with different destinations
- Improvements to the track and signalling between Derby and Chesterfield to improve the speed of trains
- Longer platforms at stations to enable longer trains to operate
- Electrification of the route north of Bedford;
  - Bedford to Corby for December 2019
  - Kettering to Derby/Nottingham for December 2023
  - Derby to Sheffield for December 2023.

Further details of the specific schemes that deliver all the improvements listed in this section are shown in the updated summary project plans section. The relevant schemes are:

- Derby Station Area Remodelling
- Midland Mainline Electrification
- MML Programme – Capacity (Kettering to Corby)
- MML Programme – Capacity (Bedford to Kettering)
- MML Programme – Capacity (Long-Distance High-Speed Services Train Lengthening)
- Market Harborough Line Speed Improvement
- Derby to Sheffield Journey Time Improvement
- Birmingham New Street Gateway project
- Walsall to Rugeley electrification
- Bromsgrove electrification
- Redditch branch enhancement.

The diagram on the following page sets out our plan for scheme delivery in CP5 and CP6 across the area and the passenger benefits that will come on line as a result of these schemes.

The Midlands projects and passenger benefits



East – West Rail/Chilterns services

The key benefit passengers will see in this area is increased capacity on services to/from London Marylebone. Passengers travelling on services between London Marylebone and the West Midlands via High Wycombe have already seen the benefits of longer trains providing additional seats.

In additional to this, in 2016 two trains an hour will operate between Oxford and London Marylebone via Bicester, with services to Oxford Parkway having commenced before the end of 2015.

The Network Rail works to facilitate these outputs include:

- Lengthening existing station platforms
- Provision of new track and signalling between Oxford and Bicester
- A new station at Oxford Parkway.

Taken together, these works have the potential to accommodate up to 1000 additional passengers in the three-hour morning peak, an increase of approximately six per cent.

During CP5 development work will continue into the full re-opening of the route between Bicester and Bletchley – a project which will enable trains to operate between Oxford/Aylesbury and Milton Keynes/Bedford (East West Rail Phase 2) and delivery will be started as soon as possible.

Further details of the specific projects that deliver these improvements will be shown in a draft update of the Enhancement Delivery Plan. The relevant schemes are:

- East West Rail Phase 1
- Chiltern Main Line Train Lengthening

West Coast Main Line passenger services

This section covers the very busy route from London Euston to the West Midlands, the North West and Scotland, including the approaches to Birmingham, Liverpool and Manchester. The West Coast Main Line (WCML) has seen substantial investment over the last decade and the plans currently being implemented in CP5 represent the completion of a series of works to relieve key bottlenecks on the route.

To this end, Network Rail is currently completing works at Stafford that will provide improvements for services on the WCML in CP5, including:

- Capacity through the Stafford area for two additional fast trains from London to the North of England
- Capacity through the Stafford area for an additional service between Birmingham and Manchester
- Improvement to the performance of trains through the area.

In collaboration with train operators through the timetable development process, the opportunity for journey time reductions is also expected to be realised.

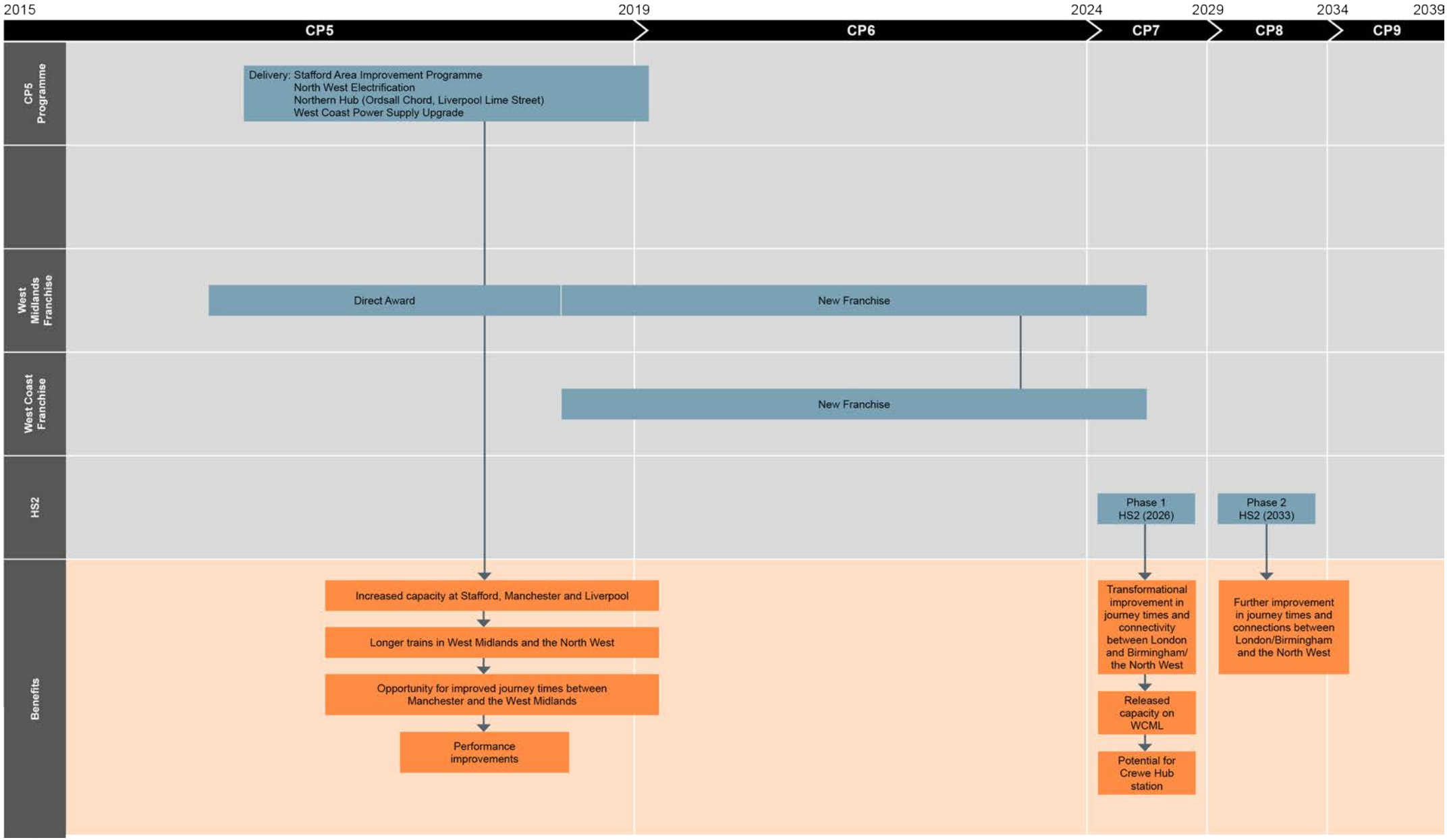
Passengers using Birmingham New Street are already seeing significant improvements in that station, which are described in the Midlands section.

Further details of the specific schemes that deliver these improvements will be shown in the draft update of the Enhancement Delivery Plan. The relevant schemes are:

- Stafford Area Improvement Scheme
- West Coast Power Supply Upgrade.

The diagram on the following page sets out our plan for scheme delivery in CP5 and CP6 across the route area and the passenger benefits that will come on line as a result of these schemes.

West Coast Main Line projects and passenger benefits



East Coast Main Line passenger services

This section covers the East Coast Main Line (ECML) from King's Cross, linking London and parts of the South East with Lincolnshire, Yorkshire, the North East and Scotland. Network Rail is working with the Train Operators through the Intercity Express Programme and the East Coast Connectivity Programme to deliver major benefits to passengers throughout CP5, with the full benefits being seen in 2020. Passengers will see:

- New Super Express Trains replacing the current long distance fleets
- New trains providing more seats for growing passenger numbers
- The opportunity for faster journeys by allowing slow trains to get out of the way of faster services more easily

The Network Rail works programme includes:

- Providing more electric power through the overhead line system
- Works to station platforms, tunnels and bridges to allow the new longer trains to run
- Works on the approach to King's Cross to provide additional track into the station
- An additional track on the approach to Huntingdon to allow London-bound services to overtake slower trains
- The ability for slower services to pass under the ECML north of Peterborough to access the route north via Lincoln providing faster journeys on the route via Grantham and Newark
- New platform and signalling changes at Doncaster so slower trains are kept away from faster ones
- New tracks to provide overtaking opportunities between Northallerton and Newcastle.

Network Rail has received proposals from three different train operators for the specific train services that will make use of the enhanced infrastructure. Capacity does not exist for all the proposals to be accepted and the three proposals are currently being considered by the ORR.

Further details of the specific schemes that deliver these improvements will be shown in the updated Enhancement Delivery Plans. The relevant schemes are;

- East Coast Connectivity Fund
- Intercity Express Programme – East Coast Capability
- Intercity Express Programme – East Coast Power Supply Upgrade
- Gordon Hill Turnback

The time required to obtain the statutory consents for the works on the approach to Huntingdon and grade separation north of Peterborough see these works being completed in 2020.

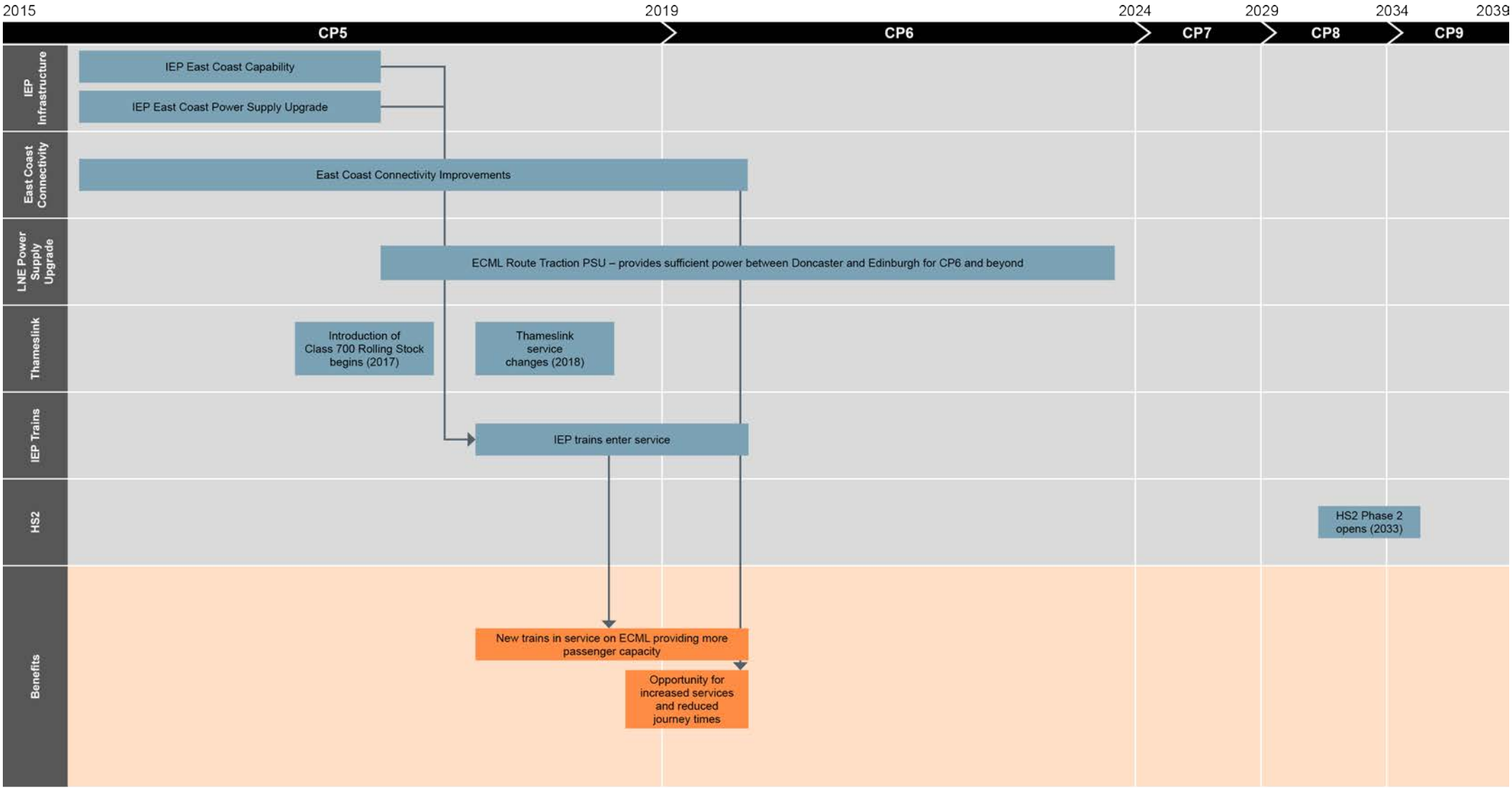
In addition to the above passenger benefits and associated schemes, it should be noted that many passengers using the London end of the ECML from Peterborough and Cambridge southwards will benefit from completion of the Thameslink Programme in 2018.

This will see new rolling stock and additional capacity provided alongside greater cross-London connectivity with new destinations south of the Thames directly accessible from the ECML.

Finally, to further support performance and efficient rolling stock utilisation on Hertford loop services in CP6, it is envisaged that a turnback facility will be provided at Stevenage for suburban services from the south.

The diagram on the following page sets out our plan for scheme delivery in CP5 and CP6 across the route area and the passenger benefits that will come on line as a result of these schemes.

East Coast Main Line Projects and Passenger benefits



London and South East passenger services

The South East Route: (Sussex and Kent)

The South East Route covers the dense commuter and regional networks emanating to the south and south east of London. The principal benefits that will be delivered in CP5 in this area are extra peak capacity for London and regional commuters and greater cross-London connectivity for passengers travelling between Sussex, Kent, parts of Surrey and key destinations north of the Thames such as St Pancras International, Luton Airport and Cambridge.

These will be reflected by the following service improvements in CP5:

- Kent Suburban area: Infrastructure to enable the lengthening of peak services on key Kent suburban routes into Charing Cross and Cannon Street, offering up to 20 per cent additional peak capacity. Depot and Stabling plans are still being finalised between the train operating company/DfT and Network Rail
- Kent Outer area: A new station at Rochester better located for the town and supporting the operation of longer trains in the peak
- Brighton Main Line (BML): A increase in capacity on the main line to London Bridge with peak Thameslink services lengthened to allow extra capacity per Thameslink train, and main line Thameslink services re-routed via London Bridge on completion of works at that location, delivering an improved frequency of service between the BML and London Bridge peak and off-peak
- BML: A wider range of direct cross-London services for destinations north of the river and greater capacity on the Thameslink core between London Bridge and Kings Cross St Pancras.
- London Bridge: A new station and new concourse designed to cater for long-term growth in passenger numbers
- Uckfield line and Croydon: An approximate 50 per cent increase in peak capacity on Uckfield to London Bridge services relieving crowding not just on the branch itself but also at East Croydon – the infrastructure works to deliver this will now be delivered early in 2016.

The projects Network Rail will deliver in CP5 in order to support the above outputs for passengers are listed below. The Updated summary project plans section contains more detail on each scheme:

- Kent Suburban area: Completion of Power Supply Upgrade works to support longer trains (the lengthened platforms have already been delivered on schedule by Network Rail). Completion dates for depot and stabling works are still to be agreed with DfT and Southeastern.
- BML & London Bridge: Completion of the Thameslink Programme. Completion of major power supply upgrade works. Completion of the Redhill remodelling scheme.
- Uckfield & East Croydon capacity: Completion of Uckfield line platform lengthening in 2016 - two years earlier than anticipated.

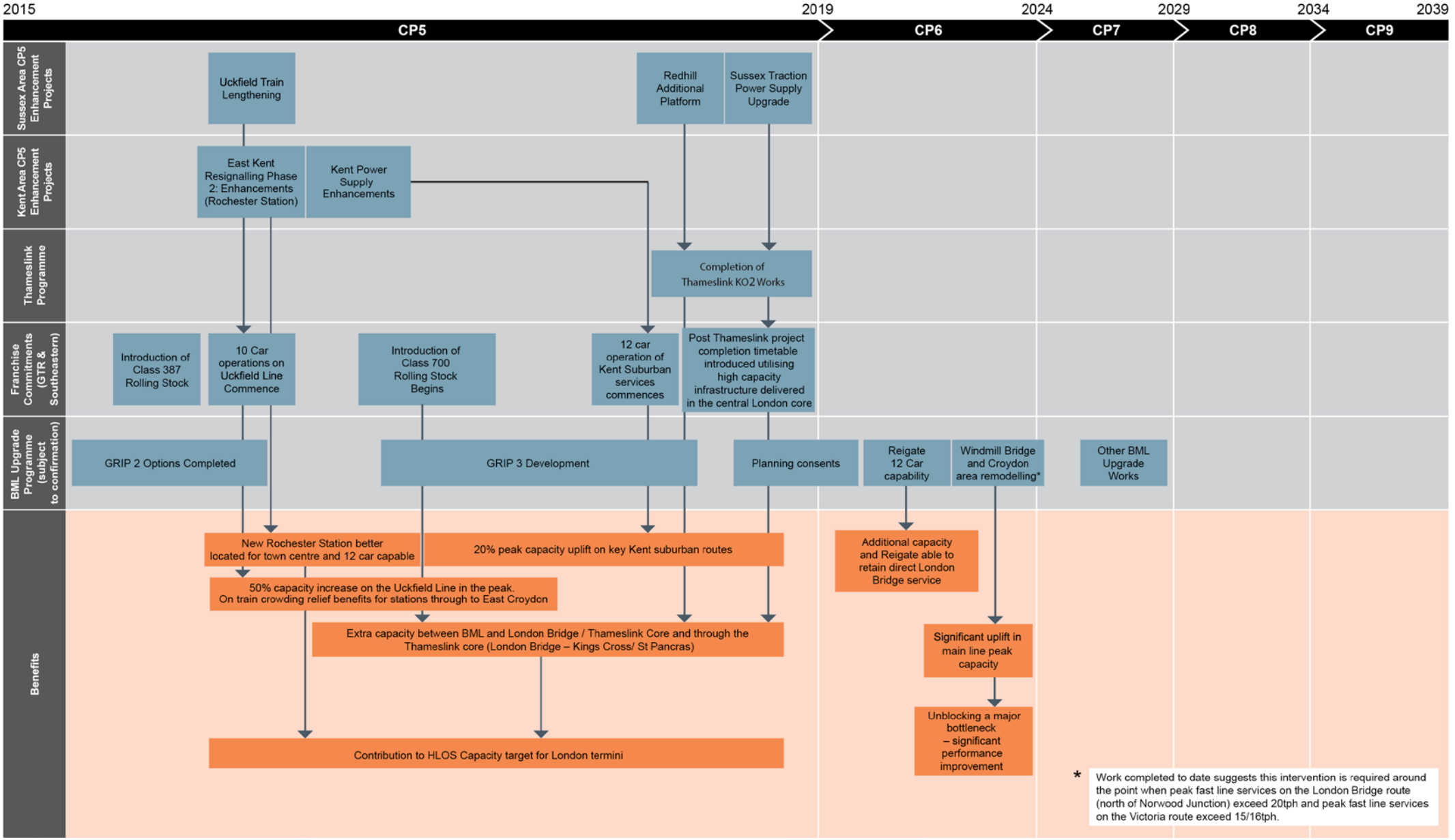
It should also be noted that in this route area two key passenger benefits for CP5 have already been delivered. These are:

- Doubling of capacity on the West London Line (WLL) to allow up to eight car operation (Network Rail completed platform lengthening in September 2014)
- 20 per cent increase in peak capacity on Caterham/ Tattenham to London Bridge/ London Victoria (platform extensions completed by Network Rail December 2013)

Just one project from Network Rail's original Strategic Business Plan (SBP) for CP5 is now planned to be completed in early CP6 in this area. This concerns the Victoria Station decongestion scheme (S004) retail units at Victoria Station and increasing space for passenger circulation.

The diagram on the following page sets out our plan for scheme delivery in CP5 and CP6 across the route area and the passenger benefits that will result.

South East Route: projects and passenger benefits



The Wessex Route

The Wessex Route covers the South West Main Line (SWML) routes to Surrey, Hampshire and Dorset as well as the complex commuter network throughout South West London and the suburbs. The key benefits that will be delivered in CP5 in the Wessex area are extra peak capacity for Windsor Line commuters, Main Suburban commuters (on Kingston, Epsom, Chessington, Cobham, Shepperton, Hampton Court and Strawberry Hill routes) and extra peak capacity for SWML commuters from Surrey and Hampshire.

These will be reflected by the following service improvements in CP5:

- Main Suburban area: Lengthening of peak services on all main suburban routes into Waterloo leading to extra capacity throughout the peaks
- Windsor Lines: lengthening of Reading line services delivering extra capacity on that route into London Waterloo in the peak. Some additional peak only services from the Hounslow loop to Waterloo
- SWML (Surrey / Hampshire-London): Additional capacity during the peaks. Strengthening of main line services across the three-hour peak so all are operating at maximum length
- London Waterloo Station: Full re-opening of Waterloo International (WIT) to allow for the above service increases on the Windsor lines in CP5 and pave the way for future additional main line services in CP6 and beyond.

The projects Network Rail will deliver in CP5 in order to support the above outputs are listed below: The Enhancement Delivery Plans will contain more detail on each scheme:

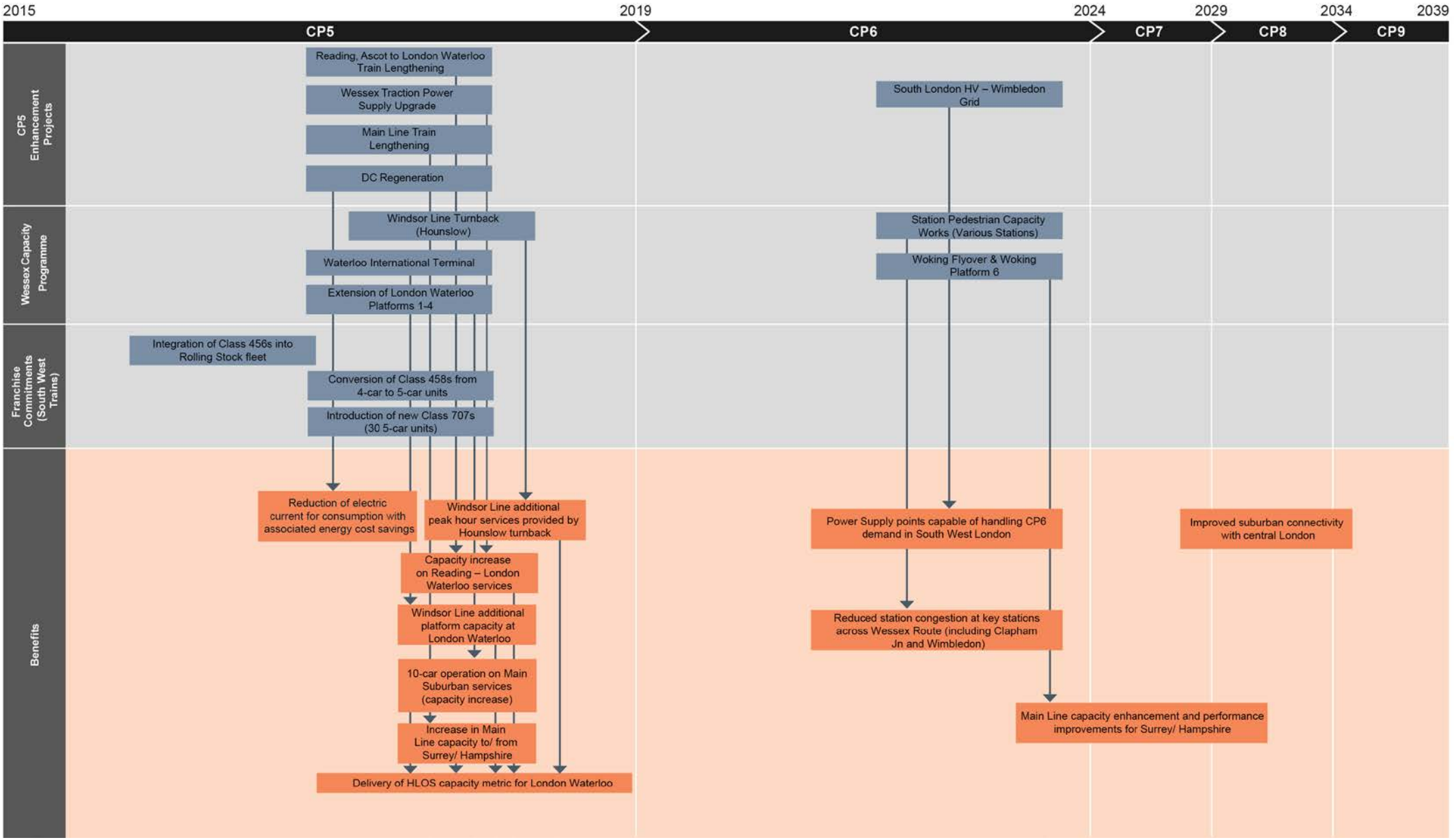
- Main Suburban area: remodelling of Platforms 1-4 at Waterloo to allow 10-car operation (all platform lengthening outside of Waterloo is already completed in CP4). Station capacity works at Waterloo and Vauxhall.
- Windsor Lines: Platform lengthening on the Waterloo-Reading route and associated power supply upgrade. WIT re-opening to support additional services.
- Main Lines: Some power supply upgrade works
- Waterloo Station: Works to aid passenger flow platforms 1-4 and around WIT. Re-opening of WIT, associated track work and work to aid passenger flow.

The only works from Network Rail's original SBP for CP5 that are planned to be completed in early CP6 in the Wessex area are as follows:

- Station capacity works on the suburban lines out of Waterloo. Some locations will see improvement to passenger flow at stations now in early CP6 rather than in CP5
- Queenstown Road new platform and associated track alterations. This work will take place in CP6 now, as the main benefit of the work is that it enables additional peak long-distance services in the longer term, once Woking Junction and other key constraints are removed
- South London HV (Wimbledon Grid). Implementation of this scheme will now take place in CP6 to align with works that National Grid is undertaking at the site.

The diagram on the following page sets out our plan for scheme delivery in CP5 and CP6 across the route and the passenger benefits that will result.

Wessex: projects and passenger benefits



The Anglia Route

The Anglia Route covers the Great Eastern Main Line (GEML) to Ipswich and Norwich, the West Anglia Main Line (WAML) to Cambridge, Ely and Kings Lynn, the suburban routes on North Thameside, key cross-London orbital routes and an important cross-country and regional network of lines in Essex, Suffolk, Cambridgeshire and Norfolk. The key benefits that will be delivered on the Anglia Route in CP5 are:

- New services and improved connectivity between local stations on the WAML and Stratford, supporting major housing development in the Lee Valley
- A step change in capacity and connectivity between stations inwards of Shenfield and central/ west London via Crossrail
- An electric service on the Gospel Oak–Barking (GOB) line with new rolling stock
- The first steps towards improved journey times on the GEML between Norwich and London.

These will be reflected by the following measurable service improvements in CP5:

- West Anglia: An increased frequency of service between some local WAML stations and Stratford – an approximate doubling in capacity and frequency at certain times of day
- GEML Inner suburban: an increase to around 16tph in the peak on the electric lines offering increase in peak capacity and cross-London connectivity. Through operation to central and West London via Crossrail.

Separately as part of DfT's franchising plans it has committed to deliver "Norwich in 90" services within CP5 and there is capital in CP5 for initial work.

The projects Network Rail will deliver in CP5 in order to support the above outputs are listed below. The updated summary project plans section contains more detail on each scheme.

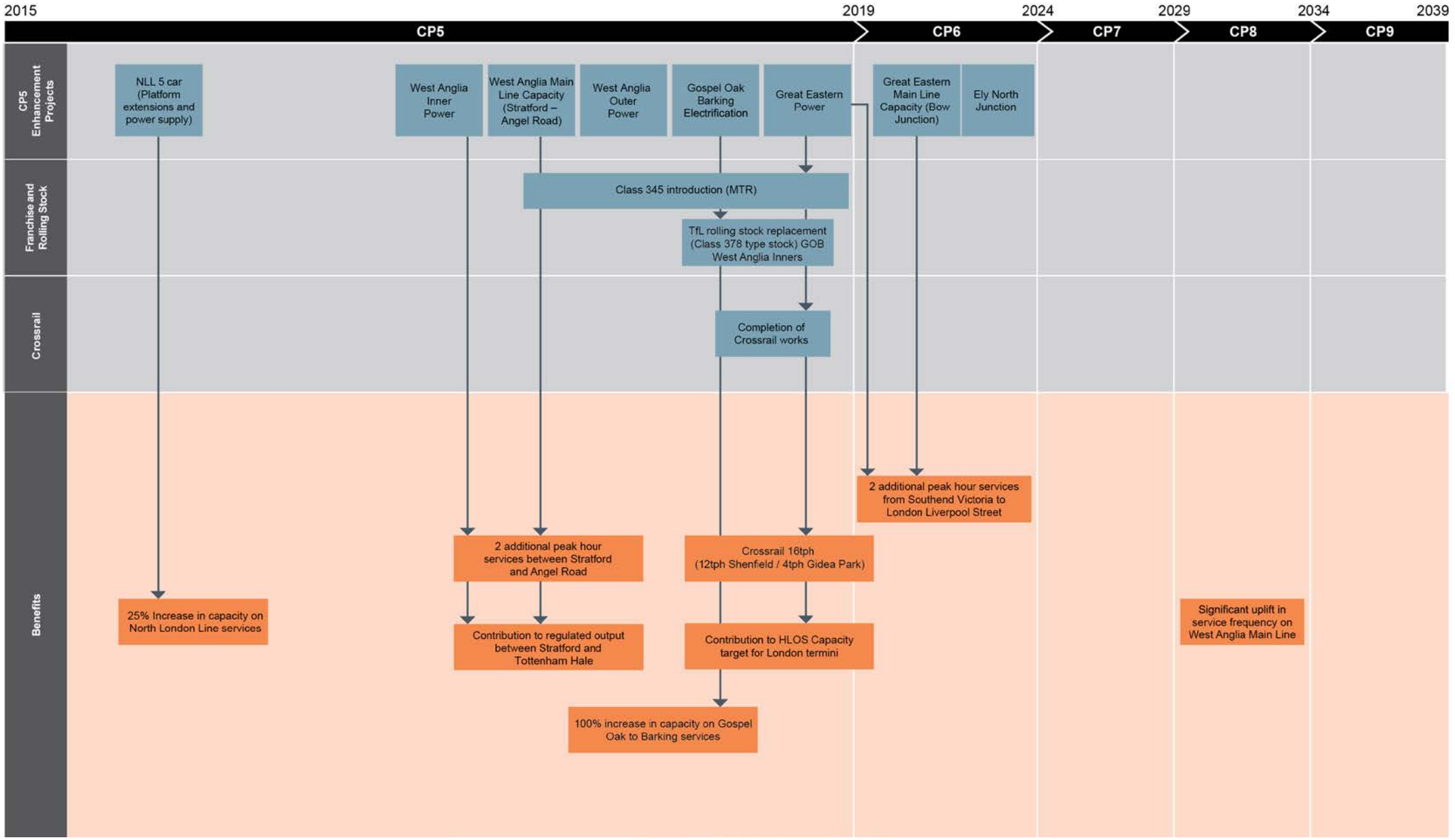
- West Anglia: Construction of a third track on the West Anglia route through Tottenham Hale and Angel Road. Power supply improvements along the line of route. Construction of a newly located station at Angel Road
- GEML Inner suburban: Extensive on network works to support Crossrail operations between Pudding Mill and Shenfield
- GEML power supply enhancements
- GOB: AC electrification of the route
- Commence enabling works on the GEML to improve linespeed.
- Network Rail is undertaking development on a scheme to allow the lengthening of peak time services on the Cambridge to Kings Lynn corridor from 4 to 8 car length to tackle overcrowding and will report back to DfT on costs and programme for delivery in spring of 2016.

The only works from Network Rail's original SBP for CP5 that are planned to be completed in CP6 in the Anglia area are as follows:

- Bow Junction remodelling.
- Ely North Junction. This scheme will be delivered now in CP6 to allow co-ordination with safety critical level crossing works nearby. Despite this Network Rail is aware of the strong aspiration of the DfT and local user groups and MPs to see improvements to services on the Cambridge to Kings Lynn corridor as soon as practicable.

The diagram on the following page sets out our plan for scheme delivery in CP5 and CP6 across the route and the passenger benefits that will result.

Anglia: projects and passenger benefits.



Western and Wales passenger services

The Western and Wales routes are extensive and diverse, the focal element being the Great Western Main Line (GWML) which runs from London to Bristol leading into the main line route through Wales and the south west to Penzance. Extending from this are radial routes to Oxford, the Cotswolds, Birmingham, South, Mid and North Wales and the South Coast. Branch lines into the London suburbs, to the Devon and Cornish coast and dedicated freight only lines complete the mix of routes. In urban south-east Wales is the cluster of lines known locally as the Cardiff Valley lines which radiate from the capital city of Cardiff.

Rail services within the route support long-distance, interurban and commuter passenger flows into and between the main centres of London, Reading, Bristol, Cardiff, Swansea and Exeter. Significant freight flows also operate across the route and include intermodal, steel, automotives and aggregate traffic serving a number of key freight terminals.

Significant benefits for passengers in our Western Route area and Wales will be achieved through improved capacity, service frequency, connectivity, new trains and improved journey times – all contributing to the economic benefits of rail by encouraging modal shift. We will also complete design and planning consent activities on a new western link to Heathrow as planned with delivery in CP6.

Inner Suburban (Reading to Paddington)

- From December 2019, the full Crossrail service will replace current inner suburban services and provide improved connectivity to the West End and London. The services will provide an increased service provision with 24 tph in each direction in the peak hour, through the central tunnel with 14 services in the peak hour turning round at London Paddington, four tph to London Heathrow Airport, two tph to West Drayton, two tph to Maidenhead and two tph to Reading
- Crossrail will make travelling in the area easier and quicker reducing crowding on London's existing transport network, by approximately 30 per cent on the western section of the route. Crossrail could also reduce journey times between the City of London, Twyford, Maidenhead and Slough by circa 30 minutes compared with 2013

Outer Suburban, Regional and Longer Distance Services

- Electrification will facilitate the progressive introduction of electric passenger services on the Great Western Main Line (to Bristol, Cardiff and Swansea), regional (Oxford/Newbury) and suburban (Thames Valley branches) services and provide a significant increase in seating capacity
- The provision of electric trains on inner and outer Thames Valley services (specifically to Didcot, Oxford, Reading and Newbury) will provide around 40 per cent increase in peak capacity into London Paddington
- The introduction of longer eight-car electric trains proposed on the outer suburban services from London to Oxford and Newbury with the new Electric Multiple Unit (EMU) fleet in the Thames Valley, facilitates the cascade of rolling stock to the West of England services, initially to the Greater Bristol area, providing greater seating capacity (circa 10 per cent) and improvements in journey times
- The ability of the new Super Express Trains (SET) to operate in electric or diesel (bi-mode) functions also enables capacity benefits to be seen on other routes where bi-modes will be operating such as the North and South Cotswolds and to the South West
- The enhanced capabilities and qualities of the new rolling stock (through acceleration and braking) implementation of electrification plus the revised service specification structure will benefit passengers across the whole route through improved end-to-end journey times on long distance services.

Valley Lines

- Valley Lines Electrification will modernise the commuter network into Cardiff, providing faster journey times, better connectivity and service improvements for passengers. The Welsh Government, which is the primary funder, is making a decision on the scope and direction of this project
- DfT is reiterating its commitment to provide the agreed contribution directly to Welsh Government for the Valley Lines Electrification. This will enable the Welsh Government to make decisions on the scope and direction on this project.

Network Rail's programme of works in CP5 to enable these service changes includes:

- Crossrail
- Great Western Electrification Programme: London Paddington to Cardiff, via Bristol Parkway, part of Thames Valley Branches (excluding Maidenhead to Bourne End and Marlow Branch Lines), Bath to Bristol Temple Meads and Reading to Newbury and associated new grid supply, feeder at Bramley and Filton Bank Electrification
- Intercity Express Programme and required capacity improvements at Paddington and Bristol Parkway
- Great Western Route Modernisation Programme which includes Oxford Corridor Phase 0 and works associated with progressing the Transport and Works Act order,

capacity improvements between Dr Days Junction and Filton Abbey Wood, passenger circulation improvements at Bristol Temple Meads
- Completion of Cardiff Area Signalling Renewal in early 2017
- Reading Station Area Redevelopment
- Barry – Cardiff Queen Street corridor capacity enhancements.

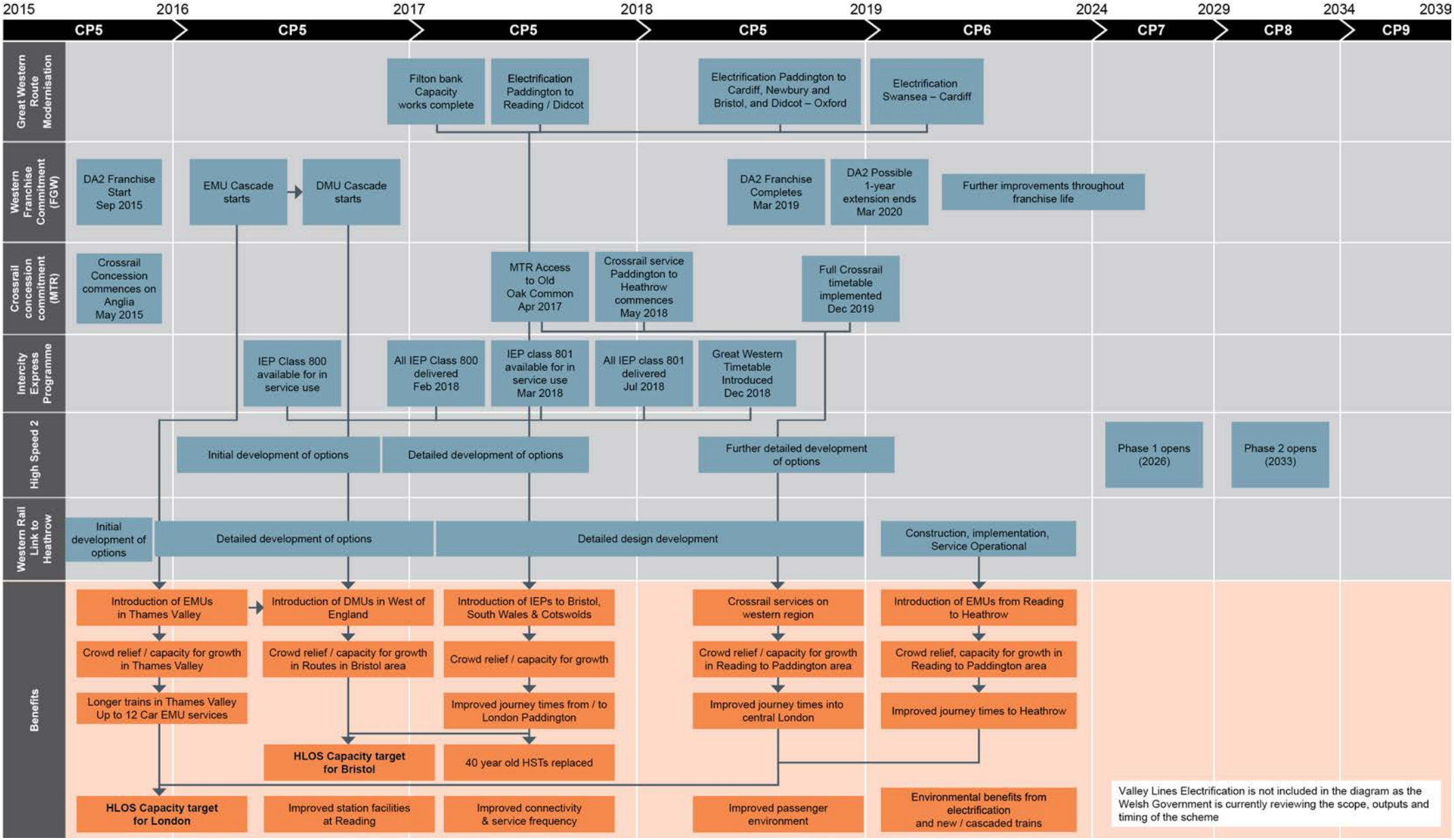
In each case, more detail on the projects can be found in the relevant Enhancement Delivery Plans.

Elements of scope within some specific projects will continue to be delivered within CP6, these include:

- Great Western Electrification; discrete sections of electrification Cardiff to Swansea
- Oxford Station Area Capacity & Station Enlargement Phase 2; Oxford Station Area Capacity & Station Enlargement: reprogrammed to CP6 to better align with Oxford City Council's aspirations to improve the highway through the Botley Road Bridge
- Bristol Temple Meads passenger capacity has been divided into two parts. In CP5 the passenger circulation works will be delivered, however, the reinstatement of platforms within the Midland Shed capable of accommodating a 260 m long 10-car train is now proposed to be included with the Bristol Temple Meads Master Plan. The remaining elements of scope will not affect service benefit outcomes. This will be subject to future external funding being finalised
- ERTMS Infrastructure; Paddington to Bristol South ETCS Commissioning. Continuation of this project during later control periods has no impact on service benefit outcomes
- Construction of the Western Rail Link to Heathrow will be delivered as planned, subject to planning consent.

The diagram on the following page sets out our plan for project delivery in CP5 and CP6 across the area and the passenger benefits that will come on line as a result of these projects.

Western and Wales projects and passenger benefits



Improvements for freight customers

Rail freight plays a vital role in Britain's economy. Since rail privatisation volumes have increased by over 80 per cent; from 13.5 billion net tonne km in 1995 to 24.4 billion net tonne km in 2013–14. In 2013 KPMG estimated that rail freight delivers productivity gains for UK businesses and congestion and environmental benefits totalling over £1.5 billion per year.

The enhancement of rail infrastructure targeted at freight services seeks to facilitate the growth of the market and to reduce conflicts between freight and passenger traffic, increasing overall capacity for all rail services. Investment in schemes to date has delivered significant environmental, operational and economic benefits.

Strategic Freight Network Fund

The DfT document 'Britain's Transport Infrastructure – Strategic Freight Network: The Longer Term Vision' set out the vision for how the rail network could be optimised for freight. A Strategic Freight Network (SFN) Fund has been set up for the current and previous control periods to provide funding for rail freight schemes. Appraisals carried out for schemes funded by the SFN Fund indicate an average Benefit Cost Ratio of between four and five, which is 'very high' value for money using the DfT's criteria.

The schemes prioritised are assessed against the nine objectives of the SFN:

- Longer and heavier trains
- Efficient operating characteristics (through-running of freight trains without the need for looping and recessing)
- 7-day and 24-hour capability
- W12 loading gauge
- UIC GB+ (or 'European') gauge freight links
- New freight capacity
- Electrification of freight routes
- Strategic rail freight interchanges and terminals
- Strategic freight capacity initiative (to provide a quantum of protected freight paths across the SFN where growth is forecast).

The SFN Fund is managed by a cross-industry stakeholder group, the SFN Steering Group, which oversees the development of schemes and outputs of the fund.

Schemes delivered

The SFN Fund is the main source of funding for rail freight enhancements. A mix of projects have been developed and implemented, some providing immediate capability or capacity enhancement, whilst others enable the delivery of future benefits from a wider set of infrastructure changes in future control periods. Examples of current works delivering immediate benefits include a number of successful gauge enhancement projects, while enablers of future benefits typically comprise elements of incremental line-of-route upgrades which need to form part of a longer term plan. Freight enhancements can be categorised in two ways – capability and capacity:

- Capability enhancements support the operation of bigger, longer and heavier services
- Capacity enhancements provide additional paths and performance improvements for freight services.

Examples of recently delivered projects include:

- Ipswich Yard Train Lengthening – to support the capacity for rail freight services to and from Felixstowe by enabling Ipswich Yard to handle longer freight trains
- Peak Forest to London train lengthening – delivers the capacity for 775m length trains and allows longer aggregate and cement trains to travel from the Peak Forest and Hope Valley into London via Dore Junctions and the Midland Main Line
- Southampton W12 diversionary route (via Andover and Laverstock) – creates a W12 route between Southampton and Basingstoke to enable intermodal traffic to run whilst maintenance and renewal takes place on the core route via Eastleigh.

Programmes in development and delivery

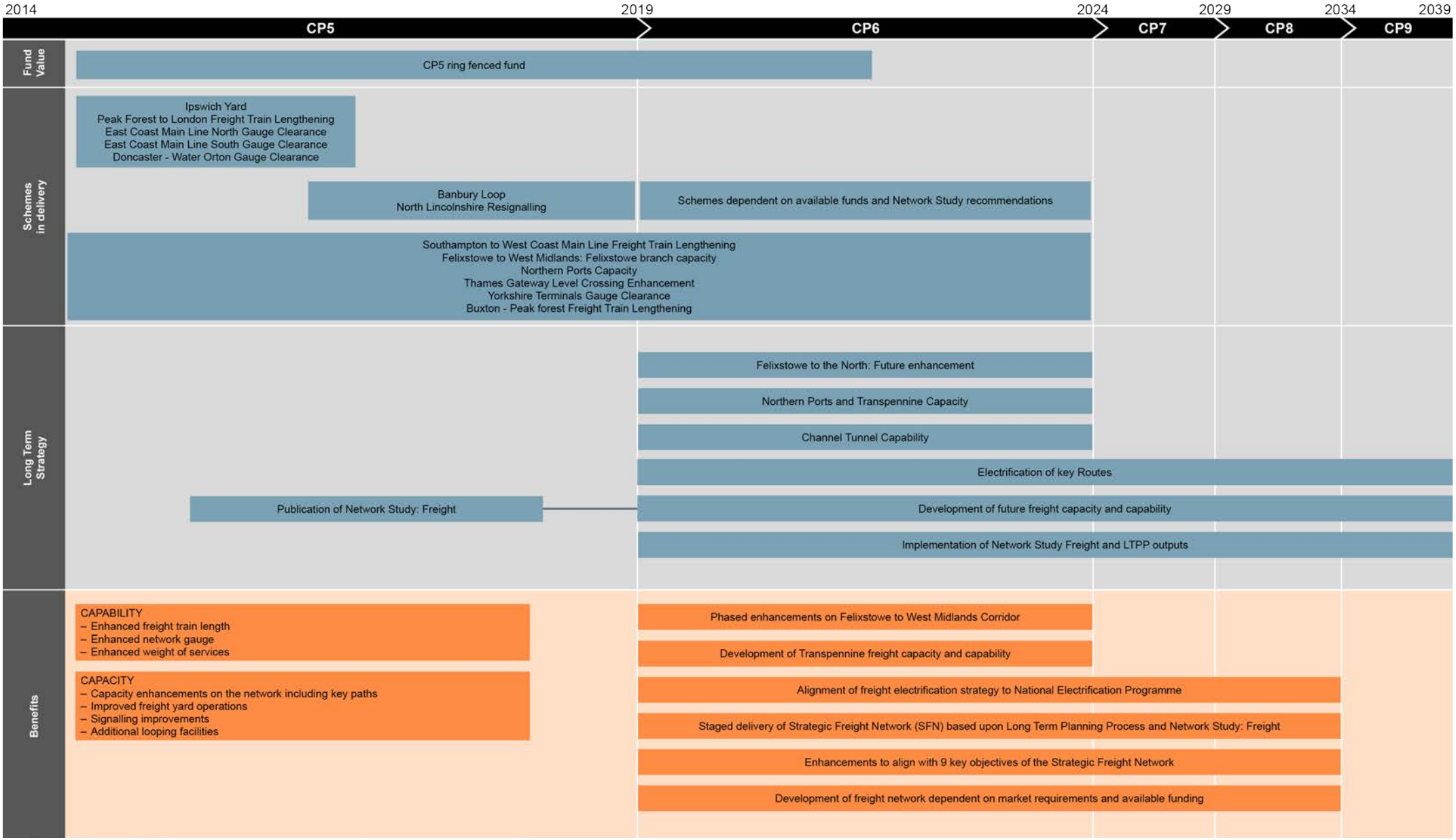
Key projects that are currently being developed through the SFN fund include the Felixstowe to Nuneaton programme and Southampton to WCML freight train lengthening.

The Felixstowe to Nuneaton programme is delivering capacity enhancements on the key freight route from the Port of Felixstowe to the West Midlands and the north. This enables a greater quantity of intermodal freight services on this core route from the port. Enhancements delivered in the previous control period include Nuneaton North Chord, Ipswich Yard capacity and resignalling enhancements. During CP5, a scheme to increase the capacity of the Felixstowe branch is being developed with the aim of supporting increased freight train paths in CP6.

The purpose of the Southampton to WCML train lengthening programme is to allow 775m train lengths for intermodal services from the Port of Southampton to the West Midlands and WCML. The works, started in CP4, will continue in CP5 and include elements of loop lengthening, speed increases and signalling works.

A number of other schemes are also being developed in this control period. These schemes include Northern Ports and Transpennine capacity and Thameshaven level crossing enhancements. These schemes also increase capacity from major ports.

Freight benefits



Ring Fenced Funds

In addition to the large range of major enhancement schemes in delivery and development, a large number of generally smaller enhancement schemes are being delivered all over the country currently as a result of a set of general ring fenced funds made available to Network Rail in CP5.

These funds and the benefits passengers will see from the investments made from them between now and 2019 are summarised below. In each case, significant benefits have already been delivered in the first 18 months of CP5. Although the schemes delivered by Network Rail under these ring fenced funds tend to gain limited attention at a national level, the benefits they deliver often make a significant difference to passengers' journey experiences on a daily basis. The schemes themselves also employ a significant part of overall industry delivery resource and also have substantial demands on access to the railway for works.

Examples of ring fenced funds are set out below. The updated Enhancement Delivery Plan to be published in early December will include an individual entry for each of the funds. All of the schemes in the ring fenced funds will go ahead in CP5 or CP6.

Level Crossings Risk Reduction Fund

The purpose of this fund is to reduce risk of accidents at level crossings. A wide range of schemes are being delivered in CP5 to support this aim, with the priority being the permanent closure of high risk level crossings. In addition, footpath crossings are being replaced with footbridges, and crossings that cannot be closed are being upgraded to improve safety. There are over 200 locations nationwide where work has either already been delivered, or is in the process of being developed or delivered by the end CP5. A cross-industry Level Crossings Strategy Group (LCSG) has provided strategic direction in helping Network Rail to prioritise the use of this fund. We will continue to explore opportunities for obtaining additional funding for reduction of level crossings risk.

National Stations Improvement Programme (NSIP)

The purpose of this fund is to achieve a noticeable improvement to the passenger perception of stations, focusing on high footfall, low passenger satisfaction stations. Schemes currently in delivery range from improvements to passenger information in times of disruption to improved customer facilities and access. Over 450 stations benefited from investment in CP4 and the CP5 programme is an extension to this.

NSIP investment at stations is proposed by a Local Delivery Group (LDG) and the NSIP Board (a cross-industry body consisting of train operating owning group representatives, the DfT, ORR and Network Rail) agrees funding allocation to projects meeting the agreed criteria.

Stations – Access for All (AfA)

The fund aims to increase accessibility at stations across the network, building on the significant work carried out to date which has delivered over 140 schemes.

For each station in scope, the aim is to achieve an unobstructed 'accessible route' within Network Rail controlled infrastructure, from at least one station entrance (usually the main one) and all drop-off points associated with that entrance, to each platform and between platforms served by passenger trains.

An accessible route is defined as:

- meeting all applicable areas of 'Accessible Train and Station Design for Disabled People Code of Practice technical standards, except where dispensations have been agreed
- a distance, ideally not exceeding 400m, from station entrance (or drop off point if further) to the appropriate point of entry/exit of trains at platforms
- a route for a manually self-propelled wheelchair user to negotiate.

Network Rail's role is to manage the programme and deliver efficiently the schemes that are authorised by DfT to draw down from the fund.

Network Rail Discretionary Fund (NRDF)

This fund is a mechanism for funding small (typically less than £5 million) schemes for which funding is not available elsewhere and that have a positive whole-industry business case. It is primarily aimed at schemes that will result in an increase in the capacity or capability of the network. Typically the fund is used to add small scale enhancements to Network Rail's renewals activity on the network, for example, adding additional signals to a re-signalling scheme to increase capacity at a network pinch-point. Scheme priorities are agreed locally with train operators through local working groups.

The fund has already delivered a substantial number of network improvements in CP5, building on the schemes already delivered in the last control period.

Passenger Journey Improvement Fund (PJIF)

The fund will be used to deliver a step change improvement in journey times on key corridors in conjunction with other major capacity and capability improvements with the intention of delivering significant enhanced franchise and economic value.

A key focus of the fund will be journey time improvements on the MML, including at Market Harborough, Leicester South and between Derby and Sheffield.

In addition, Network Rail will deliver improvements to the journey time between Walsall and Rugeley and make some improvements on the route between Ashford and Ramsgate in Kent. Some enabling works will be commenced on the Great Eastern Mainline (GEML).

Approach and Findings

Network Rail has undertaken a comprehensive review of the enhancements portfolio so that it can reach a view on how to maximise the delivery of passenger and freight benefits in CP5 as well as maximising value for money for the taxpayer with the current funding constraints. As projects are now more mature than they were at the time of ORR's final determination, this has resulted in an equally more mature view on deliverability and cost. This section of the report describes the work undertaken together with the findings and conclusions of the review.

What has been the overall approach to reviewing enhancements?

Network Rail has conducted a detailed review of the deliverability of individual projects. This has included a full review of costs, milestones, key assumptions and risks. As a result, delivery milestones have been revised to reflect a more mature understanding of the enhancements portfolio than at the time of the Final Determination. Project forecasts have been updated to reflect both the revised milestones and appropriate levels of contingency to reflect risk.

Both Network Rail and supply chain capability have been assessed together with potential gaps in capability across the enhancements portfolio. This included assessing capability in areas such as planning, estimating and specialist skills. Risk mitigation plans have been developed to address any issues identified.

Network Rail has worked with the DfT to understand the impact of revised cost estimates on individual business cases. This has taken into account the impact of work undertaken to date and Government commitments to service changes and rolling stock.

The review has covered all enhancements work and expenditure associated with the CP5 enhancements portfolio in England & Wales and incorporates the latest understanding of funder requirements and priorities. Network Rail has worked closely with the DfT to minimise the potential impacts of this revised plan on franchising agreements and rolling stock procurement. For the deliverability assessment, the review has also covered Scotland to ensure that the overall delivery capability is considered. Separately, Network Rail continues to review the enhancement programme and borrowing requirement for Scotland and continues to update Transport Scotland and ORR.

Much of the detailed work carried out during this review has been assured by Nichols, an independent consultant that is familiar with the scale and scope of the major enhancements programmes as ORR's independent reporters through its work on the development and delivery of CP5 enhancements and renewals.

How has Network Rail assessed deliverability of the enhancement programme?

The review has systematically examined every element of the enhancement programme; reviewing costs and timescales, and establishing robust estimates of both. The project reviews looked at individual projects as well as the portfolio as a whole.

Project level reviews were conducted by internal experts that are independent of the enhancement programmes. They sought to confirm that key essentials are in place, including whether the project scope is clearly defined, schedules and cost plans are robust, and risks are well understood. Portfolio level assurance assessed whether suitable competencies are maintained across the business to deliver all the projects and programmes in the portfolio.

The business case for each programme has been reviewed. The portfolio has been reviewed against current DfT commitments for franchises and for new rolling stock. This has enabled the programme to be prioritised to reflect the Government's political commitments and maximise benefits to both passenger and freight users.

Nichols provided further external assurance to this work by reviewing the Network Rail assurance reports and then undergoing an independent verification directly with the project teams. The verification process involved an examination on programme scope and cost planning.

Project level reviews

In carrying out the deliverability review, in August 2015 Network Rail completed an assessment of the CP5 enhancements portfolio covering 28 major programmes and projects in England & Wales and Scotland, representing 70 per cent (by value) of the CP5 enhancements portfolio. Including GWEP and unpaused programmes this increases to 85 per cent. The projects reviewed are listed in the table on the following page.

The review process was based on the Major Projects Authority (MPA) Gateway approach, which examines programmes and projects at key decision points in their lifecycle. Each project underwent a comprehensive review by a highly experienced and independent team.

The reviews were undertaken over a number of days and each project was assessed to determine how likely it was to meet its commitments of regulatory milestones, project scope and outputs. The areas reviewed included:

- Project schedule – assessed interdependencies, key areas of complexity, associated third-party deliverables (e.g. planning consents, access), Quantitative Schedule Risk Assessment and anticipated timetable changes

- Project costs – reviewed for adherence to standard costing approach, identified funding gaps between the authorised budget and costs to date plus forecasts to complete
- Contingency provision – evaluated the assessment of existing provisions for scope change, contractor issues and emerging clarity around assumptions
- Commercial arrangements – reviewed contracting strategies, contractor performance, supply chain resilience and mechanisms for supply of resources
- Capability requirements – assessed the delivery capability within projects including internal specialists (e.g. timetable assessment and analysis support), plant and equipment, specialist labour and other critical resources
- Assumption and risk evaluation – evaluated the adequacy of planning and cost assumptions and identified key areas of risk
- Constraints and enablers – reviewed train and freight operator engagement, land acquisition requirements, listed building considerations and lineside neighbours communications
- Governance and assurance – assessed the clarity of roles and accountabilities, escalation and support arrangements, sponsor and funder interactions (e.g. programme boards), customer expectations, communications and stakeholder management.

In order to value the uncertainty of each project, Quantitative Cost Risk Assessment (QCRA) was carried out. This analysis provides a range of potential cost for each project with an associated confidence level. Quantitative Schedule Risk Assessment (QSRA) was also carried out to assess a range of potential impacts on the delivery schedule. This enabled Network Rail to identify the risk of further cost increases and milestone slippage. The following table lists the projects included in the review.

The projects that make up the balance of the CP5 portfolio report underwent a separate desktop review. This was based on a similar methodology using a higher level assessment of each project's plans and costs.

Since August 2015 a number of mitigating actions have been undertaken to improve the certainty of successful delivery of these 28 programmes. These actions included further development works to provide greater scope clarity and programme milestone adjustments resulting in an improved deliverability assessment. There has been a separate review of the cost and delivery schedule for the Great Western Electrification Programme and South Wales Mainline Electrification Programme (Cardiff-Swansea). These two projects were subject to a number of assurance reviews by internal Network Rail specialists and external consultants.

The deliverability review was further extended following the DfT announcement in September 2015 that works on the electrification of the Transpennine route and MML are to restart.

Project reviews	
Stafford Area Improvement Scheme	IEP – East Coast Capability: Gauging
West Coast Power Supply Upgrade	IEP – East Coast Capability: OLE
Walsall to Rugeley Trent Valley Electrification	IEP – East Coast Capability: Stations 1
North of England Programmes Phase 3	IEP – East Coast Capability: Stations 2
North of England Programmes Phase 4 + 5	IEP – East Coast Capability: OLE Resilience
North of England Programmes Northern Hub	Tram Train Pilot
East West Rail Phase 1	Kings Cross Remodelling
East West Rail Phase 2	Thameslink Programme
Derby Station Area Remodelling	Crossrail Programme
Derby to Sheffield Journey Time Improvement	Gospel Oak to Barking Electrification
MML – Capacity (Bedford to Kettering)	West Anglia Main Line Capacity Increase
MML – Capacity (Kettering to Corby)	Great Eastern Main Line Capacity Improvement (Bow Junction)
Market Harborough Line Speed Improvement	Wessex Capacity Improvement Phase 1
IEP - East Coast Power Supply Upgrade	Wessex Capacity Improvement Phase 2
Great Western Electrification Programme	Cardiff to Swansea Electrification
Oxenholme to Windermere Electrification	Transpennine Route Upgrade – Electrification York to Leeds
MML Programme Electrification (Bedford – Corby)	Transpennine Route Upgrade – Electrification Route Clearance Stalybridge to Leeds
MML Programme Electrification (St Pancras – Bedford)	Transpennine Route Upgrade – Intermediate Interventions
MML Programme Electrification (Kettering – Sheffield)	Transpennine Route Upgrade – Intermediate Interventions: Capacity improvement, Leeds and Huddersfield Stations

Portfolio level reviews

Network Rail reviewed both its own delivery capability as well as its supply chain capability together with the related risks. The conclusions from the reviews provided additional information to develop Network Rail's view on the overall deliverability of the enhancements portfolio. The specific areas reviewed included:

- Human Resources – Capacity and capability risks
- Resource capability (including engineering access) - key resource requirements within the business and our supply chain partners
- Signalling – current and future capabilities for specialist signalling resources
- Planning Consents – Transport and Works Act (TWA), planning permissions, network & station change, safety & environment, legal, specialist engineering, heritage protection legislation
- Engineering Risk – technical engineering risks
- QSRA/QCRA Modelling – modelling of schedule risks (Quantitative Schedule Risk Assessments) and cost risks (Quantitative Cost Risk Assessments)
- Cost Assurance – commercial assurance framework for overall project costs
- Commercial Strategy – contracting arrangements and supporting commercial mechanisms to address third-party delivery and cost management risks.

Prioritisation of the enhancement portfolio

Network Rail has worked with the DfT to review the business cases for the investment programme. A consideration of value for money (VfM) was firmly embedded into the assessments for the Hendy Review. An early step was to update the VfM assessment for all projects in the portfolio based on the latest costs emerging from the deliverability review. This update was developed in close collaboration with DfT. The process used reflects the Government's latest appraisal guidance and also Network Rail's most recent cost forecasts. However, this analysis only addresses whether these schemes are still appropriate to progress by effectively reconsidering the original 'do or not do' decision taken some years ago.

The review then considered whether projects should proceed now or could be completed at a later date. Many of the important factors for this assessment are not reflected in the updated VfM analysis. For example, since the original decision was taken, rolling stock and train service outputs may have been contracted, some of the infrastructure costs may be sunk (or committed to), or the base case against which the scheme was originally appraised may no longer be a choice that is available to industry.

Network Rail has worked with DfT to understand the potential impacts of the factors such as franchising agreements and rolling stock contracts and these extra factors, where relevant, have been considered in a qualitative manner. Network Rail has also considered the impact of sunk infrastructure costs on each projects. These additional factors have had a significant impact in determining the relative priorities of the projects, as has deliverability and delivery slippage.

These assessments have informed internal and external discussions on the funding requirements for CP5. Key industry stakeholders were engaged and able to input into the prioritisation process through a series of route specific consultations during August and early September 2015 as well as reviews by the Planning Oversight Group of the Rail Delivery Group.

What was learned from the project reviews?

It is important to understand that many things are going well. In the first year of CP5 Network Rail delivered over £5 billion of infrastructure improvements. It has also transformed Birmingham New Street Station, revitalised Manchester Victoria, opened Borders Railway and completed the link from the new Oxford Parkway to Bicester and London Marylebone as part of East West Rail Phase 1. Work also continues on the Thameslink and Crossrail programmes in London.

Project reviews were undertaken with the project sponsor and delivery team. These involved a detailed forensic analysis to determine a project's ability to deliver its aims and objectives on time, within budget and to the required safety and quality standards. This resulted in an overall rating for each project. As projects develop through their life cycle (GRIP), the rating/status improves as risks are mitigated and removed. Within rail infrastructure projects confidence levels are generally lower until such time that consents, access, approvals and the design is sufficiently agreed to enable greater confidence in deliverability.

Separately, the Great Western Electrification Project has undergone a detailed re-assessment and replanning as part of this review. Revised dates have been established for the electrification of each route section based on more conservative assumptions about production rates. Further work will be required across the industry to re-plan the wider industry programme based on these new infrastructure dates, including incorporating operational activities such as train driver training.

We will include a summary of the outcomes of these reviews for each project with the draft update of the Enhancement Delivery Plan entries when it is published early in December. This will summarise the key issues identified in the initial review of projects in August 2015 and the activities being taken to address them.

What was learned from the portfolio level reviews?

In addition to reviewing the individual projects, reviews were also carried out in eight key areas that affect all projects in the portfolio.

Functional review	Network Rail findings	Nichols findings	Action Plans
Human Resources – Overall capacity and capability of our people	Capacity and capability risks are manageable with existing action plans. Agility and ability to move Network Rail owned resource is challenging.	Gaps identified in Infrastructure Projects capacity and capability including lack of assurance that all staff have the competence for their role.	Regular review by Infrastructure Projects leadership team. Continue implementation of existing action plans that have been developed over the last two years.
Signalling – Critical signalling resource in each signalling project	Integrated view of overall resource in place together with change control, identification of conflicting plans and re planning process. Signal testers' capacity is planned to double and data designers' utilisation will be optimised.	Consolidated planning guidelines and work bank prioritisation process must be followed along with meaningful, risked schedule information. The Critical Resource analysis at Portfolio Level is based on the June 2015 Delivery Plan and needs re-validating against the revised Delivery Plan.	Continue to develop signal-testing capacity in line with plans. Continue to optimise the use of critical resources at times of peak demand by applying agreed processes including the use of a detailed commissioning diary which covers signalling resources at a national level.
Resource Capability – Key engineering resource capacity and engineering access arrangements	Key resources will become stretched during peak demand. This will be resolved through regular reviews to identify conflicting resource plans to prioritise available resources.	Consolidated Planning Guidelines and Work Bank Prioritisation Process must be followed along with meaningful, risked schedule information. The information from projects to enable checks of access clashes in 2017/2018 is not currently in the model and needs re-validating against the revised Delivery Plan.	Covered by existing processes which were put in place through the Delivering Work Within Possessions Process (DWWPP).These include Integrated Planning and critical resource de-confliction reviews. Actions are also in place to extend the lock down of engineering access to the railway network subject to TOC / FOC co-operation.
Consents – Management by project teams of planning consents	There are different levels of detail recorded in each project on the approach to managing the planning consents.	Individual projects appear to have a full understanding of issues, but to date there has not been a portfolio wide, real-time understanding.	Establish a centralised consents register linked to QSRA process to ensure project plans are suitable, including impact on delivery schedule and cost. Ensure that delivery plan assumptions for significant planning consents that are outside Network Rail's direct control are clearly stated.
Engineering – Approach to systematic capture and management of risks	Technical risks identified considered manageable. Risks affecting deliverability were: a) insufficient competent engineering resources; b) inadequately defined scope at GRIP 3; c) late changes to engineering scope.	Network Rail report is based upon individual project risks but does not explicitly consider portfolio wide risk or mitigations. No explicit Portfolio Cost Adjustment for Portfolio Wide Risks has been included in the CP5 Portfolio Cost Plan.	No further action considered necessary as engineering / technical risks are being managed by the individual programmes. Appointment of National Infrastructure Projects Engineering Director and alignment of Network Rail 'in-house' design to this new function.
Cost Assurance – Ensure cost estimates and within appropriate tolerances	Cost estimating processes are adhered to across projects, Cost of Work Done and Cost Forecasts are robustly prepared each period. Issues include improving effective change control through Contract Variations.	Report states that project AFC preparation is generally compliant with Network Rail practice but does not provide a portfolio view of fully risked AFC cost profiles.	Improve and reinforce the Central Estimating Department to ensure national compliance and consistency.
QSRA/QCRA Modelling – Quality and content	QSRAs support the amended delivery dates in the revised plans. QCRAs support revised estimates albeit a full 'monte carlo' simulation to determine a full P80 cost has not been undertaken in all circumstances.	The analysis of P80 cost estimates is consistent with the agreed methodology, which is sound, However, the underpinning information can be improved which would improve the quality of P80 estimates.	QSRAs and QCRAs will continue to be reviewed and updated as part of the Enterprise Risk & Value Management framework in Network Rail covering delivery of all major projects and programmes of work.
Commercial Strategy	Published in May 2013 following consultation with the market. Updated via regular forums including the Commercial Directors Forum.'	The report does not address supplier incentivisation early in the GRIP process. Ensure attention to relationships to retain flexibility without challenge.	Continue regular dialogue and engagement with the market including Supplier Account Meetings and the Commercial Directors Forum.

What is the outcome of the Hendy Review?

Network Rail will continue to deliver a significant enhancement programme during the period to 2019. Almost all of the originally planned projects will still be delivered in CP5 with significant benefits for passengers and freight users.

The benefits and scope of each programme will be included in the draft update of the Enhancement Delivery Plan to be published in early December. This includes a description of the scope, outputs, assumptions and risks relating to each programme, reflecting the impact of revised cost forecasts and delivery milestones. The output of the review has an increased level of certainty of delivery to schedule and cost. The principal revisions to the plan are driven by:

- Adjustments to the timings of projects to provide more probable timescales and to include contingency periods
- A re-profiling of costs to match timing adjustments
- Revision of overall project cost forecasts to provide a consistent approach to contingency allocations for uncertainties risks.

Revising the enhancement plan

Enhancement projects, which were at early stages of development at the time of the Final Determination, have matured since the start of CP5. For some projects, the requirements and scope continue to emerge and are still in the early development stages. Most notable examples are Transpennine and East West Rail Phase 2. It is not unusual for complex infrastructure projects to face significant challenges in the early stages of planning as solutions are developed and put in place; this is recognised by the Government's Major Projects Authority which oversees public sector projects.

The deliverability review of the enhancements portfolio has identified that the majority of the portfolio can be delivered in CP5. In some cases, projects have replanned their delivery milestones either within CP5 or, in a limited number of cases, into CP6. However, the overall enhancements portfolio is not affordable within the available funding in CP5. Network Rail and DfT have therefore worked together, using the results of its updated VfM analysis to understand the impact of completing schemes in CP6, to further prioritise the enhancements that will be delivered in CP5.

Separately DfT is reiterating its commitment to provide the agreed contribution directly to the Welsh Government for the Welsh Valleys Electrification Programme. Following the announcement to unpause Transpennine Electrification, we have included an assumed expenditure level for initial delivery of electrification in CP5 following completion of development in 2017.

All of the schemes in the ring fenced funds will go ahead in CP5 or CP6.

The following table illustrates the extent to which each enhancement programme will be delivered within CP5 or completed in CP6.

Projects to be delivered in CP5

- Anglia Traction Power Supply Upgrade
- West Anglia Main Line Capacity Increase
- Kings Lynn to Cambridge - 8 Car
- Lostock Junction to Wigan North Western Electrification (GRIP 3 development)
- Gospel Oak to Barking Electrification
- Stations Commercial Project Facility 2 (SCPF2)
- Cambridge North Station
- Tram Train Pilot
- Crossrail Programme
- Reading Station Area Redevelopment
- East West Rail Phase 1
- Thameslink Programme
- North of England Programmes, North West Electrification
- North of England Programmes including Northern Hub
- Mobile Maintenance System
- Station Security
- FTN/GSM-R inclusion of freight-only branch lines
- MML Programme – Capability (Long Distance High Speed Train Lengthening Phase 1)"
- St Pancras – Sheffield Line Speed Improvement
- Derby Station Area Remodelling
- Kenilworth Station Stage 1
- MML Programme – Capacity (Kettering to Corby)
- Market Harborough Line Speed Improvement
- Sussex Traction Power Supply Upgrade
- Thames Valley Electric Multiple Unit Capability Works
- West of England Diesel Multiple Unit Capability Works
- Kettering Stabling Facilities (Depot and Stabling and Ancillary Works funded)
- Level Crossing Risk Reduction Fund
- HS2 Development
- New Stations Fund
- CP4 Station Commercial Project Facility (SCPF) – Completed
- LSE Weather Resilience Fund
- Western Route Flood Resilience
- Oxenholme to Windermere Electrification (GRIP 3 development)
- Kent Traction Power Supply Upgrade
- Route 1 – Power Supply Enhancements
- East Kent Resignalling Phase 2 Enhancements
- New Cross Grid
- Package 4: Gravesend Train Lengthening
- IEP – East Coast Capability
- IEP – East Coast Power Supply Upgrade
- Gordon Hill Turnback
- Stafford Area Improvement Scheme
- West Coast Power Supply Upgrade
- Birmingham New Street Gateway
- Walsall to Rugeley Trent Valley Electrification
- Chiltern Main Line Train Lengthening
- North West Train Lengthening
- Bromsgrove Electrification
- Redditch Branch Enhancement
- Balcombe to Copyhold Bi-directional Signalling Upgrade
- Uckfield Line Train Lengthening
- Redhill Additional Platform
- Great Western Electrification Programme
  - Maidenhead to Didcot
  - Didcot to Wootton Bassett Junction
  - Reading to Newbury
  - Wootton Bassett Junction to Bristol Parkway
  - Bristol Parkway to Cardiff
  - Wootton Bassett Junction to Bristol Temple Meads
  - Didcot to Oxford
  - Filton Bank
- IEP – Western Capability
- IEP – Specific GWML Capacity Projects
- Swindon to Kemble Redoubling
- Western Route: Access To Assets
- Westerleigh Junction to Barnt Green Line Speed Improvement
- Dr Days to Filton Abbey Wood Capacity Improvements
- Thames Valley Branch Lines (excludes Maidenhead to Bourne End and Marlow Branch Lines)
- Bristol Temple Meads Passenger Capacity
- Barry – Cardiff Queen Street Corridor
- Wessex Capacity Improvement Programme – Phase 1
- Reading, Ascot to London Waterloo Train Lengthening
- Wessex Traction Power Supply Upgrade
- Package 7, 10 Car South Western Suburban Railway
- Wessex ASDO
- Wessex DC Regeneration
- Wessex Route 3 – Power Supply Enhancements
- Cornwall Capacity Enabling Scheme
- Oxford Corridor Capacity Improvements – Phase 1

Projects to be developed and delivered in CP6

- Ely North Junction Capacity Improvement
- Electric Spine Development Programme
- Development Fund for Future Control Periods
- Ely to Soham Doubling
- Stevenage Turnback

Projects with significant delivery in CP5 and completion in CP6

- Stations – Access for All (AfA) CP5 Additional Schemes
- MML Programme – Electrification Phase 1 (Bedford to Kettering/Corby)
- MML Programme – Capacity (Bedford to Kettering)
- National Stations Improvement Programme (NSIP)
- Stations – Access for All (AfA)
- Strategic Freight Network (SFN) Fund
- Passenger Journey Improvement Fund (PJIF)
- Depots and Stabling Fund
- Gatwick Airport Station Development
- Transpennine Route Upgrade - Intermediate Interventions
- ECML Traction Power Supply Upgrade
- Network Rail Discretionary Fund (NRDF)
- East West Rail Phase 2 (subject to design work, delivery will be started as soon as possible)
- European Train Control System (ETCS) Cab Fitment Fund
- European Train Control System (ETCS) Infrastructure
- East Coast Connectivity Fund

Projects being developed in CP5 and delivered in CP6

- Great Eastern Main Line Capacity Improvement (Bow Junction)
- Oxford to Bletchley Electrification
- Acton (GWML) to Willesden (WCML) Electrification
- MML Programme – Capability (Long Distance High Speed Train Lengthening Phase 2)
- Southcote Junction to Basingstoke Electrification
- MML Programme – Electrification Phase 2 (Kettering to Nottingham and Sheffield via Derby)
- MML Programme – Capacity (Leicester Area)
- Innovation Fund
- Strategic Research and Development Fund
- Syston to Stoke Gauge Enhancement
- Oxford Corridor Capacity Improvements – Phase 2
- Transpennine Route Upgrade
- South Wales Main Line Electrification – Cardiff to Swansea
- Reading Independent Feeder (Bramley)
- Western Rail Link to Heathrow
- Wessex Capacity Improvement Programme – Phase 2
- South London HV Grid (Wimbledon) Upgrade
- London Victoria Station Capacity Improvements

The overall cost of the revised plan

The table below shows the current forecast for the enhancements portfolio in CP5 and compares that to the funding allocated for each category in the Final Determination.

£bn (cash prices)	Final determination	Latest forecast	Variance
Thameslink & Crossrail	3.4	3.8	0.4
Ring-fenced funds	1.3	1.0	(0.3)
Electrification schemes	3.2	5.5	2.3
Other committed schemes	2.2	2.4	0.2
Other named schemes & CP4 rollover	0.8	0.8	–
HLOS capacity metric schemes	0.8	0.8	–
Other	1.1	1.0	(0.1)
Total	**12.8**	**15.3**	**2.5**

This highlights that the biggest increases in forecast costs have been in the electrification programmes. There have also been increases in the cost forecasts for the Thameslink programme as it reaches completion. The other principal increase in forecast costs relates to the Northern programme (which is included within other committed schemes).

Portfolio cost adjustments

All projects in the enhancements portfolio carry levels of risk and uncertainty. As the projects progress, the range of uncertainty decreases and the specific drivers of risk become more evident. Examples of these drivers can include planning decisions, finalisation of scope and assumptions.

For Enhancement projects, pricing between funders (primarily DfT) and Network Rail has traditionally been at a level that gives an 80 per cent chance of the project cost coming in at the quoted price or lower, this being referred to the P80 value. It is also the level which ORR has approved funding for this and previous periodic reviews and for ECAM. Network Rail proposes to continue to price and agree projects at this level.

As part of the deliverability review the level of contingency provided on programmes was also re-assessed. The overall process is a well-established methodology in establishing the price and schedule of long-term capital programmes. The key components of the findings of the review have led to a number of portfolio level assumptions resulting in a net reduction of just under £400 million. Key issues were:

- Value Engineering**.** Given the constrained funding, it has been assumed that Network Rail can identify savings that will reduce the initial cost but are likely to increase long-term running costs. It will need to agree specific decisions with DfT as they are developed
- Undervalued risk. There was a systemic undervaluing of risk included in the individual cost estimates caused by a natural optimism bias by project managers. Portfolio adjustments have therefore been made to the expected CP5 expenditure levels
- Alternate Risk Evaluation Model. During this review, a revised modelling technique, Cause Association Modelling (CAM), has been applied to better reflect actual experience of risk. This results in an increase in contingency
- Unplanned slippage. The programmes are dependent on a number of enablers that are outside of Network Rail's direct control, including planning decisions and access constraints. Its ability to recover lost time if programmes fall behind schedule can be significantly constrained, particularly where work can only be completed at Christmas and Easter. An assumption has therefore been made that there will be overall slippage equivalent to the amount Network Rail expects to spend in ten weeks of the five year control period.

Impact on CP6

This review has identified a number of projects that are not deliverable in CP5. In addition, there will be significant scope emerging for work currently in early development. In addition, as a result of this review, some schemes will now be completed in CP6. Network Rail will therefore include significant levels of enhancement expenditure in its longer term plans for CP6.

What are the key assumptions underpinning the revised plan?

Every project in the review is underpinned by a number of assumptions, which allow projects to proceed even when there are significant 'unknowns' at the time of starting work and they provide a base from which plans can be made and work can continue. If over time the assumptions are proven to be incorrect, then plans must be adjusted and sometimes rework is required. This may result in schedule delays or increased cost.

Rolling stock specification including depots and stabling

DfT is accountable for the specification of rolling stock which is a critical pre-requisite to the design of infrastructure. There are a number of projects where the specification of rolling stock is not yet finalised so assumptions have been agreed jointly with DfT.

This presents a risk that the final specification will differ from the agreed assumptions and that the infrastructure design will require rework to accommodate any differences. The specification of the rolling stock also has an impact on the provision of depots and stabling for maintenance facilities and overnight parking.

Availability of signalling skills

There is limited availability of specific signalling resources, in particular testers and data designers, both of which are highly skilled specialists. Network Rail makes best use of this limited resource by planning work to avoid conflict in demand and by working closely with the supply chain to increase availability. Nonetheless, this remains an area that poses risk to a number of projects and needs careful monitoring and management.

Planning consents

Many projects require planning permission. This can range from local authority planning permission through to full Transport and Works Act approval. When scheduling projects assumptions are made about when consents will be granted, but in reality timescales can vary considerably. This is particularly the case where objections are raised by members of the public, national or local organisations. As a result, construction can be delayed by months or even years in extreme cases. The case study on Aristotle Lane is a good example.

Electrification

Electrification of existing lines brings its own set of particular challenges and design assumptions need to be made for subsequent delivery stages. The Great Western Electrification case study provides an example of the issues faced. There is also an issue in some locations where it may not be economically or practically viable to meet normal European standards on electrical clearance. In these cases a risk assessment is carried out and subject to the result an assumption will be made that a timely exemption can be obtained from the relevant standards authority.

Franchise award

Where a project is underway on a route that is subject to a franchise bidding process, there can be changes required to the infrastructure in order to accommodate the requirements of the franchise process. These requirements can be for new infrastructure or for changes to existing infrastructure. If these changes are identified when the project is in the latter stages of design or even in delivery this can have significant impact on project schedules and cost whilst simultaneously introducing additional risk. Therefore, projects may make an assumption that current or future franchise competitions do not introduce new requirements.

New product approval

Some projects will require innovation in new technical solutions. New technologies need to go through a rigorous process to ensure they are safe and capable of delivering what is needed. The time needed to do this is built into the plans but as with anything new progress can be unpredictable and require more time than anticipated.

The following table illustrates how these assumptions impact some of our projects.

Project	Rolling stock	Depots & stabling	Signalling resource	Planning consents	Elec'n	Franchise award	New product approval
Great Western Electrification			✖	✖	✖	✖	✖
Midland Mainline Electrification	✖		✖		✖	✖	
Northern Programmes		✖		✖	✖	✖	✖
East West Rail Phase 2	✖			✖	✖		
East West Rail Phase 1				✖			
Transpennine Route Upgrade Electrification					✖	✖	
East Coast Connectivity				✖			
Tram Train Pilot							✖
Reading, Ascot to London Waterloo train lengthening				✖	✖	✖	
West Anglia Main Line Capacity Increase				✖			

Case study – Aristotle Lane, Oxford

Network Rail planned to install a replacement footbridge over the Oxford to Banbury Line north of Oxford Station and close an adjacent private level crossing for safety reasons. People walking from a nearby car park, across some allotments to the other side of the tracks, used the level crossing. The new bridge will have a link to the allotments removing the need for people to cross the tracks.

The level crossing is not a public right of way and the rights to use it are owned by Oxford City Council. As part of the East West Rail (phase 1) improvement scheme, Chiltern Railways made an application in 2009 to close the level crossing as part of a wider project to upgrade the railway line.

Objections from allotment holders at the Public Inquiry meant that the approval was not granted. This meant that Network Rail needed to pursue a separate planning application in order to complete the work and deliver Marylebone to Oxford services.

Efforts to close the crossing and deliver the scheme continued. Meetings were held in 2012 between Network Rail, ORR and the Council to find a solution. Finally, in 2014 the principle to close this one level crossing was granted, but with the conditions that Network Rail had to fund and construct better access to the allotments, arrange a land swap so the local school could be expanded and to fund and build a new car park. All of these require further, and separate, planning permissions.

A planning application was submitted in May 2014 and approved a year later after three separate planning committee presentations. Construction of the bridge is now planned to start in January 2016 with completion in September 2016. The level crossing will then be closed seven years after the first application.

Case Study – Great Western Electrification

The Great Western Electrification programme will electrify the main line from Maidenhead to Wales and will deliver faster and smoother journeys to passengers as well as being more environmentally friendly.

The project requires extensive work to be carried out on the signalling system along the route to allow for the safe movement of trains following electrification. The signalling also needs to be protected from interference of the high-voltage electricity which is used to power the trains. This signalling work is usually undertaken prior to electrification.

There has been an acknowledged shortage of suitably skilled people available in the supply chain to undertake the necessary signalling work along this route as they are undertaking many other signalling renewals around the UK. In order to maintain momentum and not cause delays to the programme, Network Rail took the decision to change the sequence of construction and to start piling (the digging of holes) in preparation for the gantries that will hold the electric wires before carrying out the signalling works.

The signalling system on the Western Mainline was buried beneath the ballast in the 1970s to prevent it being stolen or vandalised. There were no accurate maps of where the signalling cables were buried. This means that the location of the cables was uncertain. As our contractors started mechanical piling, on two occasions buried cables were hit. These cables were cut, resulting in significant costs being incurred and unacceptable disruption being caused to passengers. To avoid this happening again, a new practice has been introduced whereby trial holes are dug by hand to locate the cable to make sure that piling will not impact the operational railway.

There are over 16,000 piles to be installed throughout this route. This additional work adds significant delay and cost to the electrification of Great Western.

What are the key risks to delivery of the plan?

Risk Management is a critical part of making sure that Network Rail delivers against its revised commitments. The updated Enhancement Delivery Plans to be published in early December will identify the key assumptions which underpin the individual projects in the portfolio. This section of the report draws out significant areas of risk that must be managed to ensure successful delivery.

Not all of these risks are in Network Rail's direct control. Some rely on external events or influences whilst others rely on co-operation from the broader industry. DfT in particular have a part to play in ensuring that portfolio level risks can be managed effectively.

The CP5 enhancement programme has been subject to a rigorous deliverability review and a number of themes have emerged which should be considered as underpinning assumptions which present significant risk to the industry and its ability to realise the passenger and freight benefits which are underpinned by the Network Rail portfolio of infrastructure works. These risks are identified and managed by Network Rail even though they are outside Network Rail's direct control.

Planning permission and consents

A number of programmes still need to obtain formal planning permission or consents from local authorities, English Heritage, Natural England and other bodies. The timescales for these processes are uncertain so there is a risk that this could impact the delivery dates for programmes that require approvals. This includes Transport and Work Act consents where previous experience shows can significantly affect project schedules. These consents are not in the control of Network Rail. More specific guidance is being developed on the approach for developing planning assumptions for the time and cost of planning consents.

Engineering access

Engineering access to the railway so that we can deliver the planned work is critical. The plan assumes that Network Rail will continue to work effectively with train operators to ensure that sufficient access is provided to safely enhance the railway.

Expertise

It is critical that Network Rail continues to attract and retain highly experienced people, who are in demand globally, to develop and deliver this major investment programme. There is therefore a major focus on recruitment and retention for programmes in delivery, which needs to take into account the likely increase in demand for infrastructure expertise in high speed rail, highways, power generation, nuclear and other utilities such as water and the National Grid as the plans to transform UK infrastructure are implemented. In addition, poor weather, including severe storms and flooding can adversely affect delivery of project schedules and costs.

How will additional costs be funded?

Network Rail has reviewed the core business plan to assess the accuracy of its forecasts and to identify options for reducing the overall borrowing requirements. In updating the business plan, Network Rail has sought to balance:

- the level of renewals activity required to manage the network safely and sustainably
- the extent to which it can deliver the full enhancement programme (recognising that this cannot be financed through additional borrowing)
- the future affordable pipeline of enhancements
- the headroom to the borrowing limit to enable ongoing management of further risks
- the extent to which it can raise capital by selling assets to fund the enhancement programme while recognising that the resulting income loss will increase the level of funding required in future control periods.

It has concluded that it can manage its core business within the borrowing limit that has been set for CP5. The principal change to achieve this will be a reduction in renewals activity, which Network Rail considers can be managed safely and does not go so far as to create a backlog that cannot be caught up in subsequent control periods. There will be an increase in renewals expenditure in CP6, particularly relating to structures and earthworks assets. While this change partially offsets increases in the rest of the core plan, the buffer between Network Rail's forecast debt requirement and the borrowing limit is now small. There is further work required to complete the update of the core business plan, which includes agreeing the regulatory treatment of updated train performance forecasts with ORR.

To fund the increased enhancement expenditure, Network Rail will address the funding shortfall by asset divestment totalling around £1.8 billion through divestment of non-core assets. This includes considering options for the sale of property assets (including retail units in managed stations and the commercial estate), spare capacity on the telecoms network and non-core rail assets such as depots.

Network Rail will work with DfT to assess the overall value for money of asset sales. More detailed plans are being developed for each asset disposal. There is some uncertainty over the timing of each transaction. There is also further work to do on the accounting treatment and its impact on the Government's accounts. Network Rail has therefore agreed with the Government to include a level of proceeds from sales that it considers realistic given these uncertainties. Work continues with the Government to determine the appropriate structure for each transaction.

While Network Rail and DfT consider it is right to sell assets to fund enhancements, there are clearly implications for the future funding of the railway. Less income from property means more will have to come from elsewhere. Given the importance to passengers and the wider economy of the enhancement programme, the overall conclusion is that this plan represents the best balance in delivering value for money.

In addition to the asset sales, DfT has agreed to increase Network Rail's borrowing limit by £700 million to provide further funding for the enhancement programme.

What are the next steps?

There is a significant amount of further work required to make the changes to enhancements programme, deliver the asset sales programme and to improve Network Rail and the Government's approach to future management of enhancements. Some of the further work that is being carried out is outlined below.

Resetting the baseline for CP5

This review proposes a new baseline for what Network Rail commits to deliver in CP5. This commitment is regulated by ORR.

The draft update of the Enhancement Delivery Plans will contain full details of the individual projects that form the revised CP5 enhancements baseline. These draft project sheets will together form the basis of a revised CP5 Enhancements Delivery Plan which is a document used by ORR to hold Network Rail to account, and by Network Rail's customers and funders, to gain visibility of the plans.

The changes to the business plan will need to be reflected in our CP5 Enhancements Delivery Plan subject to agreement with ORR through the formal change control process. The draft updated EDP entries will be published in early December. Alongside this, DfT will carry out a consultation with stakeholders on the updated plan. An update of the overall Delivery Plan will also be published in March 2016.

Network Rail will also need to obtain ORR's agreement to the updated cost forecasts for enhancements through the ECAM process, which is the process by which ORR resets the enhancement cost assumptions included in its final determination for CP5. This will need to include adjustments for some programmes that have already been through the ECAM process.

Funding future enhancements

Consistent with the recommendations in the Bowe report, ORR, DfT and Network Rail will also consider a new approach to funding enhancement programmes to ensure that commitments are not made until the cost and scope of programmes is sufficiently well developed.

Improving performance and capability

Network Rail has an improvement programme to improve its capability across the whole organisation to provide increased confidence in its ability to deliver. Given the size and complexity of our business, it also needs highly capable leaders. They are generally being recruited from the private sector, as this is where relevant skills and experience can be found. Network Rail will also need to recruit enough people on appropriate private sector salary levels so that it can develop the strong senior management capability that is needed to deliver the required improvements.

For enhancements, the Bowe Review has been undertaken to understand what could have been done better in the run up to and early months of CP5. Further key improvement areas have been identified within Network Rail both in internal working practices and in the way it works with DfT and the broader rail industry. These are being addressed through a number of initiatives, some of which are specific to enhancements and some which address the business overall.

It is recognised that the industry as a whole has faced various challenges, cost increases and delays in the development and delivery of major enhancement programmes during CP5, especially with regard to electrification projects. Network Rail has identified specific areas of improvement targeted at how it costs, delivers and manages enhancements projects and programmes. The Enhancements Improvement Programme has been established to deliver improvements in the following areas:

- Improve safety by designing safety considerations in from the start of our planning and project lifecycle
- Develop industry integration in the planning, delivery and governance of the enhancements projects and portfolio
- Support industry's senior and executive management in their decision making through the provision of timely and accurate information
- Improve the clarity and quality of the industry process between Network Rail and project funders, ideally targeted not earlier than at completion of project GRIP 3 stage, and following more rigorous early stage definition, cost estimating and independent assurance, while also aiming for a minimum of public commitments on project scope, schedule and cost until this final investment decision milestone has been reached
- Strengthen capability of the sponsor community

- Improve how Network Rail define, develop and cost work in strategic planning & early development stages
- Improve project assurance at key stage gates, by more rigorous and consistent application of the existing GRIP framework, improved first line stage-gate assurance and more robust independent peer reviews
- Achieve greater pricing consistency across the portfolio by improving working practices for estimating, risk management and whole life costing;
- Improve delivery capability by better understanding and developing the capacity and performance of the supply chain, and by implementing a plan to improve the recruitment, development and retention of Network Rail's internal resource.

The Enhancements Improvement Programme is more than just a Network Rail programme; it seeks to engage the whole industry at appropriate points and to ensure that working practices recognise our external funders, specifiers, and suppliers together with other participants and stakeholders.

The Enhancements Improvement Programme aims to work across the whole industry, with a different cultural approach to how Network Rail works with others in the industry, by being more formal and transparent about project definition, assurance, budget/scope approval and subsequent change management, supported by appropriate governance and assurance processes more clearly aligned to industry best practice.

Asset sales

Network Rail is developing more detailed plans for each asset disposal. It is working with Government to determine the appropriate structure for each transaction. Delivery of the disposal programme will be dependent on having appropriate governance. A joint programme is therefore being created with Network Rail, DfT, HM Treasury and Shareholder Executive representatives with appropriate delegated authority. Some assets disposal will also require consent from ORR consistent with the network licence conditions on assets disposals. The requirements are currently being reviewed by Network Rail and ORR.